

# **Foresight Exercise on Infectious Diseases in Canada**

## **Future Trends and Emerging Issues**

Prepared by the  
National Collaborating Centre for Infectious Diseases

A Program of the  
International Centre for Infectious Diseases Inc.  
Winnipeg, Manitoba

December 2005

# TABLE OF CONTENTS

Executive Summary	3
Introduction	6
The Foresight Exercise	
Objectives	6
Participants	6
Sponsors	6
The Process	7
The Findings	
Assumptions about the Future	11
Prospective Challenges	13
Commonalities	16
Integration	21
Research Gaps	24
Knowledge Creation, Translation and Commercialization	28
Identification, Diagnosis and Prevention of Infectious Diseases	32
Conclusion	35
Annexes	
Annex 1: Environmental Scan	
Annex 2: Discussion Points and Options for NCC-ID Projects	
Annex 3: Foresight Questionnaire	
Annex 4: Foresight Telephone Interview Summaries	
Annex 5: Foresight Exercise Workshop Discussion Documents	
Annex 6: Contacts Listing	

## EXECUTIVE SUMMARY

The dynamic nature of infectious diseases and their unpredictable effect on human and animal populations presents a constant challenge to scientific researchers and public health specialists. Infectious diseases recognize no borders – the growing pace of international travel, immigration, food imports and global economy further increases the potential for rapidly spreading diseases. Emerging, re-emerging and persisting infectious diseases are enduring and evolving as threats to the health, prosperity, security and social stability of Canadians and all global citizens.

Recognizing the seriousness of this situation in 2005, the Canada's National Collaborating Centre for Infectious Diseases (NCC-ID) initiated a project to look ahead to future conditions and trends. It surveyed a large segment of the Canadian infectious diseases community in a Foresight Exercise to identify key considerations and future needs.

The Foresight Exercise provided the method for a systematic, participatory gathering of anticipatory intelligence for vision-building to inform present-day decision-making and to mobilize coordinated actions with a mid- to long-term horizon.

The result was to present a distillation and organization of thoughts, ideas, and suggestions about the present and future from many participants with differing backgrounds and perspectives. In this case, expert opinion was collected and collated from across Canada, representing the continuum of participants from researcher to front-line public health worker. The information was collected from credible sources and individuals who are considered leaders in their fields and whose opinions should be considered as a "pulse-check" on the status of infectious disease services and research.

Because of the immediacy of current infectious disease threats, this project took place in a much shorter period than the typical Foresight Exercise. The information was collected over a ten week period in the summer months of 2005. The information was compiled through several steps including undertaking an environmental scan, developing discussion documents, generating questionnaires, conducting a telephone survey, and hosting group workshops in several locations.

The workshops were held with selected leaders from across the infectious disease community to further delve into the issues identified by the telephone survey in terms of the trends that might influence infectious diseases research, prevention and treatments.

The Foresight Exercise produced results that reflected themes, areas and issues that were identified by participants as either gaps or changes in emphasis in the research of and response to infectious diseases for the next five years. The recommendations and the implications of implementing proposed changes are included. The recommendations are based on suggestions made by Foresight Exercise participants, as well as those

contained in the background reference and information sources that were consulted (e.g. websites for professional and advocacy groups, submissions to the Naylor Inquiry, Romanow Inquiry and Kirby Commission).

Although the feedback provided during the Foresight Exercise spanned a breadth of issues, many common themes emerged. For example, public health clinicians and individuals delivering infectious disease programs at the front-line or grass roots level want more involvement and input into research agendas. At the same time, many researchers said they need front-line input to ensure that their research is applied to a demonstrated need for information, diagnosis, treatment or prevention.

The findings in this report are grouped into eight categories:

1. Research gaps
2. Knowledge generation, translation and commercialization
3. Identification, diagnosis and prevention of infectious diseases
4. Commonalities
5. Integration
6. Prospective challenges
7. Assumptions about the future
8. Wild cards

Recommendations were numerous and varied, including:

- Canada must have a national strategy to deal with infectious disease;
- A comprehensive surveillance system would be the cornerstone of an infectious disease strategy;
- Infectious diseases cannot be addressed in isolation – social determinants of health that facilitate the emergence and spread of infectious diseases must be addressed as part and parcel;
- A national inventory of experts and expertise is needed to allow for opportunities to identify similar areas of expertise for collaborations and for crisis response;
- The gap between public health and clinical medicine must be bridged;
- Canada's public health professionals require more availability and easier accessibility to educational upgrading;
- Emphasis must be placed on recruitment and training for laboratory professionals;
- Specific research and knowledge gaps must be filled;
- Several aspects in the manner that research is carried-out, organized and funded must be addressed;
- There must be enhancement to several areas of infectious disease identification, diagnosis and prevention to reduce the burden from infectious diseases;
- Many areas of public health activity require integration in some fashion;

- Prospective challenges, such as an influenza pandemic and global climate change must be considered.
- Technological advances must be emphasized and supported: our greatest hopes in addressing infectious diseases lie in our ability to maximize technological interventions.

## Conclusions

Although the information offered by Foresight participants included a spectrum of issues relevant to their current and expected future work and research, many issues were identified as potential “wild cards” worthy of consideration for their potential impact on the threats from infectious diseases. The unpredictability in the evolution of diseases requires flexible responses as diseases are identified through surveillance.

# FORESIGHT EXERCISE ON INFECTIOUS DISEASES IN CANADA: FUTURE TRENDS AND EMERGING ISSUES

## INTRODUCTION

The nature of infectious diseases requires vigilance, early identification and decisive responses. Infectious diseases can be expected to endure as threats to the health, prosperity, security and social stability of Canadians and all global citizens. Emerging infectious diseases will likely originate from densely populated areas of Asia where human populations live in close proximity to dense animal populations. This proximity will continue to provide opportunities for viruses originating in animal populations to cross the species barrier and infect humans.

As well, multiple factors contribute to the re-emergence of infectious diseases such as tuberculosis and malaria. The evolution of infectious agents producing strains that are more virulent and resistant to treatment, increases in the number of people who are immuno-compromised from other conditions such as cancer therapies and HIV/AIDS, antibiotic resistance, host susceptibility, and global travel and immigration continue to impact the re-emergence patterns of infectious diseases.

Also present is the persistent threat from diseases such as HIV and hepatitis. Further complicating the situation is the possibility of the intentional dissemination of infectious agents such as anthrax and small pox as the means to achieve the goals of terrorist organizations.

Thus, the health of Canadians is at risk due to the very nature of infectious diseases. Although the burdens of each disease and the morbidity and mortality vary, all significantly impact the wellness, productivity and quality of life of our citizens.

To respond to the threat inherent in infectious diseases, the National Collaborating Centre for Infectious Diseases (NCC-ID) engaged a large number of Canadian infectious diseases stakeholders in a Foresight Exercise to identify key considerations and change trends for the future of infectious diseases in Canada. The findings are meant to assist government agencies and public health personnel throughout Canada in addressing the nation's most pressing concerns regarding infectious diseases.

# THE FORESIGHT EXERCISE

## OBJECTIVE

A Foresight Exercise is a technique for the systematic, participatory gathering of anticipatory intelligence for vision-building to inform present-day decision-making and to mobilize coordinated actions. It is a valuable early step in any planning process with a mid- to long-term horizon. The findings from the Foresight Exercise on Infectious Diseases in Canada will assist PHAC in identifying areas of action that will ultimately prepare Canada to more effectively respond to current and future infectious diseases outbreaks.

## PARTICIPANTS

Participants in the Foresight Exercise included people along the continuum from researcher to front line worker, from coast to coast, and government and private sector. A wide-spectrum of public health professionals, scientists, academics, advocates, researchers, lab specialists, public health officials, advocates from professional associations, professional institute personnel and front-line health care deliverers offered their time and thoughts to this exercise.

## SPONSORS

The National Collaborating Centre on Infectious Diseases (NCC-ID) was established in April 2005 to build linkages and joint activities across Canada's public health institutions and disciplines.

The NCC-ID operates as a program of the International Centre for Infectious Diseases Inc based in Winnipeg, and works with institutions and public health personnel across the country. It works with five other entities, each concentrating on particular areas of public health in projects that have a focus on knowledge translation to benefit front-line public health practitioners.

The International Centre for Infectious Diseases Inc is a not-for-profit corporation working with Canada's pre-eminent medical researchers and institutions, including universities, government laboratories and innovative health care organizations. It serves as a catalyst for infectious diseases research, training, and new product development.

## THE PROCESS

A Foresight Exercise is a distillation and organization of thoughts, ideas, and suggestions about the present and future that are put forth by many participants from a breadth of backgrounds and perspectives; it is not “pure research” nor is it a confirmation or compilation of scientific or other literature. The information is collected from credible sources and individuals who are considered leaders in their fields and whose valued opinions should be considered as a “pulse-check” on the status of infectious disease services and research.

A Foresight Exercise typically spans six months to three years. Due to the very short timeline for the completion of this exercise, a modest approach to this Foresight Exercise was adopted and information was collected over a two-month period.

For the Foresight Exercise on Infectious Diseases in Canada, information was compiled through several steps and undertakings starting with an initial survey of the infectious diseases landscape in Canada and ending with intense group workshops.

### ***Environmental Scan***

An Environmental Scan was completed to provide a profile of the areas of research into infectious disease that are being conducted in Canada and identify some of the researchers and officials who are leading those efforts or heading research programs and institutions. A draft copy of the Environmental Scan is attached as Annex 1.

### ***Discussion Points Document***

The Discussion Points Document was developed based on information compiled from position papers posted on the websites of advocacy or professional organizations with an interest or mandate related to infectious diseases. Most position papers were submissions in response to the Naylor Inquiry, Romanow Commission or the Kirby Report. Key concepts from these papers served as the basis for discussions to identify and prioritize the projects and activities that could be undertaken by either NCC-ID or the International Centre for Infectious Diseases (ICID). All areas identified in the Discussion Points Document represent an existing gap in the Canadian public health system. A draft copy of the Discussion Points Document is attached as Annex 2.

### ***Questionnaires***

Based on the Discussion Points Document, four questionnaires were developed to solicit feedback about the infectious disease topics and issues people are currently working on and researching, and on the directions they anticipate their work will take in

the future. The questionnaires included a wide variety of topics relating to current and future work research being done by respondents, gaps in areas of infectious disease research and service delivery that will require more emphasis during the next five years, and future technological and informational requirements that will be necessary to assist those who research infectious disease topics or deliver infectious disease services. The questionnaires were administered to a wide-spectrum of public health professionals, scientists, academics and advocates throughout Canada. A copy of one version of the questionnaire is attached as Annex 3.

### ***Telephone Survey***

The questionnaires were administered through a nation-wide telephone survey to a cross-section of researchers, lab specialists, public health officials, advocacy and professional associations, professional institute personnel and front-line health care deliverers. A compilation of the responses to the telephone survey appears as Annex 4.

### ***Infectious Diseases Discussion Documents***

Two documents were developed based on the information that was obtained from the telephone survey. These documents served as reference points and checklists for the ensuing workshops. The *Discussion Points* document was a categorized summary of key points expressed in the telephone questionnaire process. The *Summary of Assumptions about the Future* was a summary of common themes about the future related to infectious diseases. It identified future informational and technological requirements and articulated the gaps that will require greater attention during the next five years. This document included the “greatest gaps” and “wild cards” that survey respondents believed were worthy of consideration. Both documents are attached as Annex 5.

### ***Key Contacts List***

A listing of individuals involved in any aspect of research or delivery of infectious disease services in Canada was initiated. Currently, the draft list contains a listing of researchers, provincial/territorial ministries of health, provincial/territorial health regions or health authorities. This is a living document and as NCC-ID expands its contact base, the list will be expanded. The working copy of the list appears as Annex 6.

### ***Workshops***

Workshops were held with selected leaders from across the infectious disease community to further delve into the issues identified by the telephone survey in terms of the trends that might influence infectious diseases research, prevention and treatments.

Vancouver, Winnipeg and Ottawa were targeted for workshops. Participants spanned the breadth of public health and infectious diseases professionals and included representatives from the Public Health Agency of Canada and the National Microbiology Laboratory.

# THE FINDINGS

This Foresight Exercise produced results that reflected themes, areas and issues that were identified by participants as either gaps or a change in emphasis in the research of and response to infectious diseases for the next five years. General assumptions about the future and common concepts of major issues are presented followed by more detailed descriptions of gaps and corresponding recommendations and the implications of implementation of those recommendations.

## **1. Assumptions about the Future**

Participants in the Foresight Exercise were asked to identify assumptions they were making about the future that would cause them to change or not change the focus of their work. The responses to this question and others related to it were varied, largely related to the source, ie. academic researchers, advocacy and professional organizations, or front-line and program-delivery providers. Still, several common themes about the future related to infectious diseases emerged.

### *Focus of Work/Research Will Stay the Same, But Shift to New Diseases*

Most believe that there will not be a large shift in the focus of their work or research. There will be an evolution in that new diseases will come along that will require immediate attention.

### *Technology Will Drive Shifts in Research, Detection and Diagnosis*

Technology, especially improved diagnostic tools and techniques, will drive changes in the focus of work and research into infectious disease, at the same time creating new opportunities in research which will increase the extent of knowledge about infectious disease processes and host responses. New study tools will be used, such as genomics and proteomics. Technology will continue to produce better assays, and quicker test results. Technology will become more accessible to clinicians and brought to the bedside of patients.

### *Multidisciplinary Approach Will Become More Common*

There will be, must be, increased cooperation among disciplines and between researchers and those who deliver front-line infectious services and programs. The method by which research is undertaken must become more inclusive of other disciplines. Public/private partnerships will be necessary in order to ensure the ultimate goal of protecting society.

### *Skills Shortages and Graying Workforce Will Challenge Canada's Capability*

Skills shortages in infectious diseases fields will be primarily among laboratory and microbiology professions due to both an increased domestic and international demand for these specialized skills and concurrent aging of the current medical and research workforce.

### *Pandemic Preparedness Concerns Will Expand*

An influenza pandemic is inevitable and Canada will have to increase its readiness to respond. Although several pencil plans have been drafted, many have not provided for training and surge capacities that will be needed. As well, preparedness for workplaces has been limited to health care professionals thereby negating that over fifty percent of the population is employed, and that keeping people at work will be essential to maintain economic and social stability.

*Silos Will Be Broken, Networks and Collaborations Will Be Developed*

Silos among agencies, between provincial, federal and municipal governments interfere with the ability of public health to move forward in a collaborative way. Out of necessity, this will, and must, change in the future. Many believe that the Public Health Agency of Canada and the National Collaborating Centre for Infectious Diseases will have significant roles in ensuring this happens.

*Enhancement to Public Health Programs Will Be Required*

There will need to be increased effort and resources allotted to public health and infectious diseases programs generally. Although public health has gained some prominence and awareness since SARS, the resources necessary to adequately respond to the threats posed by infectious diseases have not been made available.

*Social Factors Will Emerge and Become More Significant*

Social factors will need to be addressed in order to more effectively reduce the impact of infectious disease. Health disparities and broadening income gap in Canada will require a broader focus on social determinants of health as primary causes of infectious diseases.

## **2. Prospective Challenges**

Many prospective challenges and potential solutions from infectious diseases exist but their impacts remain elusive at this time.

### *Pandemic Influenza*

Almost all who participated in the Foresight exercise believe that a global influenza pandemic is an inevitability to which Canada is not adequately prepared to respond. Although preparedness activities have intensified at all levels of government in Canada and throughout the world, global preparedness still falls short. While the arrival of an influenza pandemic is uncertain, the economic and social impacts when it does manifest, will be profound. Lack of preparedness will result in the very worst of all possible outcomes. Adequate preparedness could provide the capacity to mitigate and reduce some of that impact.

The use of vaccines and antiviral prophylaxis will not be realities for at least the first wave of an influenza pandemic. Prevention measures will be dependent on mitigations such as hand-washing, surface cleaning and reduced public gatherings. Maintaining the social fabric of Canada will depend on keeping Canadians protected, reassured, calm and working.

During a pandemic, disparities in wealth among global populations will challenge Canada to consider its role as a leader in assisting the developing world, while at the same time ensuring that the health and safety of Canadians is maintained. Mounting concerns about the threat of pandemic influenza will continue to capture the attention of researchers, practitioners and the global community. Although planning on paper has been implemented in every corner of the globe, limited training exercises, resources and materials have been allotted to preparedness efforts.

### *Bioterrorism*

The potential that a bioterrorist attack could occur on Canadian soil was the only area identified in the Foresight Exercise where there were two opposing and polarized beliefs. On one hand many participants believe that Canada's traditional approach to global politics makes the threat of a bioterrorist attack unlikely. The contrasting sentiment is that the potential for irrational people to make irrational decisions and use infectious agents as a threat to the health of Canadians is very real, and that Canada should dramatically enhance its vigilance in this area. In reality, both of these opinions are accurate; Canada does have a reputation as being tolerant but at the same time, we cannot become complacent and rely on our good reputation to provide us with immunity to the irrational decisions of others.

### *Global Immigration and Travel Patterns*

Threats to Canadians from infectious diseases originating in other countries are made real by the extent and rapidity of global travel. Infectious diseases events that occur elsewhere on the globe – even those that do not affect Canadians – will have political and economic implications to the entire globe.

The potential for disruption in global travel and commerce exchange due to infectious diseases will require Canada to respond to the notion of whether to limit travel to and from certain regions of the world, and also to limit immigration from those areas. The implications of these decisions to Canada's open immigration policy, and to the country's role as a global leader in tolerance will resonate into perpetuity.

#### *Global climate change*

The potential effects of in global climate change on infectious disease patterns are an unknown factor that will only be revealed over time.

#### *Trends in Technological Advances*

New study tools such as genomics and proteomics will drive shifts in research into infectious diseases. Detection and diagnosis capabilities through technologies such as molecular diagnostics will be enhanced and results will become available more rapidly. As more is known about innate immune defenses, mitigation strategies will be developed. Increasingly however, costs of research, newly available diagnostic techniques and clinical treatments will require a demonstrated net cost-savings to the health care system. Many new tests are available but are not implemented because of their costs.

Nanotechnology is still an exotic technology that could have profound implications to infectious disease identification and containment.

#### Recommendations

- Facilitate relationships among agencies involved in federal pandemic influenza planning (a potential role for NCC-ID).
- Develop a national media campaign emphasizing prevention techniques required to reduce the contact transmission of influenza.
- Develop Canada's preparedness capacity to deal with bioterrorist or accidental threats from infectious diseases that is based on basic principles, not on a specific disease or threat.
- Take the opportunity to upgrade our ability to respond to a crisis originating from a threat of bioterrorist action.
- Capitalize on research funding opportunities available from US agencies offering incentives should be capitalized upon.
- Consider carefully any decisions to limit global migration and travel to Canada during an infectious disease event, such as an influenza pandemic.

#### Implications

- Easier navigation through provincial, territorial, regional and local boundaries through the arm's-length relationship of the NCC-ID with the PHAC.
- Enhanced ability to respond to threats from infectious agents, regardless of their origin – e.g. bioterrorist or otherwise.

- Upgrades and enhancements to the Canadian public health system and the ability to respond quickly to an urgent infectious disease event.
- Reduced fears of those Canadians who believe that bioterrorist attacks are likely.
- The implications from decisions taken about whether or not to limit global migration and travel to Canada from other areas of the world will be long-lasting.

### **3. Commonalities**

Participants in the Foresight Exercise raised similar issues – but came at them from many different perspectives, largely depending on the nature of their own work, or the affiliation with advocacy or professional groups. Despite their varying backgrounds, they articulated many similar sentiments that they believe are necessary in order to bring about adequate attention to the identification, diagnosis, prevention and treatment of infectious diseases in Canada.

#### *Need for a National Infectious Disease Strategy*

Canada must have a national strategy to deal with infectious diseases that includes a solid and enduring commitment and application of resources to ensure Canadians sustain the lowest possible impact from infectious diseases. The lack of a strategy results in inconsistently available resources are applied to the identification, diagnosis, prevention and treatment of infectious diseases. As a result society may not enjoy the level of good health that it has the potential to obtain.

A national infectious disease strategy is essential in order to sustain the current prominence and attention on infectious diseases that has resulted from events such as SARS in Ontario, BSE in Alberta, E-coli in Walkerton, and Avian Flu in poultry stocks in British Columbia. This momentum and focus may be lost as other public health issues gain prominence. The only way to ensure funding for infectious diseases is not diverted to other health challenges is to have a national strategy that sets out priorities, goals and objectives and that requires accountability through annual status reports on those goals and objectives.

The national strategy would acknowledge the true burden of infectious diseases on Canadians. Various types of diseases such as heart disease and multiple cancers are lumped together and deemed to afflict greater portions of the population and capture research efforts, funding and prevention initiatives. If statistics for infectious diseases were captured in the same manner, infectious diseases would constitute the number one threat to the health of Canadians.

An integrated infectious disease strategy would be multifaceted and include capacities to identify, diagnose, prevent and treat of all types of infectious diseases. It would provide the capacity to address known, unknown and reemerging infectious diseases. The strategy would also emphasize Canada's obligations as a prosperous and influential leader to assist other nations in their struggles against infectious diseases.

A national strategy would appreciate that infectious diseases cannot be addressed in isolation – social determinants of health that facilitate the emergence and spread of infectious diseases must be addressed as part and parcel. The disparate burden of infectious diseases borne by Canada's First Nations population will be acknowledged and remedies for that disparity will be prioritized. The strategy will be cognizant and of federal/provincial/territorial/regional/local roles in managing service delivery for infectious diseases, but also mindful of the need for leadership and coordination at the

federal level. A lobby capacity is needed to ensure infectious diseases remain at the forefront of public and political attention to ensure competing funding and resources are sustained and not diverted to other areas when the “next big thing” emerges.

#### *Need for National Surveillance*

Comprehensive national surveillance systems will be the cornerstone of a Canadian infectious disease strategy. Integrated and linked surveillance systems that capture laboratory and hospital data from multi-levels of data generators and sources of public and chronic health-based data and contextual information are essential components of an integrated infectious diseases strategy. Without the early-warnings that surveillance systems provide, it will not be possible to efficiently identify, diagnose, prevent or treat infectious diseases that affect Canadians. The resistance and discomfort that has arisen due to changes to privacy legislation must be rationalized and incorporated into data collection so that privacy issues do not impede the collection of data and compromise the health of the nation. Comprehensive surveillance will require standardized reporting requirements and incentives for collection and contributions of data by data generators.

#### *Access to Experts and Expert Information*

Although Canada has exceptional intellectual and technical expertise, researchers and experts are dispersed throughout an expansive geography. There is not an inventory of experts who can be called upon for advice and confirmation. Although many use the personal networks and relationships developed during the course of their professional practice, the availability of a national inventory would allow for opportunities to identify similar areas of expertise for collaborations.

#### *Bridging the Gap between Public Health and Clinical Medicine*

Bridging the gap between public health and clinical medicine is critical to a more efficient public health system that is more efficient in the identification, diagnosis, prevention and treatment of infectious diseases. Relationships between these two fields are often polarized because of a perceived (or real) competition over scarce resources. Systems in health care delivery practices often exacerbate this polarization. For example, community health physicians do not have access to laboratory testing and emergency room admission privileges despite the likelihood of their counseling individuals who require immediate treatment for infectious diseases. Similarly, public health does not have a presence in hospital settings.

#### *Educational Requirements to Address Skills Shortages*

Canada’s public health professionals require continual enhancements to and upgrading of their educational qualifications in order to ensure they have the capacity to respond to the challenges infectious diseases present. This accessibility should be the same regardless of province or territory of residence, or urban or rural settings. In reality, those in rural areas have few opportunities as compared to their urban counterparts.

The ability to ensure adequate supply of fully-trained laboratory professionals is already compromised and this trend will continue. Increasingly there will be a lack of availability

and accessibility to training/upgrading opportunities from limited resources or geographic location. Laboratory professionals require decision-making and sound judgment skills that cannot simply be replaced by “new graduates” from colleges and universities. As the current professional population “grays”, insufficient number of replacements will be ready and able to take their places. The trend to reduce the number of middle managers is also contributing to a loss of institutional memories. The fields of microbiology and laboratory technology will be particularly affected.

### Recommendations

Develop an infectious disease strategy that provides on-going commitment to the identification, diagnosis, investigation, prevention and treatment of infectious diseases that affect Canadians. This should be done by PHAC.

The strategy should be the Agency’s commitment to the Canadian public and PHAC should be held accountable for delivering the provisions within the strategy to Canadians.

The strategy should acknowledge and address the affect of other factors such as social determinants and chronic disease on infectious diseases, and provide for these factors in a national strategy.

On an annual basis, the Minister of Health should provide an annual report to Canadians, demonstrating the status of goals articulated in the strategy.

“Real” categorization and quantification of the impact of diseases to the health of Canadians – e.g. heart diseases and cancers of all kinds are “lumped” together and identified as first and second leading challenges to health of Canadians – if infectious diseases were lumped in the same manner, they would rate as number one.

Take a global leadership role in efforts to mitigate the effects of infectious diseases in developing nations.

- Create a national surveillance system that will provide rigorous and robust detection across provincial and territorial boundaries using federal leadership, oversight, resources, and support.
  - Data input from laboratory, clinical and public health settings.
  - Aggressive, comprehensive and inclusive mitigation to deal with the perceived barriers that have been erected due to changes to privacy legislation. This issue must be tackled and rationalized so that data generators and contributors are comfortable with collecting and contributing person-specific data into surveillance systems.
  - System must be developed in such a manner that they can be expanded over time and standardized so they have the capacity to exchange information with other systems.
  - Capacity for active, passive and sentinel surveillance of infectious diseases.
  - Data collected from the continuum of sources – from front-line epidemiological information, vaccine hospital and acute-care data, provincial and private laboratories.

- Ensure a parallel system of surveillance for of animal infectious and zoonotic diseases.
- Develop an inventory of individuals and agencies across Canada with identified areas of infectious disease expertise. These individuals and agencies could be called upon by others to reduce duplication and inefficiencies.
- Establish settings where research and clinical practice can be carried-out in the same place. The model used by the BC Centre for Disease Control where specialists are all under the same roof and interacting with one another on a daily basis has been recommended by many.
- Provide cross-training opportunities through internships in public health, epidemiology for students in undergraduate and graduate students in science faculties.
- Offer fellowships in community microbiology and infectious diseases for medical students.
- Rotate community health officers in infectious diseases areas, including outbreak investigations and contact tracing.
- Re-educate public health professionals about known infectious diseases – many no longer have the basic information for re-emerging diseases that have been successfully dealt with through immunization.
- Develop rapid education provisions that can be deployed for events such as SARS.
- Increase wages/training for laboratory professionals to increase attractiveness of these fields to the right kinds of people – e.g. need decision makers and interpretive skills in these professions.
- Identify ways to improve job satisfaction in health-care in order to retain people in helping professions and meet recruitment shortfalls.
- Address inequities among public health team-members. Some professions are more highly regarded and receive greater remuneration. However, a breadth of skills is needed to address infectious diseases and all team contributions are important and should be recognized as such.
- Address financial inequity between private, public and government professionals.

### Implications

- National leadership, ownership and accountability for acknowledging and addressing the burden of infectious diseases to Canadians.
- Gradual trust and support of the newly-created governmental and arms-length organizations such as PHAC and NCC-ID.
- Bench-marking of goals and objectives for future comparisons of progress made in addressing infectious diseases.
- International respect and influence for Canada
- Intellectual capacity and economic prosperity to take-on a global leadership role in the area of infectious diseases.
- Accurate and comprehensive surveillance information available to inform decision-making based on information that provides a true profile of the population of Canada.

- Decision-making for prevention and mitigation strategies focused and evidence-based information rather than a “best guess.”
- Ability to anticipate outbreaks or epidemics so that preventive interventions can be implemented before cases of infectious diseases occurs.
- Earlier identification of small clusters or single events of infectious diseases that are of particular concern.
- Earlier identification and or warning of “the next big thing.”
- Easier evaluation of mitigation and prevention strategies for infections – what works and what does not work.
- More efficient delivery of health care – prevention strategies can be implemented much earlier and where needed.
- Enhanced ability to respond quickly when something new emerges.
- Objective assessment of interventions during epidemics.
- Easier and more rapid information exchange among individuals and agencies.
- Reduced costs to the system by ensuring availability of the best information and advice from experts.
- Experts to be called upon during times of crisis for input and advice on how to most effectively respond to the issue at hand.
- Greater opportunity for cross-pollination of ideas.
- Familiarization with the value of epidemiology, community health, outbreak investigations and contact tracing with new professionals from various related and even distant fields.
- Professionals comfortable crossing disciplines.

#### **4. Integration**

Many areas were identified that Foresight participants believe require integration in some fashion to achieve more streamlining and efficiency of infectious disease research and service delivery.

##### *Confusion of Roles*

The individual and combined roles of agencies such as PHAC, provincial Ministries of Health, regional health authorities and provincial and private laboratories will persist. The constant churn and reorganization among governmental organizations will contribute significantly to the confusion of users, making it difficult to identify who is “in charge.”

There is significant skepticism about leadership roles during times of crisis and this confusion will continue to be particularly frustrating to Canadians and result in less effective containment and understanding of newly emerging infectious agents. Of most notable concern is how the response to an influenza pandemic will be handled. The manner in which the Ontario public health system responded to the SARS crisis is considered by many to be a “wake-up call that was never answered,” with few of the recommendations of the subsequent Naylor Inquiry being implemented.

There is, at the same time, optimism and skepticism as to whether or not PHAC will emerge as a leader that will bring order and leadership to the pursuit of control and containment of infectious disease in Canada, or whether it will remain a restructuring of Health Canada. Until time has passed and the new PHAC has proven itself as a leader in this area and a credible agency with a mandate separate from Health Canada, there is likely to remain some skepticism among the public health and research communities.

##### *Persisting Silos within Health Care Delivery*

Silos continue to prevent exchange of information between many areas of public health and infectious disease treatment and service delivery. There is a necessity for increased collaboration among public health and infectious disease communities. Gaps that exist between public health and clinical medicine, between community-acquired and hospital acquired infections, public health and emergency room physicians etc. are likely to continue. The perceived or real competition for scarce resources is likely to ensure this trend persists.

##### *Funding Models*

Funding for infectious disease programs is usually targeted to be applied to certain preventive or educational initiatives. Allocation of funding is often reactive to public opinion. Many clinicians and public health professionals involved in front-line service delivery are frustrated that funding is allocated where it is not needed or not significant regionally or locally. West Nile virus was cited as an example in multiple areas of the country. In Vancouver, monies were available for West Nile education programs but not initially available for education and immunization of young gay men becoming infected

with hepatitis B. In Ottawa, funding was again available for West Nile programs but unavailable for other areas of concern.

### *Communication and Liaison*

Good communication with the public is invaluable. It is important to educate and inform the public about infectious diseases and how to prevent them. Failures in communication during crisis events will heighten rather than allay anxiety. Most Canadians obtain their information about infectious diseases through the mass media. There is often a contrast between public perception and the reality of a threat from an infectious disease. Media attention is usually the source of this distortion.

At the present time there is no national capacity to expeditiously transmit vital infectious disease information into all areas of infectious disease research and service delivery.

### *Surge Capacity for Infectious Disease Emergencies*

The ability to respond to a public health emergency requires the ability to rapidly expand beyond normal services to meet the increased demand for qualified personnel, medical care, public health and laboratory services. Without sufficient surge capacity, the threats from public health emergencies such as a particularly virulent strain of an emerging infectious disease or a bioterrorist threat will not be effectively addressed. Unless cross-training and more generalist public health professionals are in positions that they can quickly be re-assigned during times of crisis, it is likely that infectious disease emergencies will not be met as rigorously or as robustly as possible.

For newly emerging diseases that are highly virulent and contagious, identifying those individuals who may have had contact with index cases or other contacts will be paramount. The capacity to quickly and effectively identify and trace contacts will be fundamental to containment of the disease with the smallest possible number of casualties. However, contact tracing remains an area within which few professionals have received training.

### Recommendations

- Provide discretionary funding for infectious disease education and prevention programs.
- Require front-line input into decisions for funding allocations.
- Develop and disseminate information about infectious diseases to the media in an organized and proactive manner.
- Determine how existing technologies can be adapted to provide mechanisms for broad-range communication of messaging during a national infectious disease crisis, e.g. text messaging for cell phones.
- Create a web-based list-service for infectious diseases that individuals from all areas of public health could sign-up for and receive e-mail alerts. The primary model is the WHO weekly epidemiological record.
- Emphasize employing generalist public health professionals.
- Develop training courses for front-line public health professionals and their supervisors/managers.

- Develop training programs and computer programs for outbreak investigation and tracking contact tracing.

### Implications

- Resources applied to the risk factors that are relevant at local and regional levels.
- More efficient use of resources.
- More consistent information disseminated by the media.
- Canadians receive consistent information.
- Ability to reach many public health professionals quickly and efficiently.
- Ability to sound an alarm about infectious diseases of particular concern.
- Lessened disparity between urban/rural information users.
- Public health professionals who have generalist skills easily deployed into other roles when a crisis presents itself.
- Cross-training for public health professionals to make it easier for them to be deployed into other areas of work.
- Enhanced ability for contact tracing to provide better ability for containment.
- Enhanced capacity to deal with an infectious disease crisis.

## **5. Research Gaps**

Participants identified many research gaps and questions that will need to be addressed in order to effectively identify, prevent, diagnose and treat infectious diseases. Important areas include zoonotic and food borne diseases, the link between infectious diseases and chronic diseases, social determinants of health and infectious diseases, persistence of diseases common to Canadians, and antibiotic resistance.

### *Zoonotic and Food Borne Diseases*

Zoonotic infections transmitted from animals to humans and through food and water will increasingly pose threats to the health of Canadians and all global citizens. At present, very little information is available on the magnitude of the risk presented by infectious agents to the food chain and gastrointestinal (GI) diseases of zoonotic origin. Moreover, there is poor understanding of the long-term impacts of GI diseases in terms of premature mortality and chronic outcomes. There is also little acknowledgement or understanding of the costs associated with food borne infections. Many zoonotic diseases that will threaten the health of Canadians will not originate in Canada, but will arise due to agri-practices that provide high levels of inexpensive protein to dense populations in other parts of the world, most notably Asia. Global travel patterns and migration will be the conduits of these diseases into Canada. Lack of sufficient research at the farm makes it impossible to develop effective interventions at the source. The insufficient research and surveillance capacity to identify and quantify the risk means that the burden of these diseases to the health of Canadians will remain high.

### *Links Between Infectious and Chronic Diseases*

The association between infectious and chronic diseases is complex and diverse and is an area that requires an intensified research focus. Although infectious diseases such as the human papilloma virus and hepatitis C virus have been identified as causes of cervical and hepatic cancer respectively, the association between infectious and chronic diseases still remains a largely under-researched area. The impact of providing early treatment for precursor infectious diseases, or preventing them through immunization and thereby reduce the occurrence of chronic diseases and their costs to the health care system, remains relatively unclear.

### *Social Determinants of Health and Infectious Diseases*

Nutrition, access to education, adequate social and financial resources, parenting skills, personal safety and security, pre- and post-natal care, adequate housing, discrimination, stigmatization, racism, and unemployment/underemployment are key determinants of health for Canadians. The negative impact of social determinants of health is borne by lower income groups and those who experience marginalization by society in some other way. Infectious diseases are not represented evenly among the Canadian population; the highest rates of infectious diseases will continue to be borne by Aboriginal populations. Poor quality of housing, substance abuse, illiteracy and inequitable access to health care will have to be addressed in order to reduce the disparate burden of infectious diseases among Aboriginal populations. Unequal access to health care due to widening income gaps is a trend that will continue in Canada and

also on a global level. As well, the discrepancies that exist between access to health care in rural and urban settings will amplify the burden to society. At the global level, relationships between social development and extreme burdens of infectious diseases will continue to trap large populations in poverty and without access to health care. As poverty and infectious diseases are intimately related, developing nations will continue to sustain a disparate global burden of these diseases.

#### *Persistence of Diseases Common to Canadians*

Persistent infectious diseases associated with low mortality but significant morbidity will continue to affect Canadians. Noro-viruses, herpes simplex viruses and annual influenza viruses cause significant time loss from work and other activities. The resultant loss of productivity and increased costs to the medical system continue to affect the Canadian economy and are not likely to be mitigated anytime soon due to the minimal research being undertaken on the prevention of these diseases. Although research in this area is necessary, researchers tend to be more attracted to diseases that are topical and or “exotic.” Unless incentives are developed to encourage research into these more mundane infectious diseases, this is likely to remain an under-researched area.

#### *Antibiotic Resistance*

Antibiotics revolutionized the treatment of infectious diseases during the first part of the 20<sup>th</sup> century; however, resistance to antibiotics due to over-use in both human and animal health and the emergence of newer antibiotic-resistant organisms limits treatment options and presents a significant challenge to Canada’s health care system. Even when strains of diseases resistant to antibiotics are not endemic to Canada, global travel and migration can be the conduits for these strains to enter the country. At the same time, however, little research and development is focused on producing new antimicrobials and little emphasis has been placed on identifying non-antibiotic means of addressing infections. Given the current situation, hospital-acquired infections such as MRSA and community-acquired infections such as tuberculosis will persist and present greater challenges to the health of Canadians and to Canada’s health care system.

#### Recommendations

- Establish surveillance systems dedicated to tracking of infectious diseases resulting from zoonotic infections – most notably enteric pathogens. Possible surveillance model is FoodNet (CDC Food borne Diseases Active Surveillance Network).
- Increase research into interface between human and animal diseases.
- Increase collaborative research and information sharing initiatives between the Canadian Food Inspection Agency and the Public Health Agency of Canada.
- Participate in and support for global research and surveillance activities.
- Create a “slush-fund” for zoonotic research that can be easily accessed during times of crisis that arise due to newly emerging zoonotic diseases.
- Develop better molecular discrimination so that the pathogenic/highly virulent strains posing greatest threats to human health.

- Increase research focusing on the study into links between chronic and infectious diseases, most notably human immunology.
- Increase research into and acknowledgement of the social determinants of health and their impact on the spread and opportunities for the successful control of infectious diseases.
- Incorporate information on social determinants such as employment, income, education, ethnicity, behaviors, geography, and occupation into surveillance systems.
- Access and include contextual information from many disciplines (ex. epidemiology, social science etc.) when developing recommendations for public/social policy.
- Develop public policies that acknowledge and address the interrelation of social determinants of health on infectious diseases.
- Develop and disseminate information on prevention and control of diseases such as noro-viruses, gastrointestinal diseases and herpes simplex viruses.
- Incorporate the surveillance of low-mortality infectious diseases into a national infectious disease surveillance system.
- Encourage research into acknowledging the burden and prevention of persistent common infectious diseases.
- Research the economic impacts of persistent common infectious diseases to the Canadian economy.
- Create a national physician and veterinarian education strategy with a goal to emphasize the importance of appropriate prescription for antimicrobials.
- Incorporate the identification and tracking of antimicrobial resistant strains into a national surveillance system.
- Increase public education about the necessity to contain resistance through appropriate use of antimicrobials.
- Invest in research to develop new vaccines or antimicrobials.
- Create incentives for pharmaceutical companies to participate in this area of research.

### Implications

- Ability to acknowledge and quantify the extent to which zoonotic diseases are impacting Canadians will allow for specific and focused prevention strategies.
- Increased understanding of the epidemiology of food and water borne diseases.
- Better understanding of the origin and most likely settings of these diseases.
- Enhanced global surveillance capabilities contributing to the security to all global citizens.
- Identification, surveillance and elimination of virulent strains of food borne disease from the food chain.
- Reduced burdens of chronic diseases and human suffering and a corresponding savings to the health care system.
- Increased awareness of the connectivity between infectious diseases and social environments resulting in inclusion of these in public/social policies.
- Focus moved from treating only the disease to treating the circumstances that gave rise to the disease.

- Decreased burden of infectious diseases on those who are disadvantaged economically, socially and psychosocially.
- Enhanced prevention of persistent common diseases once their true economic impact on the Canadian economy is identified, understood and acted upon resulting in reduced economic burden on the medical system and increased productivity due to reduced absenteeism from workplaces.
- Engagement of physicians, veterinarians and other health care providers in the effort to combat microbial resistance.
- Research findings that provide alternative mitigation strategies for infection control thereby reducing the dependence on antimicrobials as the only option for infection control.
- Public participation and collaboration in the effort to combat antimicrobial resistance.
- Increased interest by pharmaceutical companies to create public/private partnerships for research into antibiotic resistance.

## **6. Knowledge Creation, Translation and Commercialization**

Issues and gaps inherent in the manner in which research is carried-out and funded were identified as a key issue for infectious diseases stakeholders. As well, issues with the translation and commercialization of knowledge and technologies were identified as important areas of concern for infectious diseases stakeholders.

### *Requirements for Public/Private Partnerships in Vaccine Development*

The financial, intellectual and time investments required for vaccine research make it increasingly necessary to develop strong collaborations to ensure successful vaccine discoveries. Although vaccines may be technologically feasible, down-stream costs such as industrialization capacities to produce required quantities of vaccines and ever increasing regulatory demands are making research and development of vaccines less-attractive ventures to private companies. Vaccines for diseases such as HIV are a tremendous need yet they offer little profitability to pharmaceutical companies.

### *Competitive Nature of Research*

The competitive rather than collaborative environment that exists among the research community still results in duplication of research efforts and competition for funding dollars. Although research funding agencies such as the Canadian Institute for Health Research have taken steps to require more collaborative undertakings, most research environments still reward and encourage individuals to excel as compared to their colleagues and counterparts. The net result has often resulted in a “gang” approach, rather than a collaborative undertaking. It is unlikely that the current environment is going to change in the short-term without radical changes in policy and perspectives, and buy-in from those with a vested interest in the current system. True collaborations among researchers would result in less duplication, less competition for funding dollars and likely provide more expeditious solutions to challenges. Notwithstanding, it will always be important to still provide opportunities for those individuals whose innovation and independence lead them down paths – and into discoveries – not usually followed by others.

### *Commercialization of Discoveries*

Canada is recognized for the quality of its intellectual capacity, research findings and state of the art technical facilities. However, getting research into the market place is often difficult because there is a lack of infrastructure available that could bring these findings to commercialization. The result is that the true extent of societal and economic benefits that could be derived from the transfer of research technology into the private sector is not being realized. Some believe that by not taking stewardship of research discoveries, Canada is losing not only opportunities to achieve a healthier population, but also losing out on significant economic benefits that commercialization could bring. Although the rights to commercialization of research discoveries and intellectual knowledge at the university front are much clearer, they are murky at best when the discovery is the result of work carried-out by government research facilities such as the National Microbiology Laboratory.

### *Knowledge and Technology Transfer*

Advances in technology will drive shifts in research and increase the extent of knowledge about infectious disease processes and host responses. New study tools will be used such as genomics and proteomics, while new and better assays will be produced and the technology of biology will create new tools that can be applied to achieve better public health for Canadians. The greatest challenge will be transferring the fruits of technology from research discoveries to the bedside of Canadians. Consequently, knowledge transfer must become a refined and routine part of research discoveries so that maximum benefit from discoveries can be realized by society. Until there is a group, body, or entity between original research and front-line delivery of public health services that can act as the conduit of research findings into accessible and usable infectious disease interventions for front-line service delivery, it is unlikely that the true potential of research discoveries in the area of infectious diseases will be realized. At the same time, there are not enough conduits to ensure transfer of front-line knowledge into research agendas to ensure that research will be focused on issues that are problematic to the health of Canadians.

### *Knowledge Synthesis*

The complexity and technical nature of research findings related to infectious diseases makes that information inaccessible to many professional and lay people. The voluminous information available on the internet and in the media often renders this information inaccessible merely because of its magnitude. As well, so many sources of information make it difficult for many to decipher what is good and credible information from trustworthy sources.

### Recommendations

- Share the costs and risks involved in vaccine development must be shared among private and public partners.
- Rationalize the regulatory “bars” and “hurdles” that challenge vaccine development.
- Develop and strengthen public-private partnerships to ensure licensing infrastructure is available for promising vaccines.
- Create a system that ensures sufficient industrialization infrastructure and expeditious licensing so that vaccine benefits can be brought to the people who need it most – especially for vaccines with biosecurity implications.
- Organize and target research collaborations so that they answer real questions.
- Identify, provide for and reward truly collaborative research undertakings and promote these as models to demonstrate the benefit of collaborative research efforts.
- Expand access and interface between the clinical domain and original research domain, bringing groups of top-notch scientists and clinical experts together to learn from one another.
- Include incentives for research funding that will bring together colleagues from various research and clinical disciplines and perspectives to foster on-going face to face interaction and exchange of ideas.
- Encourage co-location of researchers from various disciplines and front-line infectious diseases – similar to model of the BC Centre for Disease Control.

- Promote collaborative efforts among research and clinical communities.
- Ensure incentives are still available for individuals to work in isolation.
- Gain advantage from Canada's resources and strengths and develop standardized strategies to commercialize discoveries.
- Provide necessary infrastructure to support commercialization such as clinical trial settings and access to patients.
- Develop guidelines and governance to facilitate opportunities to commercialize government-sponsored research findings.
- Develop an entity for the commercialization of government research findings that is arm's length from government institutions.
- Increase knowledge and technological transfer and utilization of Canada's research discoveries.
- Increase societal benefit from more wide-spread application of research discoveries – contribute to the "greater good."
- Allow financial dividends derived from government-sponsored research findings that could be re-invested to support further research.
- Establish a national capacity to translate and synthesize voluminous information in areas of infectious diseases so that it can be used by both front-line service providers and by the general public.
- Create a web-based clearing-house that provides accessibility to information that has been reviewed and considered to be credible.
- Ensure there is room for differences of opinions and scientific disagreement.

### Implications

- Higher likelihood of vaccine manufacturers staying in the business "for the long-haul."
- Vaccines developed even when there is little marketing incentive (profitability), but where there is a demonstrable societal need.
- Ability to respond quickly when a crisis presents itself.
- Adequate vaccine supply and production.
- Research targeted at real front-line issues to ensure that intervention strategies are developed for real issues.
- Exchange of science and ideas that catalyze the collapse of both research and bureaucracy silos.
- Interface between laboratory research and clinical practice providing opportunities for valuable input, ensuring research and service delivery are mutually inclusive of each other's needs.
- Opportunities for independent and original thinkers to "go their own ways" in pursuit of knowledge.
- Increased knowledge and technological transfer and utilization of Canada's research discoveries.
- Increased societal benefits from more wide-spread application of research discoveries – contribution to the "greater good."
- Financial dividends derived from government-sponsored research findings are re-invested to support further research.

- Availability of trusted sources of information.
- Information presented in a way that is understandable to wider audiences.
- Public and public health professionals provided with options and the opportunities to make their own decisions in light of the differences of opinions that are scientific and professional realities.

## ***7. Identification, Diagnosis and Prevention of Infectious Diseases***

Participants identified many aspects of infectious disease identification, diagnosis and prevention that should be emphasized in order to lessen the threat of and reduce the burden from infectious diseases.

### *Laboratory Reference and Proficiency Standards*

There is currently no standardization of testing methods between laboratories in Canada. Laboratory confirmation criteria, test validation, comparison of laboratory test performances such as specificity and sensitivity. Although the Canadian Public Health Laboratory Network has a laboratory standardization subcommittee which is beginning to address some of these issues, work is in its infancy. There are insufficient reference standards available for Canadian laboratories to ensure that they are providing consistent and reliable results and to ensure adequate quality control. Lack of reference standards could result in inconsistencies in diagnostic results going unnoticed and reduced confidence that the answers provided by diagnostic tests are actually truly accurate. There are also many gaps in the availability and administration of proficiency programs to ensure that lab results are being correctly identified. The emergence of more molecular-based testing methodologies over the past number of years is an area with a particularly large number of gaps in proficiency programs. Although some proficiency testing is available from the College of American Pathologists, the National Microbiology Laboratory and from some provincial laboratories, there are many gaps in proficiency programs available to Canadian laboratories.

### *First Nations and Infectious Diseases*

Canada's Aboriginal people will continue to sustain a highly disproportionate burden of infectious diseases. Addressing these burdens will require addressing the factors that give rise to that burden in the first place. Many factors contribute to this phenomenon; social determinants of health, jurisdictional issues around health services provisions, access to health care, roles and responsibilities of federal, provincial and territorial players and service delivery are all problematic. Capacities to address persisting infectious diseases vary among First Nations communities and there is also no capacity that could respond to an infectious disease crisis – either on or off reserves. Not addressing the social determinants that give rise to the disparate burden of infectious diseases among Canada's Aboriginal populations such as poor housing, addiction, chronic disease, illiteracy, will ensure that prevention and control programs are unlikely to be successful. The persistence of silos within other aspects of First Nations health care delivery including mental health, addiction, and chronic disease prevention will exacerbate the potential for failure.

### *Vaccine Coverage*

Advances in vaccine development will soon make available vaccines for chronic diseases such as cervical cancer. More research into methods for delivery of single-dose vaccines for diseases such as Hepatitis B will potentially result in improved compliance and cost efficiencies. Challenges will result from lack of universal provision and access to these vaccines and variances in the rates of uptake among at groups of

Canadians at increased risk of developing infectious diseases because of other risk factors. Differences in coverage provisions among provinces and territories will also facilitate differences in infectious diseases protection among provincial and territorial boundaries. At the same time, availability of new vaccines will spark ethical debates such as the appropriate administration of vaccines that prevent sexually transmitted diseases. Growing public resistance to vaccinations resulting from adverse reactions has reduced the rate of uptake for vaccinations. Religious beliefs and conscientious objections have reduced uptake among certain groups. Paradoxically, the unparalleled success of vaccination as a public health intervention has resulted in vaccines becoming the victims of their own success. Although adverse-reactions to vaccines are rare and often present lesser health risks than disease manifestation, the public attention to these events when they do occur, has distorted public perception into believing that vaccines are dangerous.

#### *Infection Control Standards for Occupational and Nosocomial Infections*

There is a desperate need for control strategies for hospital, community and occupationally acquired infections. Infections originating in these institutions have become one of the most significant infectious disease challenges in Canada. Infection prevention and control strategies require coordination and standardization among hospital and non-acute care settings. Although many examples of good strategies exist, they are usually only available institutionally, and not accessible to assist others who could use the same information and apply it to their own health care setting. Many health care settings do not have on-site or access to infection prevention and control professionals or the resources to contract those services; it would be much easier for those facilities to access infection control standards that have been developed for other settings and apply them to their own circumstances.

#### Recommendations

- Carryout a comprehensive review of proficiency testing programs in Canada and a gap analysis to identify where new programs are needed. This should be done under the leadership of the Surveillance and Reference Services Section of the National Microbiology Laboratory.
- Based on priorities identified in the gap analysis, develop programs for reference standards and proficiency programs under the leadership of the NML with consultation from the Canadian Public Health Laboratory Network.
- Strike a taskforce to identify the burden of infectious diseases that affect Canada's Aboriginal populations, with a mandate to identify areas most emphasis and make recommendations for acting on how to deal with the disparate burden of infectious diseases among Canada's Aboriginal people that include mitigating other factors.
- Mitigation strategies must be designed to reach Aboriginal populations living both on and off reserves.
- Cultural and social sensitivities must be addressed and incorporated into infection education and control programs.
- National vaccination strategy that provides equal coverage for vaccines across all Canadian jurisdictions.

- Incorporation of data on vaccinations, rates of uptake and adverse reactions into a national infectious disease surveillance system.
- National awareness campaign on the benefits of vaccination use, emphasizing the successful eradication of diseases like small pox.
- Specialized programs to encourage uptake of vaccinations among groups with traditionally low rates of uptake such as health care workers and First Nations populations.
- Design non-invasive prevention strategies for those who do not wish to vaccinate.
- Establish a national registry of infection control and prevention strategies for hospital and acute-care acquired infectious diseases.
- Develop incentives to ensure contributions – e.g. acknowledgements and recognition.
- As part of the registry, develop a capacity to identify and evaluate strategies that have been demonstrated to be most effective in addressing individual diseases.
- Revise and update federal and provincial standards for occupationally-acquired infections.

#### Implications

- Established standard laboratory confirmation criteria.
- Improved acknowledgement of the incidence and impact of infectious diseases on First Nations populations.
- Allocation of resources and development of mitigation strategies that to reduce the inequities in First Nations health status compared to other Canadians.
- Standardized accessibility to vaccinations through a national strategy to ensure greater uptake and reduce existing jurisdictional disparities.
- National vaccination surveillance to identify groups/areas/locations with lower rates of uptake and allow for targeted outreach.
- Earlier identification of adverse reactions.
- An awareness campaign to address the claims made by the growing anti-vaccine lobby and ally fears.
- Alternative prevention practices that provide assurance of containing outbreaks in non-vaccinated populations.
- Standardized infection control strategies available for all to utilize.
- Reduced duplication of policy development in infection control strategies.
- Reduction nosocomial and occupational infections and consequently reduce costs to the health care system.

## CONCLUSION

Although the information offered by Foresight participants included a spectrum of issues relevant to their current and expected future work and research, many issues were identified as potential “wild cards” worthy of consideration for their potential impact on the threats from infectious diseases – wild cards could have either a negative or positive impact.

- Unpredictability in the frequency and pattern of disasters and diseases crises – small or large.
- A single event and effective political voice could make a significant difference in future decisions about the resources for infectious diseases research and public health investment.
- Whether or not the Public Health Agency of Canada can grow and be developed into an entity with clout and credibility.
- Bioterrorism and the resultant global instability. Today, terrorists are using bombs – that may fall out of fashion and they may turn to infectious agents.
- Outbreaks can change a lot of assumptions, strategies and public opinion about public health, as SARS showed.
- Withdrawal of industry funding from development of antibiotics, antifungals, antivirals – e.g. if they become less profitable or controversial as they did for HIV.
- Global travel, immigration and economic activity could be dramatically reduced as an impact of rapidly spreading diseases.
- Globalization could result in the loss of key infectious diseases specialists and personnel who move to work in more lucrative areas -- brain-drain results.
- Demoralization of the health care workforce from insufficient resources or excessive strain on resources.
- Pandemic influenza’s arrival timing, speed of transmission, and communicable patterns – with dramatic economic and political consequences.
- Emerging infectious diseases – difficulty in coping when combined with influenza and other strains on the health care system.
- Lack of integrated network of people developing preventive strategies and vaccines.
- Possible irrelevance of long-term disease mitigation plans in light of unique nature of influenza pandemic or other emerging diseases.
- Patterns of vaccines – slight reduction in uptake of vaccines by public could have a large impact on the ability to prevent infectious diseases.
- Technology will bring us solutions – may be a time when infectious diseases are highly contained, or certain categories of them.

- Knowledge and technology are bringing us solutions to diseases that we did not anticipate – e.g. vaccine for cervical cancer
- Environmental integrity – can we continue to have the same level of economic development in the rest of the world and have an environment that does not affect human health...or will we create the seeds of our own demise.
- Government leaders and politicians – are they prepared to cope – and how will they make decisions in the circumstances of infectious disease crises
- More and more diagnosis in physicians' offices will have implications on the collection of surveillance data not being collected into the general data bases – Physicians are notorious for not reporting their findings – therefore, red flags could be missed or get noticed too late.
- We do not understand enough about things like BSE, and the extent to which Zoonotic diseases could compromise the food chain.
- Complexity of the food distribution system generally – this is a poorly understood area with limited research and information. Food moves around the globe at an alarming rate!
- Epidemiology of food production is very complex – we don't have enough information about this.
- What pharmacists can tell us – they are often the recipients of early-warning information but have no way to ring alarm bells – if they did have this capacity things could really change.
- Impact of infectious diseases on chronic diseases such as cancer. Already know that some viral diseases promote cancers – are probably many more that we do not yet know about.
- Industrialization and development in China – in Canada we can predict with a high degree of certainty what will happen politically, socially and economically – China remains an unknown entity in all of these aspects.

# Annexes

Annex 1: Environmental Scan

Annex 2: Discussion Points and Options for NCC-ID Projects

Annex 3: Foresight Questionnaire

Annex 4: Foresight Telephone Interview Summaries

Annex 5: Foresight Exercise Workshop Discussion Documents

Annex 6: Contacts Listing

# Annex 1:

## Environmental Scan

The following document was prepared to provide quick reference profiles of institutions and key contacts involved in infectious diseases research.

# **ENVIRONMENTAL SCAN: INFECTIOUS DISEASE RESEARCH AND RELATED ACTIVITIES IN CANADA**

**PREPARED FOR THE  
INTERNATIONAL CENTRE FOR INFECTIOUS DISEASES  
IN ITS ROLE TO DEVELOP THE  
NATIONAL COLLABORATING CENTRE ON INFECTIOUS DISEASES**

*DRAFT AT JULY 19, 2005*

INTERNATIONAL CENTRE FOR INFECTIOUS DISEASES  
435 ELLICE AVENUE, ROOM 422, WINNIPEG, MANITOBA R3B 1Y6  
PHONE 204-946-0908 FAX 204-946-0927 E-MAIL CCASSIDY@ICID.COM

## TABLE OF CONTENTS

<b>1. Environmental Scan Overview.....</b>	<b>6</b>
<b>2. Academic Institutions .....</b>	<b>10</b>
Alberta.....	10
British Columbia .....	12
Manitoba .....	15
New Brunswick .....	16
Newfoundland and Labrador .....	17
Ontario .....	17
Nova Scotia.....	24
Prince Edward Island.....	26
Quebec .....	27
Saskatchewan.....	30
Territories .....	32
<b>3. Research Funding Agencies.....</b>	<b>33</b>
Alberta Heritage Foundation for Health Research .....	33
Alberta Heritage Foundation for Science and Engineering Research (Alberta Ingenuity Fund) .....	33
Canadian Foundation for AIDS Research .....	34
Canadian Foundation for Infectious Diseases.....	34
Canadian Foundation for Innovation .....	35
Canadian Health Services Research Foundation.....	36
Canadian Institute for Health Information.....	37
Canadian Institutes for Health Research .....	38
Change Foundation (Ontario) .....	39
Council for Health Research in Canada.....	40
Michael Smith Foundation for Health Research (British Columbia) .....	40
Natural Sciences and Engineering Research Council of Canada.....	41

Networks Centres of Excellence Program.....	41
<b>4. Government of Canada Agencies.....</b>	<b>43</b>
Canadian Food Inspection Agency .....	43
Defence Research and Development Canada.....	48
Health Canada.....	49
Public Health Agency for Canada.....	50
National Microbial Laboratory .....	59
National Research Council of Canada.....	63
<b>5. Provincial Government Agencies.....</b>	<b>1</b>
Government of Alberta.....	1
Government of British Columbia.....	2
Government of Manitoba.....	3
Government of New Brunswick .....	4
Government of Newfoundland and Labrador .....	4
Government of Nova Scotia.....	6
Government of Ontario.....	6
Government of Prince Edward Island.....	8
Government of Quebec .....	8
Government of Saskatchewan .....	9
Government of the Northwest Territories.....	10
Government of Nunavut .....	10
Government of the Yukon .....	11

# 1. Environmental Scan Overview

This Environmental Scan was carried out to provide a profile of the areas of research into infectious disease being conducted in Canada. It also identifies some of the researchers and officials who are leading those efforts or heading research programs and institutions.

This report is in draft form and is, by its nature, not meant to be inclusive of all research in this field, nor of all of the organizations and programs involved in infectious diseases. It is meant to serve as a quick reference and an overview of the primary research-related activity, rather than be a comprehensive guide to all of the research that might be taking place. It is therefore subjective in terms of its portrayal of the information. Any suggestions for revisions to the information contained here would be gladly welcomed. Readers are urged to provide corrections and suggestions for clarification about any aspect of this draft report.

The report is meant to be a first step towards identifying current areas of research in order to help inform future development and assist in building collaborative activities among the institutions.

This Environmental Scan was internet-based and relied primarily on information that was available on websites in April 2005. Most of the information included in it was excerpted directly from websites; some information that appeared on websites was excluded where it was not directly related to the purpose of the Environmental Scan.

This report was initiated by the International Centre for Infectious Diseases in its role of beginning to work with institutions, researchers and health care professionals across Canada to establish the National Collaborating Centre on Infectious Diseases. The Environmental Scan is meant to provide a reference to the current research and related activities that are relevant to infectious diseases.

Strict definitions for “research” and “infectious disease” were not assigned so that the report could be more, rather than less, inclusive of information.

Due to the voluminous amount of information compiled for the Environmental Scan and the limited opportunity to confirm the accuracy or clarify the data, the report will remain in draft form, pending revisions. The information is presented in the following four sections:

## **Academic Research Institutions**

The websites of all Canadian universities were reviewed for information on research programs or initiatives focused on infectious diseases. Profiles of those institutions conducting infectious disease research are included. Typically, infectious disease research is conducted in faculties and departments of medicine; divisions of infectious disease, microbiology and immunology programs and public health programs. Information found on Institutes, Centres or Networks established to promote infectious diseases is also included.

## **Research Funding Agencies**

Profiles of Canadian agencies that fund infectious disease research are included. Non-Canadian agencies that fund Canadian researchers are not included (e.g. US National Institutes of Health) in this list.

## **Government of Canada Agencies**

Profiles of federal agencies involved in research activities, data collection or surveillance initiatives related to infectious diseases are included. Government of Canada research agencies, such as the National Research Council and National Microbiology Laboratory, are also found under this category.

## **Provincial and Territorial Agencies**

Information on provincial and territorial governmental departments or ministries that are the dissemination and or collection points for research information on infectious diseases is included. Typically, these agencies include ministries or departments of health and provincial laboratories.

While there appear to be instances of infectious diseases research carried out at other Canadian institutions not referenced in the report, such as regional health authorities and workers compensation boards, this report has not provided any detail of those not associated with academic or other research institutions.

## **Summary of Findings**

While there are highly specialized research programs across the country, the major hubs of infectious disease research in Canada include:

- **University of Toronto Department of Medicine Division of Infectious Diseases**  
The Division of Infectious Diseases encompasses the eight teaching hospitals in the Toronto area and includes the University Health Network.
- **National Microbiology Laboratory**  
The National Microbiology Laboratory programs of research and services encompass diagnostic and reference microbiology and virology, disease surveillance, fundamental research and the development of new products and methods in microbiology and infectious diseases.
- **National Research Council**  
Infectious disease related research is carried out in at least three of the National Research Council's 20 research institutes as well as through the Genomics and Health Initiative.
- **British Columbia Centre for Disease Control**  
The BC Centre for Disease Control provides a comprehensive program of communicable disease and environmental health prevention and control for the

province of British Columbia. The BC Centre for Disease Control collaborates with the University of British Columbia Centre for Disease Control.

## Research Categories

Although by no means exhaustive, the following are broad categories of research being conducted at Canadian research institutions (Table 1 indicates where each category of research is being conducted):

- Microbial Pathogenesis: studies into the mechanisms of viral, bacterial and fungal pathogenesis
- Epidemiologic studies into infectious diseases, such as:
  - HIV/AIDS
  - Hepatitis B and Hepatitis C
  - vaccine preventable infections
  - antimicrobial resistance
  - nosocomial infectious
  - clinical epidemiology
- Host response to bacterial, viral, and parasitic infections
- Immunologic mechanisms of disease
- Novel solutions and clinical trials for vaccine, antimicrobial, antiviral and antiretroviral therapies
- Emerging infectious diseases, such as SARS and BSE
- Sexually transmitted diseases, such as Chlamydia and Herpes Simplex Viruses
- Microbial genomics
- Various types of studies into Bloodborne diseases such as HIV/AIDS, Hepatitis B and Hepatitis C
- Respiratory diseases such as tuberculosis
- Food, water and vector-borne diseases
- Nosocomial and occupational infections
- Zoonotic diseases, such as West Nile Virus

**Table 1 – Areas of Infectious Disease Research by Institution**

	Microbial Pathogenesis <sup>1</sup>	Epidemiology <sup>1</sup>	Host response/defence <sup>2</sup>	Immunologic mechanisms of disease	Emerging infectious disease <sup>3</sup>	Novel Solutions and Clinical Trials <sup>4</sup>	Antimicrobial Resistance	Sexually transmitted Disease	Microbial genomics	Bloodborne Diseases <sup>5</sup>	Respiratory Diseases <sup>6</sup>	Food, Water and Vector borne Diseases	Tropical Diseases	Nosocomial or Occupational Infections	Zoonotic Diseases
Dalhousie University	•	•	•	•		•	•			•				•	
McGill University	•	•	•	•		•	•		•	•	•			•	
McMaster University	•		•	•		•	•	•	•	•	•				
Memorial University										•	•				
National Microbiology Laboratory	•	•	•	•	•	•	•	•	•	•	•	•		•	•
Queen's University						•				•					
University of Alberta	•					•									
University of British Columbia	•	•	•	•	•	•	•	•	•	•	•	•		•	
University of Calgary	•		•	•	•	•				•	•				•
University of Manitoba	•	•		•			•								
University of Ottawa						•			•						
University of Saskatchewan				•		•	•			•	•				•
University of Toronto	•	•	•	•	•	•	•	•	•	•	•		•	•	

1 Includes public health and infectious disease epidemiology

2 Includes host responses to bacterial, viral and parasitic agents

3 “Emerging Infectious Disease” includes SARS, TSEs

4 Includes vaccine, antimicrobial, antiviral and antiretroviral

5 “Bloodborne Diseases” includes HIV/AIDS and Hepatitis B and C

6 “Respiratory Diseases” includes Tuberculosis

7 Includes all National Microbiology Laboratory research programs

## 2. Academic Institutions

### **Alberta:**

Infectious disease research in Alberta is concentrated at the University of Calgary with some other research carried out at the University of Alberta in Edmonton.

### **University of Calgary**

Infectious disease research at the University of Calgary is primarily in the Faculty of Medicine's Department of Microbiology and Infectious Disease. Researchers in the department are concentrated on:

- microbial pathogenesis
- epidemiology
- host response
- diagnosis
- therapy
- prophylaxis of microbial infections

### **Research Groups**

- **Bacterial Pathogenesis Research Group**

*(Dr. George Chaconas, Chair)*

Areas of focus include bacterial pathogenesis and fundamental processes, such as gene regulation and DNA replication, in pathogenic organisms.

- **Infectious Disease Research Group**

*(Dr. Deirdre L. Church, Co-Chair)*

The Infectious Diseases Research Group focuses on microbial pathogenesis including molecular analysis of pathogenic mechanisms, mechanisms of viral entry and persistence in cells, and host responses to bacterial, viral, and parasitic infections. Various preventive and therapeutic strategies are also being pursued.

- **Immunology Research Group**

*(Dr. Paul Kubes, Chair)*

The Immunology Research Group focuses on the development and physiology of cells of the immune system and the immunologic mechanisms in disease and the inflammatory process. There is a growing interest in cell-cell interactions, in particular the role of adhesion molecules in both of these core themes.

- **Gastrointestinal Research Group**

*(Dr. Keith Sharkey, Chair)*

The Gastrointestinal (GI) Research Group is a dynamic group of basic and clinical investigators who study the GI tract and liver in health and in a variety of important human diseases. The GI tract is the site of digestion of food, and it is also an important barrier for defense against pathogens, bacteria and viruses. Members of the GI Research Group study the normal functions of the gut and liver and aspects of many of these diseases.

## **Institute for Infection, Immunity and Inflammation**

*(Dr. Paul Kubes, Director, Dr. John Conly, Co-Director)*

The Institute's mission is: "to create a world class community of researchers and clinicians focused on the cellular processes and clinical consequences of infection, immunity and inflammation and the translation of this knowledge to the benefit of society." One of the four themes of the institute is Emerging Infectious Disease.

The Calgary Health Region in partnership with the University of Calgary Faculty of Medicine Institute of Infection, Immunity and Inflammation is in a unique position to establish a comprehensive world-class research program dedicated to finding novel solutions to reducing the burden of illness related to infection or its complications. Discovery research would target the development of new antimicrobial agents and vaccines for disease prevention.

## **Canadian Bacterial Diseases Network**

*(Scientific Director: Dr. Julian Davies)*

Canadian Bacterial Diseases Network is part of the *Networks of Centres of Excellence* program, is a Canada-wide consortium of researchers and their laboratory personnel whose work focuses on bacterial disease.

The Network's mission is "to advance scientific knowledge and enhance Canada's economic competitiveness through networking, excellence in fundamental research on bacterial diseases and collaboration with industry (putting fundamental science to work)."

The scientific discoveries of the researchers in CBDN are the basis for solutions and new technologies that can be transferred from academia to industry. CBDN is partnered with a not-for-profit facilitator company, the Canadian Microbiology Consortium Inc. (CMCI) providing a network-wide standard interface for these commercialization activities.

## **TARRANT: The Alberta (Morbidity) Reporting and Research Network**

*(Dr. Jim Dickinson, University of Calgary)*

The Viral Watch program has been operating in Alberta for 20 years, providing surveillance data for six respiratory conditions, and taking samples to analyze for influenza viruses, during the fall, winter and spring seasons.

The program gives early warning of epidemics by assembling data from many physicians, so that the few cases seen by each individual add up to a number sufficient for trends to be observed in the Alberta population as a whole, before there is increased hospitalization rate from pneumonia, etc.

The results enable public health action to be taken to reduce the impact of influenza epidemics and have contributed to national and international knowledge of influenza epidemiology. Viral Watch is widely acknowledged as being an outstanding example of a community-based, infectious disease surveillance system. TARRANT is supported by Alberta Health and Wellness.

## **University of Alberta**

### **Faculty of Medicine and Dentistry**

*(Dean: Tom Marrie)*

### **Department of Medical Microbiology & Immunology**

The University supports an extensive research program. Staff members in Edmonton are currently carrying out research in various aspects of:

- cellular, molecular, reproductive and tumor immunology,
- microbial pathogenesis; and
- development of novel methods for the diagnosis and treatment of infectious diseases.

Department members, such as Dr. Lorne Tyrell, are drawn from specialists in the basic biomedical sciences of medical microbiology and immunology, applied clinical microbiology and infectious diseases.

## ***British Columbia:***

Infectious disease research in British Columbia is concentrated in the UBC Faculty of Medicine, the BC Centre for Disease Control and the UBC Centre for Disease Control.

## **University of British Columbia**

### **Department of Medicine, Division of Infectious Disease**

*(Division Head: Dr. Neil Reiner)*

The Division of Infectious Diseases has continued to develop programs of excellence at both main locations, Vancouver General Hospital, and St. Paul's Hospital, while maintaining consultative services at UBC Hospital, GF Strong Rehabilitation Centre, and

Women's Centre. Ambulatory clinics span a range of services related to general infectious diseases, HIV/AIDS, tropical and travelers' diseases, and outpatient intravenous antibiotic therapy.

The Division has a broad and vigorous research program with studies being carried out by members located at St. Paul's Hospital, the Women's Centre, the UBC Centre for Disease Control, and the Vancouver Hospital Site. The main research areas are:

- microbial pathogenesis
- host defense
- HIV/AIDS epidemiology and therapeutic trials
- novel anti tuberculous drug targets
- public health epidemiology
- clinical epidemiology
- Vaccine studies and other clinical trials.
- microbial genomics
- sexually transmitted diseases

## **UBC Centre for Disease Control**

*(Director: Dr. Robert Brunham)*

The BC Centre for Disease Control collaborates with the UBC Centre for Disease Control in the advancement of academia, research and teaching.

The UBC CDC is a joint venture of the BC Centre for Disease Control (BCCDC) and the University of British Columbia (UBC), established in 1998. The focus of the Centre is collaborative research into the surveillance, control and prevention of communicable disease. UBC CDC links academia, governments and public health organizations in the understanding, management and prevention of infectious diseases of public health significance.

Current research focus is in the public health areas of communicable disease protection such as:

- SARS,
- drinking water protection,
- food safety,
- global health,
- bio-terrorism and
- Influenza.

The Centre's research and operational emphasis is on events that occur at the whole population level using basic science applications from epidemiology, sociology, demography, ecology, microbiology, genetics and evolutionary biology.

Current and past research projects at the UBC CDC are in the areas of:

- Bloodborne diseases
- Respiratory diseases

- Sexually transmitted diseases
- Food and waterborne diseases
- Vector-borne diseases

## Collaborations

- **Vietnam HIV/AIDS Community Clinics Network Project**  
(*Dr. Michael Rekart*)

The goal of this project is to contribute to the reduction of poverty through improved access to basic social and infrastructure services by the poor.

- **SARS Accelerated Vaccine Initiative**  
(*Scientific Director, Dr. Brett Finlay and Associate Director, Dr. Robert Brunham*)

The SARS Accelerated Vaccine Initiative (SAVI) is a BC-led international consortium of organizations and individuals working to fast-track the development of a SARS vaccine. SAVI is based on an emergency planning infrastructure, allowing researchers to undertake normally-sequential activities in parallel. SAVI expects to significantly shorten the amount of time it would normally take to produce a vaccine for human testing.

- **Genome Science Centre (BC Cancer Agency)**  
(*Dr. Marco Marra, Associate Member*)

One joint project involves high throughput mapping studies of a number of strains of *Chlamydia trachomatis* as a possible mechanism for serotype diagnosis.

- **The Peter Wall and Genome Canada Pathogenomics Projects (Simon Fraser University)**  
(*Dr. Fiona Brinkman, Associate Member*)

This project, which involves researchers from across Canada and the United States, continues its investigation of unusual host-pathogen protein similarities, but has also expanded to include a large microarray-based analysis of host and pathogen gene expression responses under selected model infection conditions. A variety of bacterial, viral and fungal pathogens infecting human cells, bovine, and chickens, are being examined.

- **Vaccine Evaluation Centre (BC Children's Hospital)**

To date, VEC investigators have completed over 125 studies ranging from epidemiology of vaccine-preventable infections to evaluation of candidate vaccines to measurement of the impact of newly implemented immunization programs.

- **Animal Determinants of Emerging Infectious Disease (Centre for Coastal Health)**  
(*Dr. Craig Stephen, Associate Member*)

ADEID's vision was to gain a greater understanding of the causative mechanisms of disease emergence, develop strategies to prevent emerging diseases, and implement programs to improve the general health of the public through research targeting human interactions with animals and their shared environments.

## **UBC Centre for Microbial Diseases and Immunity Research**

*(Director: Dr. Robert E.W. Hancock)*

The Centre for Microbial Diseases and Immunity Research is a multi-faculty, multi-department consortium of world class microbial diseases and immunology researchers. Its scope encompasses:

- the molecular mechanisms of bacterial, viral, fungal and microbial parasite pathogenesis, host responses to and defences against these agents,
- basic mechanisms of host immunity, and
- Novel therapeutic and clinical approaches to the treatment of microbial and immunological diseases.

The objectives of the Centre for Microbial Diseases and Immunity Research are:

- to encourage collaboration among microbial diseases and immunology researchers utilizing different approaches to pursue similar problems,
- to increase access to research funding by encouraging involvement from the pharmaceutical and biotechnology industries, and by promoting group and collaborative research grant proposals, and
- to promote graduate and undergraduate education in microbial diseases and immunology

## ***Manitoba:***

Infectious disease research in Manitoba academic institutions is concentrated at the University of Manitoba, although the University of Winnipeg has some related research in fields such as vectors.

## **University of Manitoba**

### **Faculty of Medicine:**

- **Department of Community Health Sciences**

*(Director: Dr. John O'Neil)*

The department carries out research related to infectious diseases primarily through its extensive work in aboriginal health and its applied medical research in occupational health.

- **Department of Medical Microbiology and Infectious Diseases**

*(Department Head: Dr. Joanne Embury; Head of Adult Infectious Diseases: Dr. Ethan Rubenstein)*

The Department of Medical Microbiology and Infectious Diseases is dedicated to research and training in the area of infectious diseases of humans. The core disciplines used by the scientists and trainees in research programs include:

- molecular pathogenesis of microbial disease,
- immunobiology of infection,
- molecular mechanisms of antimicrobial action,
- microbial resistance and
- epidemiology.

Through this department, the University of Manitoba has carried out extensive research projects across the full array of infectious diseases, including: hepatitis C, HIV, herpes, measles, influenza and many others. It has also worked extensively in pathogens, proteomics and genomics related to infectious diseases.

Since mid-2001, the University of Manitoba has carried out more than 260 research projects and studies in medical microbiology. It leads an international program in infectious diseases involving its research and clinical activities in Kenya and India.

Organizations operating closely with the University in disease-related research include the Manitoba Institute of Cell Biology, involved in subjects such as the molecular origins of cancer, regulation of gene activity, and AIDS.

The Department of Medical Microbiology and Infectious Diseases also has close affiliations with the Health Sciences Centre's (HSC) and St. Boniface Hospital's Clinical Microbiology departments, as well as the National Microbiology Laboratory and Cadham Provincial Laboratories.

A renowned international program of the University is its ICID Training Program funded by the CIHR and Province of Manitoba, advancing the knowledge of medical and postdoctoral students in infectious disease specialties.

## ***New Brunswick:***

There does not appear to be any concentrated infectious disease research being carried out in New Brunswick universities.

## **Newfoundland and Labrador:**

There is no concentrated infectious disease research program carried out in Newfoundland and Labrador academic institutions; however, there are some research projects carried out in the Faculty of Medicine at Memorial University.

## **Memorial University:**

The Faculty of Medicine, Department of Paediatric Medicine has infectious disease research projects in the treatment of community and hospital acquired pneumonia and HIV/AIDS.

## **Ontario:**

Infectious disease research in Ontario is largely concentrated at the University of Toronto and its associated teaching hospitals. Research is also being carried out at McMaster University, Queens University and the University of Ottawa.

## **University of Toronto**

### **Faculty of Medicine, Division of Infectious Diseases**

*(Program Director: Dr. Tony Mazzulli (Adult Infectious Disease) Mount Sinai Hospital; Dr. Lee Ford-King (Paediatric Infectious Disease) Hospital for Sick Children)*

The University Of Toronto Division Of Infectious Diseases includes 8 major teaching hospitals:

- The Toronto Hospital (Toronto General Division and The Toronto Western Division),
- Mount Sinai Hospital,
- Women's College Hospital,
- The Hospital for Sick Children,
- Princess Margaret Hospital,
- The Wellesley Hospital,
- St. Michael's Hospital, and
- Sunnybrook Health Science Centre.

Major foci for infectious disease research are the University Health Network (Toronto General Hospital, Toronto Western Hospital and Princess Margaret Hospital), Hospital for Sick Children, Mount Sinai Hospital and SunnyBrook & Womens' College Health Sciences Centre:

### **University Health Network: Toronto General Hospital, Toronto Western Hospital, Princess Margaret Hospital**

*(Tom Closson President and CEO)*

The University Health Network includes Toronto General Hospital, Toronto Western Hospital and Princess Margaret Hospital. Infectious disease is one of the research foci of the Toronto General Research Institute (TGRi) located at Toronto General Hospital.

## **University Health Network Infectious Diseases Care Area**

The University Health Network's Infectious Diseases care area is made up of several multidisciplinary clinics. Each clinic specializes in providing one-stop shopping and continuing care from a team of nurses, physicians, pharmacists and social workers.

### ***Immunodeficiency Clinic***

The immunodeficiency clinic is the largest of its kind in the country. It serves 1,500 individuals and care is usually offered through outpatient clinics.

### ***Centre for Travel and Tropical Medicine***

This clinic provides leading-edge pre-travel advice as well as treatment for tropical diseases. The clinic also meets the specialized needs of patients in cancer, transplant and immunodeficiency programs who plan to travel.

### ***Tuberculosis Clinic***

Diagnosis, treatment and prevention of tuberculosis are the aims of the tuberculosis clinic. Through directly observed therapy, the clinic increases the cure rate and decreases drug resistance in patients. Research is also underway to improve treatment and prevention of tuberculosis in Toronto's immigrant population.

### ***Hospital Infection Control and Occupational Health***

The Infection Prevention and Control Unit (IPPAC) is leading UHN's fight against antibiotic resistant infections, or "superbugs." This unit also monitors infections to keep the risk of acquiring an infection in the hospital as low as possible

## **Hospital for Sick Children: Division of Infectious Diseases**

*(Division Head: Dr. Allen Upton)*

The Division of Infectious Diseases provides inpatient consultation and ambulatory interdisciplinary family centered care to patients requiring secondary/tertiary/quaternary Paediatric services). Services provided include:

- Infectious Disease Clinic - Congenital Infectious Diseases, Osteomyelitis Clinic
- Human Immunodeficiency Virus (HIV) Clinic
- Tuberculosis (TB) clinic
- Hospital Infection Prevention and Control Services

## **The Paediatric Investigators Collaborative Network on Infectious Diseases in Canada**

*(Chair: Dr. Allen Upton)*

The Paediatric Investigators Collaborative Network on Infections in Canada (PICNIC) was formed in 1991 to "promote, facilitate and engage in collaborative research that will advance understanding of the pathogenesis, causes, natural history, diagnosis, management and most importantly, prevention, of infections that affect the fetus, newborn, infant, child and adolescent." Consisting largely of specialists in childhood infectious diseases based at university-affiliated hospitals the group has been successful in obtaining funding, publishing results and presenting abstracts at national and international meetings.

## **Infection, Immunity, Injury & Repair Research Programme**

*(Programme Head: Dr. Chaim Roifman)*

The Infection, Immunity, Injury and Repair (IIIR) Programme unites scientists from diverse research fields such as surgical research, immunology, infectious disease, microbiology, gastroenterology, haematology, transplant medicine and others

One of the two common themes is host susceptibility to infection, which includes various aspects of immunity to infections and host-pathogen interactions. The invasion of the body by pathogens, the body's defence systems and the mechanisms by which the body responds to and repairs internal and external wounds are studied to one day comprehend why a common infection causes only a cold in some individuals, while in others it causes devastating meningitis. Understanding these differences will allow the creation of new therapies and medications to control and possibly prevent these infections/diseases.

## **Mount Sinai Hospital – Department of Microbiology**

*(Microbiologist-in-Chief/infectious diseases: Dr. Donald Low)*

The Department of Microbiology is a collaborative laboratory operation between the Mount Sinai Hospital (MSH) and Toronto Medical Laboratories (TML).

The Department of Microbiology at Mount Sinai Hospital conducts interdisciplinary research in areas of basic science, population based epidemiology and clinically oriented health care research.

### **Population and laboratory-based surveillance:**

- Canadian Bacterial Surveillance Network (CBSN)
- Ontario Group A Streptococcal Study
- Toronto Invasive Bacterial Disease Network

### **Research activities:**

- SARS Research Projects
- Epidemiology of Infections Diseases and Antimicrobial Resistance
- Infections and Infection Prevention in Long Term Care
- Bacterial Virulence, Pathogenesis, and Mechanisms of Resistance

- Virology and Immunology Studies

## **SunnyBrook & Womens' College Health Sciences Centre**

### **Division of Infectious Disease**

*(Division Director: Dr. Anita Rachlis)*

The Division of Infectious Diseases includes four members who provide inpatient and outpatient consultations in infectious diseases. The interdisciplinary HIV Ambulatory Clinic provides care to approximately 800 patients providing HIV-related ophthalmological and endocrinology care, nursing, social work and nutritional counseling.

Divisional research interests:

- HIV clinical research investigating treatment of opportunistic infections,
- antiretroviral therapy and HIV infection in women;
- clinical trials in new antiretroviral agents;
- projects on the provision of HIV post-exposure prophylaxis for sexual assault victims

## **University of Toronto Infectious Disease Research Group**

The diverse research programs of the individual groups at the University of Toronto provides an exciting breadth of focus, with interests ranging from the role of single virulence determinants in disease to characterization of the host's immune response to infection. The fact that individual groups are spread across several different university departments has led to the establishment of an interdepartmental "Infectious Diseases Research Group" (IDRG). This 'virtual' research group functions to bring together labs with different expertise, including the microbiologists, immunologists, cell biologists and others interested in studying the processes of infection, irrespective of their physical location on the university campus or in the various hospitals that are associated with the University of Toronto.

The IDRG has three basic functions related to this purpose:

- Create an informal forum in which IDRG members are brought together on a regular basis to discuss their ongoing work.
- Disseminate information pertinent to members of the IDRG.
- Create a focal point for those considering a visit or those who would like to train at the University of Toronto.

## **McMaster University**

### **Department of Biochemistry and Biomedical Sciences**

*(Gerard Wright, PHD, Professor and Department Chair)*

## **Departmental Research Areas**

### **Microbiological Biochemistry and Antimicrobial Research**

- New targets for antibacterial and antifungal agents
- Mechanisms of antibiotic resistance
- Molecular microbiology of bacterial development
- Mechanisms of antibiotic biosynthesis
- Bacterial secretion mechanisms
- High throughput screening in inhibitor identification

### **Cell Biology and Regulation**

- Immunity and vaccine biology
- Viral pathogenesis
- Bacterial evolution

## **Department of Medicine, Division of Infectious Diseases**

*(Dr. Paul D. O'Brian, Chair Department of Medicine)*

No information on website about research into infectious diseases.

News Release about one of the scientists, Dr. Mark Loeb being awarded \$19 million to study West Nile Virus. An Infectious Disease Residency Training Program is offered

### **Department of Pathology and Molecular Medicine: Molecular Immunology, Virology and Inflammation Program.**

Research within the Molecular Immunology, Virology and Inflammation program is relevant to a number of serious diseases. Emphasis is placed on the basic mechanisms and treatment of chronic inflammatory conditions, infectious diseases, and cancer. Current research interests within the Department of Pathology and Molecular Medicine include:

- Mechanisms of hypersensitivity
- Connections between nervous and immune systems
- Immune reactions to foreign genetic material
- Hematological malignancies
- Development of vectors for gene therapy
- Allergen-induced inflammation of airways
- Hormone regulation of immune responses to sexually transmitted diseases
- Pathophysiology of infectious diseases
- Epithelial lining of the gut
- Rheumatoid and osteoarthritis inflammation
- HIV infection
- Respiratory disorders
- Dendritic cells

## Centre for Gene Therapies

Research areas include investigating the development of vaccines to induce potent mucosal immune protection against sexually transmitted infections like Herpes Simplex Virus Type I and II and Human Immunodeficiency Virus (HIV), and a research program to identify key cell types and cytokines in host responses to acute and chronic bacterial diseases and to develop vaccines against bacterial infectious of the lung, most notable tuberculosis.

## McMaster Antimicrobial Research Centre

The McMaster Antimicrobial Research Centre (ARC) seeks to provide excellence in research and innovation in the areas of basic and applied health science that impact positively on the causes, control and amelioration of infectious diseases.

Expertise in the group spans the disciplines of Chemistry, Biochemistry, Molecular Microbiology, Clinical Microbiology, Drug Discovery and Infectious Disease Medicine and researchers in the group have interests in virology, bacteriology and the biochemistry of fungi. The vision of the ARC is to establish and maintain national and internationally competitive research in the broad field of infectious disease.

### Research Areas

- Host-pathogen interactions
- Novel targets in antibacterial research
- Molecular microbiology
- Antimicrobial resistance
- Pathophysiology
- Virus Pathogenesis
- Biochemistry of antibiotics
- Immunity and bacterial infectious diseases
- Antifungal drug resistance

## Centre for Gene Therapeutics (McMaster University)

The Centre for Gene Therapeutics is built on the foundation of basic and clinical research activities which have been ongoing at McMaster for the past twenty years. The Centre successfully brings together expertise in those areas with state-of-the-art gene transfer technology. The Centre is developing novel intervention approaches targeted to cancer, chronic inflammatory diseases and infectious diseases. Our ongoing phase II clinical trial in cancer is the first application of cell-based gene therapy in humans in Canada, and we feel that we are uniquely positioned to develop further applications in this and, possibly, other clinical areas in the next few years.

Two strong research programs have been developed:

- An extensive program investigating the development of vaccines to induce potent mucosal immune protection against sexually transmitted infections like Herpes Simplex Virus Type I and II and Human Immunodeficiency Virus (HIV).
- A research program to identify key cell types and cytokines in host responses to both acute and chronic bacterial diseases, and to develop molecular vaccines against bacterial infections of the lung, the most notable being tuberculosis.

As the incidence of tuberculosis infections is on the rise and the evolution of drug resistant strains makes standard treatments obsolete, novel therapies are being sought. There is a strong interaction between the prophylactic and therapeutic infectious disease vaccine development programs and the therapeutic cancer vaccine development program in association with the National Centres of Excellence in Vaccine and Immunotherapy (CANVAC).

## **Queens University**

### **Department of Medicine, Division of Infectious Disease**

*(Dr. Ronald Wigle, Division Chair)*

The Infectious Diseases service is composed of two clinical service groups, the adult ID service and the HIV service. The Infectious Diseases group actively collaborates with other research groups at Queen's in the Departments of Pharmacology and Microbiology & Immunology. Clinical trials of new antimicrobial agents, particularly antiviral and antifungal compounds, are an area of active patient based research within the division.

## **University of Ottawa**

### **Faculty of Medicine, Department of Biochemistry, Microbiology and Immunology**

*(Chair: Dr. Zemin Yao)*

Members of the department conduct research within the areas of infectious disease, structural biology, control of gene expression and signaling mechanisms, and integrated metabolic processes. Their work is enhanced through collaborations with scientists in the affiliated teaching hospitals, research institutes and government agencies in the Ottawa area.

## **Ottawa Institute of Systems Biology**

*(Director: Daniel Figeyss)*

The Ottawa Institute of Systems Biology is located at the Faculty of Medicine of the University of Ottawa. The aim of the institute is to develop and apply systems biology to biological studies relevant to human diseases.

Systems biology attempts to understand how a process, a cell, a group of cells, or an organism works at a global level and how the different components of a process work together. The premise is that the study of the individual elements must be brought to the level of systems in order to truly understand the biology.

Our systems biology approach will be based on the integration of technologies, biology and computation for the study of human diseases. The technology will provide the high-throughput approaches to interrogate biomolecules in various environments. The biology will provide the context (the system) in which to apply these technologies. Finally, the computation will provide the mathematical and spatial modeling at the molecular level resolution. This integration of science will lead to mechanistic understanding of biological processes at the molecular and cellular level. Moreover, it will have a tremendous impact in target and drug discovery processes, where often failure of drugs and targets are associated with a poor understanding of the systems in which a target/drug is involved.

The institute will develop:

- a systems biology program aimed at the understanding of human diseases,
- robust platform technologies for high-throughput experiments for systems biology studies and for other projects
- innovative high-throughput technologies to probe increasing numbers of biomolecules from cells to tissues and develop novel bioinformatics tools and mathematical modeling approaches for systems biology.

## ***Nova Scotia:***

Infectious disease research in Nova Scotia is concentrated at Dalhousie University.

## **Dalhousie University**

### **Department of Community Health and Epidemiology, Population Health Research Unit**

*(Acting Director: Dr. Mark Smith)*

The Population Health Research Unit is a university-based research and support group conducting systematic research into population health, health services and their inter-relationships.

## **Faculty of Medicine, Department of Medicine, Division of Infectious Disease**

*(Head: Dr. B. Lynn Johnston)*

Divisional research areas:

- Epidemiology nosocomial infections
- HIV Clinical trials
- antimicrobial resistance
- Molecular mechanisms of resistance
- Epidemiology and surveillance of antibiotic resistant pathogens
- Vaccine studies
- Clinical microbiology.
- Clinical trials with novel adult vaccines
- Antimicrobial utilization

## **Department of Microbiology and Immunology**

*(Department Head: Dr. Jean S. Marshall)*

Departmental research interests (infectious disease):

- Antibiotic resistance in respiratory pathogens
- bacterial/viral pathogenesis
- Host parasite interactions
- Antibiotic resistance mechanisms
- Anaerobic bacteriology
- Virulence factors
- Host defence mechanisms
- Clinical trials with new antimicrobial agents
- Pathogenesis of viral infection
- Viral and immune mechanisms of disease.

## **Dalhousie Infectious Disease Research Alliance**

*(Executive Director: R. Duncan)*

DIDRA is a formal network of researchers at Dalhousie University and the QEII and IWK Health Centres with expertise in the area of infectious disease. The members share a common interest in host-pathogen research (research in the biology of microorganisms, their interactions with the host, and disease prevention, through vaccine development, diagnosis, treatment, or management of infection). Members collaborate not only across disciplines and institutions, but are bridging the gap between basic and applied sciences.

### **Alliance Mission:**

DIDRA will increase the ability of its members and their affiliated institutions to carry out important research and development in the area of host-pathogen interaction. DIDRA provides infrastructure for R & D that will:

- Increase the critical mass of skilled investigators at Dalhousie and its affiliated hospitals in research in the biology of microorganisms, their interaction with the host, and the prevention, diagnosis, treatment, or management of infection.

- Attract new sources of research and development funding.
- Encourage the application of scientific knowledge to improvements in health and quality of life.
- Support regional economic growth.

### **Alliance Philosophy**

By sharing ideas, resources, and expertise, researchers at Dalhousie University and its affiliated hospitals amplify their research potential, increase the application of basic scientific findings to patient care, and provide easy access to industry collaborations.

Closer collaboration between public and private sector researchers is increasingly critical to the successful application of research. We are committed to facilitating this interaction, whether by partnerships or contract research.

Research Alliance areas of expertise:

- **Molecular Biology:** Molecular mechanisms of pathogenesis.
- **Cellular Biology:** Cell culture approaches to examine mechanisms of intracellular infections, both bacterial and viral.
- **Drug and Recombinant Protein Development:** Test potential pharmaceuticals. Create promoters and enhancers for protein production.
- **Immunology:** Study humoral and cellular host response to microbial infections and the interactions of phagocytic and antigen presenting cells.
- **In Vivo Models of Infection:** Marine, avian and rodent models of microbial infection and mucosal immunity.
- **Trial and Protocol Development:** Clinical epidemiology and biostatistics.
- **Clinical Trial Management:** Includes all aspects of trial management (e.g. forms development, research ethics review, budgeting)
- **Data Management and Analysis:** Data entry, management, and statistical analyses.

### **Research Services**

- Cellular Biology
- Drug and Recombinant Protein Development
- Immunology
- In Vivo Models of Infection
- Trial and Protocol Development
- Clinical Trial Management
- Data Management and Analysis

### ***Prince Edward Island:***

There is no infectious disease research being carried out in Prince Edward Island.

## **Quebec:**

Infectious disease research in Quebec is concentrated in Montreal.

## **McGill University**

### **Faculty of Medicine: Department of Epidemiology and Biostatistics (joint department with Occupational Health)**

The Department of Epidemiology and Biostatistics and Occupational Health is an integral part of McGill's Faculty of Medicine.

Faculty members research areas include:

- clinical epidemiology,
- respiratory epidemiology,
- biostatistical methods,
- pharmaco-epidemiology,
- population and public health,
- infectious disease epidemiology,
- women's health,
- reproductive epidemiology and maternal and child health,
- occupational health, and
- cancer epidemiology.

Emerging new areas include social epidemiology, genetic and molecular epidemiology, technology assessment, health outcomes and cost effectiveness evaluation, health services research and clinical research informatics.

Five hospital-based Clinical Epidemiology units are linked with the Department of Epidemiology and Biostatistics. Three have infectious disease relevance:

#### ***Montreal General Hospital Division of Clinical Epidemiology***

The Division of Clinical Epidemiology is dedicated to the advancement of research in clinical epidemiology, interpreted broadly to be the study of the determinants and effects of clinical decisions. Its approach is multi-disciplinary in that it brings together scientists with expertise in various areas of medicine and methodology to address health issues of concern to well or ill human populations. Therefore, it examines aspects of both prevention and treatment in patient and non-patient populations, and bridges the gap between research and clinical practice.

#### ***Royal Victoria Hospital Division of Clinical Epidemiology***

The Division's objective is to conduct epidemiological research into the causes, treatment and prognosis of disease. This objective is attained through research, teaching and service to the community. The focus of effort is on major chronic diseases, including asthma, chronic obstructive pulmonary disease, cardiovascular diseases, cancer, osteo and rheumatoid arthritis, as well as infectious diseases. The division is composed of four primary research units.

- **Pharmacoepidemiology Research Unit**  
This unit investigates the use and misuse of medications currently on the market, and evaluates their impact in terms of risks and benefits at the population level.
- **Technology Assessment Unit**  
This unit evaluates the cost-benefit of new and existing technologies proposed and used in the hospital setting.
- **Health Outcomes Research Group**  
This group conducts research on the measurement of health outcomes for chronic diseases including quality of life
- **Biostatistics Consulting Unit**  
This unit provides consulting services to clinical scientists throughout the Royal Victoria Hospital on issues of study design and data analysis of clinical research studies in the hospital.

## **Jewish General Hospital**

*(Director: Dr. Christina Wolfson)*

### **Centre for Clinical Epidemiology and Community Studies**

The mission of the Centre for Clinical Epidemiology and Community Studies at the Jewish General Hospital is to evaluate and improve human health, through research and education. The Centre has established itself as a leader in:

- pharmacoepidemiology,
- randomized clinical trials,
- neuroepidemiology,
- health services research,
- cardiovascular epidemiology,
- epidemiology of thromboembolic disorders,
- geriatrics, and
- emergency medicine.

### **Department of Microbiology and Immunology**

The Department of Microbiology and Immunology concentrates on four key areas of research:

- cellular and molecular immunology
- microbial physiology and genetics
- molecular biology of viruses
- medical microbiology

## **Centre for the Study of Host Resistance (McGill)**

*(Director: Dr. Emil Skamene)*

Host resistance is a field of study that seeks to explain the diverse nature of resistance to disease. This is a real challenge, because so many diseases like asthma, infectious diseases and cancer, are chronic conditions where multiple genes interact with each other and with environmental factors. Only by dissecting a disease into its discrete stages can the entire host response be understood. Establishment of the genetic control and biological functions at each stage of disease also makes opportunities for disease intervention.

The Centre has 22 researchers who have various expertise in immunoparasitology, genetic modeling of disease, genome mapping and functional genomics, biostatistics and vaccine development. The strong collaborative energy in the Centre has helped to unveil many prospects for the control of clinically significant diseases.

The focus of the Centre is to identify the genetic basis of susceptibility to these various diseases, to characterize the disease mechanisms and ultimately to find better therapies. Diseases studied include:

- Fungal Infections:
- HIV-AIDS
- Legionnaire's Disease
- Leprosy
- Malaria
- Rheumatoid Arthritis
- Salmonellosis
- Septic Shock
- Systemic lupus erythematosus
- Tuberculosis

## **University of Montreal**

One of the three strategic research areas of the University of Montreal is Biomedical and Health Sciences, involving infection and immunovirology at the top of the list.

In addition to the involvement of infectious diseases researchers in the interdisciplinary health group, the University of Montreal has a particular strength in the study of pathogenesis of illnesses induced by retroviruses.

## **Canadian Network for Vaccines and Immunotherapeutics (CANVAC) at University of Montreal**

*(Scientific Director: Dr. Rafick-Pierre Sékaly, Professor: Microbiology and Immunology)*

Based at the University of Montreal, CANVAC's research teams are working toward the development of safe and effective vaccines and immunotherapies to prevent and treat cancer, HIV and hepatitis C virus (HCV) infections. These diseases were selected because they are life-threatening, they are chronic and there is a sound scientific

rationale for vaccines and/or immune-based therapies.

CANVAC's research program has been designed to rapidly advance basic research discoveries into clinical trials. The program is organized around seven major themes:

- HIV vaccines;
- Therapeutic HCV vaccines;
- Breast and prostate cancer vaccines;
- Emerging diseases, particularly SARS;
- Biology of dendritic cells used as vaccine candidates;
- Immune monitoring to evaluate immune responses in vaccinated volunteers; and
- Social sciences as they relate to vaccination.

CANVAC will soon establish the National Immunomonitoring Laboratory that has been funded by the Canadian Foundation for Innovation. With its numerous industry partners, ultramodern laboratories and broad expertise, CANVAC is ideally positioned to become a critical centre for the development of vaccines against emerging viruses. That preparedness was tested and proven with the SARS epidemic of 2003. CANVAC participated in a national effort against the virus led by the CIHR's Institute of Infection and Immunity. It contributed its state-of-the-art facilities to monitor individual immune responses to the infection and developed candidate vaccines. CANVAC has engineered a candidate vaccine which has induced antibodies in small animals that neutralize the SARS virus.

CANVAC has expanded its networking with industry and non-governmental organizations. It is collaborating with major international organizations such as the International AIDS Vaccine Initiative and the French Agence nationale de recherches sur le SIDA to establish a consortium on HIV vaccines that target the immune responses in tissues where the virus initially enters the body, such as the genital tract. The consortium will develop a strategy to accelerate research and avoid duplicating efforts. Furthermore, with its research strength and leading Canadian expertise in vaccine development, CANVAC has signed collaborative research agreements with leading pharmaceutical and biotechnology companies, including Aventis Pasteur, GlaxoSmithKline, Berna Biotech, BioMérieux, Becton-Dickinson, Beckman Coulter, Antigenics, BioVex, Microscience and Merix Bioscience. These collaborations will allow researchers to access complementary and synergistic technologies that can advance their own work as well as that of CANVAC's industry partners.

## **Saskatchewan:**

Infectious disease research in Saskatchewan is concentrated in the University of Saskatchewan in Saskatoon.

## **University of Saskatchewan**

### **Faculty of Medicine, Department of Microbiology and Immunology**

(Department Head: Dr. W. Xiao)

Faculty members and associate members of the Department of Microbiology conduct both applied and basic research in many of the diverse areas of microbiology. Research programs are currently underway in various areas including:

- Virology
- Immunology
- Bacterial genetics
- Microbial physiology
- Molecular microbiology
- Tumour biology
- Infectious disease

The Royal University Hospital's Department of Clinical Microbiology is an integral part of the Department and provides diagnostic services in bacteriology, virology, mycobacteriology, mycology, parasitology and immunology.

**Research Interests of Faculty:**

- Laboratory diagnosis of infectious diseases in clinical microbiology
- molecular basis of antimicrobial resistance
- patterns in antimicrobial resistance
- antimicrobial synergy
- reversion time MIC's
- pathogenesis and immunology of infections in the immune-compromised patient,
- outer membrane proteins of gram negative organisms,
- mechanisms of resistance to heavy metals and immunodiagnostic/immunotherapeutic approaches to bacterial infections
- clinical research including antibacterial and antiviral treatment trials as well as HIV epidemiology and drug trials
- clinical infectious diseases and medical education.
- Sero-prevalence studies of blood borne pathogens in Zambia and antimicrobial susceptibility of respiratory pathogens in Zambia.
- Needlestick injuries - financial and psychosocial costs
- Vaccine design and testing for bacterial pneumonia in swine.
- Epidemiology, immunology and pathogenesis related to infectious diseases in livestock

**VIDO - Vaccine and Infectious Disease Organization**

(Director: Dr. Lorne Babiuk)

VIDO is renowned for the research, development and commercialization of products used by producers in the food animal industry. It is credited with five "world firsts" in animal vaccine research, and is expanding into human health applications. Current research interests include vaccines against a number of food-borne organisms, and novel vaccine delivery systems including needle-free methods.

VIDO is a financially self-reliant, non-profit organization owned by the University of Saskatchewan and operates with substantial support from the governments of Alberta and Saskatchewan as well as Government of Canada and industry competitive grants. It collaborates extensively with external institutes and companies and provides a rich training environment

VIDO's overarching goal is to benefit the end-user by developing technologies for the control of infectious diseases of humans and animals. This work benefits the animal health industry, livestock producers, the Canadian science and technology community and - increasingly - the Canadian human health sector.

Clinical research and epidemiology is one of two main foci of research.

### ***Territories:***

There is no infectious disease research being carried out in Northern Canada.

### 3. Research Funding Agencies

#### ***Alberta Heritage Foundation for Health Research***

*(Chair, Board of Trustees: Harley Hotchkiss)*

The Alberta Heritage Foundation for Medical Research (AHFMR) supports biomedical and health research at Alberta universities, affiliated institutions, and other medical and technology-related institutions. The Foundation was established by the Government of Alberta in 1980.

The Foundation is committed to:

- Excellence through international standards in health research,
- continuance of AHFMR for future generations,
- Responsible management of financial resources,
- Investment in health researchers at all career stages,
- Collaboration with research organizations, the private sector and other granting agencies,
- Maintaining autonomy and independence,
- Responsible stewardship of a public trust from the people of Alberta.

The Foundation's goals are to:

- maintain international standards of excellence through an appropriate and effective peer review system.
- manage expenditures to ensure the continuance of AHFMR for future generations while avoiding significant fluctuations in annual spending.
- maintain, strengthen, or expand established programs, and lead initiatives in health research in Alberta.
- maintain research education and training programs and encourage young Albertans to pursue research careers.
- encourage increased collaboration in Alberta, Canada, and elsewhere among investigators, research institutions, governments, other granting agencies and the private sector.
- continue to promote the development of health research-related economic activities in Alberta, including the commercialization of innovations.
- maintain and improve communication with the public, government, the research community, universities, and health-related institutions.
- regularly review and update AHFMR's future plans and priorities.

#### ***Alberta Heritage Foundation for Science and Engineering Research (Alberta Ingenuity Fund)***

*(President & CEO: Dr. Peter Hackett)*

The Fund's mandate is to nurture the discovery of new knowledge and encourage its application to benefit Albertans. It supports world-class research to advance science and engineering internationally.

Alberta Ingenuity operates at arm's-length from government, is governed by a Board of Trustees; headed by a President/CEO; and advised by an international science and engineering advisory council. Alberta Ingenuity is accountable to Albertans.

Alberta Ingenuity is the tradename of the Alberta Heritage Foundation for Science and Engineering Research, established by the Government of Alberta in 2000, with an Act of Legislature that provided an initial endowment of \$500 million.

Interest from the endowment is used to support a balanced, long-term program of science and engineering research based in Alberta.

### ***Alberta Prion Science Initiative***

The Alberta government is committing \$38-million to research on prions, the proteins best known for their link to bovine spongiform encephalopathy (BSE). The Alberta Prion Science Initiative will build on the research already happening in the province, Canada and internationally to better understand how prions affect both animal and human health.

The prion research initiative will be established as an Alberta Ingenuity Centre, to coordinate provincial prion research with national efforts and also to work with experts in the United States, Asia and the European Union.

### ***Canadian Foundation for AIDS Research***

*(President Board of Directors: Andrew M. Pringle)*

CANFAR is a national charitable foundation created to raise awareness in order to generate funds for research into all aspects of HIV infection and AIDS. The role of CANFAR is to fund institution-based AIDS researchers at educational, hospital and health facilities, research institutes, and established community service organizations in Canada.

CANFAR's Scientific Advisory Committee (SAC) is made up of experts from five areas of AIDS related research: fundamental and applied research, education and prevention, psycho-social, care, and community research. SAC members are aware of research already in progress and know what topics need exploring. Members are responsible for advising the Board on granting policy, establishing priorities for research funding, and evaluating proposals for funding.

### ***Canadian Foundation for Infectious Diseases***

*(President: Dr. Raphaël Saginur Division of Infectious Diseases Ottawa Hospital)*

The Canadian Infectious Disease Foundations are The Canadian Foundation for Infectious Diseases (CFID) and The Foundation for Research and Development in Infectious Diseases (FRDID).

The Canadian Foundations for Infectious Disease are registered charities committed to helping protect Canadians and people worldwide from infectious diseases. The Foundations are the fundraising arm for the Association of Medical Microbiology and Infectious Disease (AMMI) Canada.

AMMI Canada is a members-based association comprised of over 500 Medical Microbiologists and Infectious Disease Specialists. This group of highly qualified professionals promote excellence in the study of epidemiology and pathogenesis of infectious diseases; clinical and laboratory diagnosis; and, management and prevention of infectious diseases through education research and advocacy.

Together the Canadian Foundations for Infectious Diseases and AMMI Canada proactively support the essential work of Canada's best Medical Microbiologists and Infectious Disease Specialists. Through corporate and individual donations, the Foundations provide the funding to sustain AMMI Canada's educational grants, awards and fellowships advance research and development programs through specific funds.

The Canadian Foundations for Infectious Diseases are facilitating the discovery of innovative and effective solutions to identify, treat, control and prevent existing and emerging infectious diseases. The result is healthier communities in Canada and around the globe with reduced risk of developing, spreading and succumbing to infectious diseases – today and in the future

## ***Canadian Foundation for Innovation***

*(Chair: Dr. John R. Evans, Torstar Corporation)*

The Canada Foundation for Innovation (CFI) is an independent corporation created by the Government of Canada to fund research infrastructure. The CFI's mandate is to strengthen the capacity of Canadian universities, colleges, research hospitals, and non-profit research institutions to carry out world-class research and technology development that benefits Canadians.

Research infrastructure consists of the state-of-the-art equipment, buildings, laboratories, and databases required to conduct research.

Support from the CFI enables institutions to set their own research priorities in response to areas of importance to Canada. This allows researchers to compete with the best from around the world, and helps to position Canada in the global, knowledge-based economy. CFI support is intended to:

- strengthen Canada's capacity for innovation;
- attract and retain highly skilled research personnel in Canada;
- stimulate research training of young Canadians;
- promote networking, collaboration, and multidisciplinary among researchers;
- ensure the optimal use of research infrastructure within and among Canadian institutions.

The research enabled by CFI support is also creating the necessary conditions for sustainable, long-term economic growth—including the creation of spin-off ventures and the commercialization of discoveries.

### **Funding Programs**

The CFI invests in projects through the following funding programs:

- The **Innovation Fund** enables eligible institutions to strengthen their research infrastructure in priority areas—as identified in their strategic research plan. The fund promotes multidisciplinary and inter-institutional approaches, and enables Canadian researchers to tackle groundbreaking projects.
- The **New Opportunities Fund** provides infrastructure support to newly recruited academic staff. The fund helps universities attract high-calibre researchers in areas that are essential to the institutions' research objectives.
- The **Infrastructure Operating Fund** contributes to the incremental operating and maintenance costs associated with the infrastructure projects funded by the CFI.
- The **Canada Research Chairs Infrastructure Fund** provides infrastructure support to the Canada Research Chairs Program. The Program is establishing 2,000 world-class research positions at Canadian universities.
- The **Research Hospital Fund** is designed to contribute to research hospital based projects that focus on innovative research and training. It supports large-scale infrastructure projects that take a multidisciplinary approach—involving biomedical, clinical, health services, and population health research.

## ***Canadian Health Services Research Foundation***

The Canadian Health Services Research Foundation supports the evidence-based management of Canada's healthcare system by facilitating knowledge transfer and exchange - bridging the gap between research and healthcare management and policy.

The Foundations focuses on four key research themes:

- **Managing for Quality and Safety**

The focus of this theme relates to the need to identify effective management strategies to ensure safe delivery of high-quality services.

- **Management of the Healthcare Workplace**

This priority issue includes issues that relate to improvement of the workplace, appropriate workloads for all workers, and improvements in quality of work-life.

- **Primary Healthcare**

Primary healthcare is a key priority for health services research. National and provincial reform initiatives are focusing on the need for sustainable innovation and renewal in the organization, management, and delivery of primary healthcare. As well, primary healthcare emerged as a major cross-cutting theme in our recent priority-setting consultation, *Listening for Direction II*.

- **Nursing Leadership, Organization and Policy**

Nurses make up the largest healthcare provider group in the healthcare system. Staffing and other workplace issues remain critically important to this group.

## ***Canadian Institute for Health Information***

The Canadian Institute for Health Information (CIHI) is one of Canada's premiere sources of high quality, reliable and timely health information.

An independent, Canadian, not-for-profit organization, CIHI is a focal point for collaboration among major health players—from provincial governments, regional health authorities and hospitals to the federal government, researchers and associations representing health care professionals.

CIHI provides Canadians with essential statistics and analysis about their health and their health care system. CIHI is a source of information for those seeking answers to critical questions around the performance of the Canadian health system, the delivery of health care, and the status of Canadians' health.

Specifically, CIHI:

- Identifies and promotes national health indicators;
- Coordinates and promotes the development and maintenance of national health information standards;
- Develops and manages databases and registries: health care services, health human resources and health spending.
- Examines what factors determine good health (Canadian Population Health Initiative);
- Conducts analysis and special studies, and participates in research;
- Publishes reports and disseminates health information; and
- Coordinates and conducts education sessions and conferences.

## **Canadian Institutes for Health Research**

CIHR's mandate is "to excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system."

Canadian Institutes of Health Research (CIHR) is the major federal agency responsible for funding health research in Canada. It aims to excel in the creation of new health knowledge, and to translate that knowledge from the research setting into real world applications. The results are improved health for Canadians, more effective health services and products, and a strengthened Canadian health care system.

CIHR consists of 13 "virtual institutes" each headed by a Scientific Director and assisted by an Institute Advisory Board. They work together to shape a national health research agenda for Canada. The institutes bring together researchers, health professionals and policy-makers from voluntary health organizations, provincial government agencies, international research organizations and industry and patient groups from across the country with a shared interest in improving the health of Canadians.

### ***Institute of Infection and Immunity***

*(Scientific Director : Dr. Bhagirath Singh, London)*

The CIHR Institute of Infection and Immunity (III) supports research and helps to build research capacity in the areas of infectious disease and the body's immune system. Through the Institute's programs, researchers address a wide range of health concerns related to infection and immunity including disease mechanisms, disease prevention and treatment, and health promotion through public policy.

Through a virtual, global network of researchers, stakeholders and partners the III plays an important role in generating and disseminating information on infectious disease and immunity. In addition, the III plays an important leadership role on infectious disease issues in Canada, including helping to coordinate Canada's rapid research response to infectious disease outbreaks, especially those caused by new, emerging pathogens.

#### **Current III funding opportunities:**

- Models to Investigate the Link Between the Mucosal Immune Response in the Lung and Respiratory Tract and Disease Outcomes (In partnership with AllerGen - Allergy, Genes and Environment Network (AllerGen NCE); Canadian Cystic Fibrosis Foundation (CCFF); Institute of Circulatory and Respiratory Health)
- HIV-AIDS Community-Based Research Program: Capacity-Building Workshops (capacity building workshops, development grants, doctoral research awards, master's grants, operating grants etc.)

#### **Past III funding**

- Public Health and Health Care System Preparedness and Response to Severe Acute Respiratory Syndrome (SARS): Evaluation and Lessons Learned.
- Host Response to Severe Acute Respiratory Syndrome (SARS)
- Social and Behavioural Research Issues in HIV/AIDS and Hepatitis C
- Pilot Project Grants for New Investigators
- Strategic Research Initiative on Hepatitis C Prevention, Care and Support
- Planning Immunization Research Targeting Aboriginal People

### **CIHR Randomized Control Trials Program**

CIHR recognizes the importance of randomized controlled trials as a tool to provide high quality evidence on the efficacy and effectiveness of interventions in health and health services. This includes, but is not limited to the following types of interventions:

- Behavioral, Knowledge Translation,
- Complementary and Alternative Healthcare,
- Devices,
- Diagnostic,
- Educational,
- Health Services,
- Lifestyle,
- Medical Management Strategies,
- Pharmaceutical,
- Population Health,
- Preventative,
- Psychosocial, Surgical,
- Other therapeutic procedures.

It also recognizes the complexity of designing, co-ordinating and monitoring trials and the importance of incorporating their results into practice.

The CIHR Randomized Controlled Trials procedures are aimed at ensuring that public money is spent on well-managed trials of only the highest scientific quality, are safe for participants and are ethically sound. The procedures are designed to help those involved in the design and management of trials and to assist those who are involved in deciding which trials should be funded through the peer review process.

### ***Change Foundation (Ontario)***

*(Chair, Board of Directors: Shirlee Sharkey)*

The Change Foundation was incorporated by the Ontario Hospital Association in 1995 and endowed with part of the proceeds of the sale of Blue Cross in 1996 with a mandate to promote, support and improve health and health care delivery through four activity areas:

- Applied Research in Health Care
- Grants for Change Initiatives
- Knowledge Transfer through Development

- Education Programs

The Change Foundation brings together researchers, health care providers, health care managers, and policy makers in Ontario and around the world to understand the impact of change on the health of consumers and the delivery of health care services. Together with its stakeholders, the Foundation is researching, creating, innovating and networking at the forefront of trends and change in health and health care delivery.

## ***Council for Health Research in Canada***

*(Chair: Dr. David J. Hill)*

The Council for Health Research in Canada is a national, non-profit, non-governmental organization dedicated to increasing federal funding for health research. The Council was established in 1996 with the purpose of building a bridge for sustained policy dialogue with the Government of Canada.

The Council's mission is to promote the health of Canadians by ensuring that Canada is a world leader in health research. The Council is funded entirely by its members. It does not accept contributions from government, industry, or any other source.

Members of the Council include the leading health research institutes and health charities in Canada. Together, we raise public funds for health research and use these funds to address the most pressing health research needs. In 2000, Canadians entrusted our members with over \$300m in donations – sixty cents for every dollar of public investment in health research through the Canadian Institutes of Health Research (CIHR). Collectively, we are CIHR's largest partner. We are doing our part for health research and want to do more, but we also believe that government has an important part to play.

Our members speak with a common voice about the benefits of health research. We recognize that health research improves the health of Canadians, offers a real opportunity to contain health care costs, and contributes to the creation of knowledge-based jobs and economic growth. By ensuring the long-term viability of Canada's health care system, as well as our competitiveness within the world economy, health research makes Canada a better place to live.

## ***Michael Smith Foundation for Health Research (British Columbia)***

*(President & CEO: Aubrey Tingle)*

The Michael Smith Foundation for Health Research leads, partners and serves as a catalyst to build British Columbia's capacity for excellence in clinical, biomedical, health services and population health research.

In April 2003, the Government of British Columbia named MSFHR to manage the SARS Accelerated Vaccine Initiative (SAVI), a \$2.6 million investment to fast track the development of a SARS vaccine.

## **Natural Sciences and Engineering Research Council of Canada**

Science and Engineering Research Canada (also known by its legal name "Natural Sciences and Engineering Research Council of Canada" as well as the acronym NSERC) is the national instrument for making strategic investments in Canada's capability in science and technology. NSERC supports both basic university research through discovery grants and project research through partnerships among universities, governments and the private sector, as well as the advanced training of highly qualified people.

NSERC is a separate employer of the Government of Canada, reporting to Parliament through the Minister of Industry. It is governed by a Council of 21 distinguished members selected from the private and public sectors, and universities. The Council is advised by various standing committees that are guided by a Peer Review Process.

## **Collaborative Health Research Projects (CHRP)**

The objectives of the Collaborative Health Research Projects (CHRP) program are to:

- translate research results to end users/stakeholders (the mechanism for translation must be clearly described);
- encourage the NSERC and CIHR communities to collaborate and integrate their expertise and research activities;
- advance interdisciplinary research leading to knowledge and technologies useful for improving the health of Canadians; and
- train highly qualified personnel in collaborative and interdisciplinary research of relevance to health.

## **Networks Centres of Excellence Program**

Three Canadian federal granting agencies – the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Social Sciences and Humanities Research Council of Canada (SSHRC) – and Industry Canada combine their efforts to support and oversee the NCE initiative.

The funding for research and training in Canadian universities through the agencies' peer-reviewed research programs is the foundation upon which the successful network approach is built.

The Networks of Centres of Excellence (NCE) program has been operating successfully for fifteen years. In February 1997, the government established the NCE as a permanent program. Two years later, it increased the program's budget by \$30 million bringing it to \$77.4 million per year.

Networks of Centres of Excellence are unique partnerships among universities, industry, government and not-for-profit organizations aimed at turning Canadian research and entrepreneurial talent into economic and social benefits for all Canadians. An integral part of the federal government's Innovation Strategy, these nation-wide, multidisciplinary and multisectorial research partnerships connect excellent research with industrial know-how and strategic investment.

### ***CBDN - Canadian Bacterial Diseases Network***

*(Scientific Director: Dr. Julian Davies, University of Calgary)*

CBDN research covers a broad range of bacterial disease under three themes:

- vaccines and preventatives
- therapeutics
- diagnostics

This research has had an impact on both the health of Canadians and the vitality of the Canadian economy. CBDN research publications contribute to the worldwide understanding of microbial disease and mechanisms of resistance to treatment. Its membership boasts numerous national and international award winners

## 4. Government of Canada Agencies

### ***Canadian Food Inspection Agency (CFIA)***

The CFIA delivers 14 inspection programs related to foods, plants and animals in 18 regions across Canada. Its role is to enforce the food safety and nutritional quality standards established by Health Canada and, for animal health and plant protection, to set standards and carry out enforcement and inspection.

The scope of the Agency's mandate is vast and complex. Activities range from the inspection of federally-registered meat processing facilities to border inspections for foreign pests and diseases, to the enforcement of practices related to fraudulent labelling. The Agency also verifies the humane transportation of animals, conducts food investigations and recalls, performs laboratory testing and environmental assessments of seeds, plants, feeds and fertilizers.

The CFIA is Canada's largest science-based regulatory Agency. The CFIA relies on science as the basis of its program design and delivery as well as a tool to deal with emerging issues such as the development of biotechnology-derived products and addressing concerns related to BSE.

The specific activities for which the CFIA needs and uses science to support its daily work include laboratory science, risk assessment, surveillance, technology development and regulatory research. The Agency also undertakes analysis of scientific research data and information in order to provide scientific advice and intelligence to identify and prepare for emerging issues. Science is an essential component of regulatory decision making.

CFIA activities include:

- maintaining national eradication programs including surveys of the disease status of Canada's herds and flocks;
- testing, point-of-entry inspection, permit issuing and quarantine activities for live animal imports;
- issuing of Animal Health export certificates for live animal exports;
- negotiating export health requirements with other national governments, establishing import health standards and ensuring compliance to these;
- evaluating veterinary vaccines and serums for use in Canada whether manufactured here or imported;
- ensuring that animals are humanely transported in accordance with federal regulations and establishing voluntary "Codes of Practice" for the care of various farm animals;
- responding to requests for rabies diagnosis in wild and domestic animals, many of which are urgent because of the potential human exposure;

- inspecting and registering hatcheries to assure purchasers that day-old chicks are free of serious diseases; and
- providing information to marketing specialists.

## **Science Branch**

*(Vice-President Science: Judith Bosse)*

### **Office of Biotechnology**

The Office of Biotechnology is a focal point for coordination between programs on policy matters concerning the regulation of agricultural products of biotechnology. The office provides information about biotechnology to the public by responding to letters and supplying fact sheets and information kits. Responsibilities also include working with CFIA program experts to provide input and develop positions for interdepartmental, national and international biotechnology initiatives. The office responds to media inquiries and coordinates consultations on biotechnology-related matters involving multiple program areas.

### ***Animal Biotechnology Unit***

The Animal Biotechnology Unit (ABU) of the Animal Health and Production Division, Canadian Food Inspection Agency (CFIA) is responsible for establishing animal health standards and augmenting regulatory controls for the development of biotechnology-derived animals. The current mandate of the Animal Biotechnology Unit is to evaluate the assisted reproductive technologies used in livestock production (for example animal cloning, transgenic animal production or other genetic manipulations) with a focus on animal health and welfare.

## **Animal Products Directorate**

The Animal Products Directorate is responsible for the design of programs related to animals and food products derived from animals.

### ***Animal Disease Surveillance Unit***

The Animal Disease Surveillance Unit was created as a means of improving Canada's ability to recognize and deal with emerging animal disease problems.

### ***Animal Health and Production***

The Animal Health and Production Division's programs help prevent the introduction of foreign animal diseases and determines eradication actions when required. The Division also helps protect the quality of animal production inputs by regulating products like medicated feeds and veterinary biologics.

### ***Fish, Seafood and Production***

The Fish, Seafood and Production Division's programs set inspection requirements for federally registered fish and seafood processing facilities and imported products. The Division is responsible for the development of the Quality Management Program, the HACCP-based inspection program for federally registered processors.

### ***Food of Animal Origin***

The Food of Animal Origin Division's programs set inspection requirements for federally registered meat, poultry, dairy and egg establishments inspection programs.

## **Animal Health and Production Division**

The National Animal Health Program protects Canadian livestock and poultry from serious diseases that could restrict trade or pose a risk to human health. By avoiding production losses, the stability and competitiveness of livestock and poultry production are assured. The international marketability of live animals and meat products is enhanced because of Canada's reputation for being free of certain serious diseases.

The importation of animals and animal products from foreign countries is controlled to reduce the risk of introducing serious animal diseases.

## **Laboratories Directorate**

CFIA's Animal Health Laboratory Services are delivered by a network of Centres of Expertise, each of which is the national centre for its area of specialization. The Centres provide laboratory testing for CFIA's domestic disease control programs, for import and export certification, and for artificial insemination centres; conduct technology development and research projects to develop better testing and control methods; and provide information and advice on disease epidemiology, detection and prevention to CFIA's Policy and Operations officers.

The Centres are located at six different CFIA laboratories:

### **CFIA Laboratory - Lethbridge, Alberta (Animal Diseases Research Institute)**

- **Indigenous Bovine and Equine Viral Diseases Centre of Expertise**

An Office international des epizooties (OIE) Reference Laboratory for Infectious Bovine Rhinotracheitis (IBR) which provides tests for IBR, bovine viral diarrhea, and equine viral arteritis. Activities include research to understand the pathogenesis of these diseases and to develop improved detection technologies.

- **Leptospirosis and Anaplasmosis Centre of Expertise**

Activities include testing for leptospirosis and anaplasmosis and research to improve the detection and control of these diseases of livestock.

- **Non-traditional Livestock Centre of Expertise**

Provides scientific information and research on commercially-farmed, zoo-reared and free-ranging wildlife species. Activities also include research on diseases of wildlife which may affect the health of domestic livestock and testing services for brucellosis and rabies.

- **Reference Laboratory for Anthrax**

Designated by the Office International des Épizooties (OIE), the international animal health organization, comprised of 162 member countries. CFIA's Dr. Pamela Gale has been designated as the OIE Expert who will lead the Reference Lab.

### **CFIA Laboratory - Veterinary Road, Saskatoon, Saskatchewan (Health of Animals Laboratory)**

- **Centre for Animal Parasitology**

Provides tests for parasitic diseases of domestic livestock and game-farmed animals. Activities include technology development studies to improve testing methods.

### **CFIA Laboratory – Arlington Street, Winnipeg Manitoba (Canadian Science Centre for Human and Animal Health)**

- **National Centre for Foreign Animal Diseases**

Provides virology, serology, pathology and microbiology testing services for foreign animal diseases (FAD) that are exotic to Canada, for the import and export of domestic and game-farmed animals, poultry and ratites, and for confirmatory testing, reference, and epidemiological and traceback requirements. Also carries out technology development projects to improve detection methods, and provide information on epidemiology, pathogenesis, and transmission of FAD. Maintains emergency response capability and a state of readiness for laboratory confirmation of FAD, and conducts training courses for veterinarians in FAD. The CFIA's Centre for Policy and Epidemiology for FAD is located in the Centre.

### **CFIA Ottawa Laboratory – Fallowfield, Ontario (Animal Diseases Research Institute / Centre for Plant Quarantine Pests)**

- **Avian Diseases Centre of Expertise**

An OIE Reference Laboratory for Marek's Disease. Tests for import and export certification for poultry and ratites. Activities include research on avian leukosis, Marek's disease, and composting and bio-management techniques for control of pathogens.

- **Brucellosis Centre of Expertise**

An OIE Reference Laboratory for Brucellosis. Provides serological tests for import and disease control, and produces brucellosis test reagents (testing node at Lethbridge). Activities include technical and audit support for accreditation of non-federal labs which provide export testing. Provides complement fixation tests for a variety of animal diseases of regulatory importance and carries out research on new test technologies such as fluorescent polarization assays.

- **Germplasm Centre of Expertise**

Conducts tests to certify animals, semen and embryos for import or export, and for entry of animals into artificial insemination centres. Also conducts research and technology development studies to improve detection of pathogens, and to evaluate risks of disease transmission.

- **Mycobacterial Diseases Centre of Expertise**

Provides culture and histopathology tests for *Mycobacterium bovis* infection of domestic livestock and wildlife or game-farmed animals. Other activities include studies to develop more rapid diagnostic tests. Also produces and distributes tuberculin and other reagents for the detection of mycobacterial diseases in animals.

- **Rabies Centre of Expertise**

An OIE Reference Laboratory for Rabies, and a World Health organization (WHO) Collaborating Centre. Provides tests for rabies in animals (testing node at Lethbridge). Identifies rabies variants; maintains a reference collection; and conducts studies on rabies detection, pathogenesis, and epidemiology.

### **CFIA Laboratory – St. Hyacinthe, Quebec (Health of Animals and Food Laboratory)**

- **Indigenous Porcine Diseases Centre of Expertise**

Provides serological tests to certify swine for import, export and disease control programs. Also carries out research on Porcine Reproductive and Respiratory Syndrome (PRRS) transmission and detection. Also provides histopathology services, and trichinosis testing (node).

- **Retrovirology Centre of Expertise**

Provides testing for Equine infectious anemia (EIA), Bovine Leukemia virus (BLV), Maedi-Visna of sheep, and caprine arthritis-encephalitis. Activities include development and validation of new tests and accreditation support for non-federal labs which provide EIA and EBL tests for export and herd health programs.

## **Defence Research and Development Canada:**

Defence R&D Canada (DRDC) is an agency of the Canadian Department of National Defence responding to the scientific and technological needs of the Canadian Forces. Its mission is to ensure that the CF remains scientifically and operationally relevant. The agency is made up of six research centres located across Canada with a corporate office in Ottawa. DRDC has an annual budget of \$300 million and employs 1500 people. With a broad scientific program, DRDC actively collaborates with industry, international allies, academia, other government departments and the national security community.

## **Defence Technologies**

The broad scope of research undertaken at Defence R&D Canada includes:

- **Canadian Integrated Biological Detection System (CIBADS)**  
A world first, CIBADS system detects airborne biochemical agents in real time.
- **Chemical, Biological, Radiological and Nuclear Research & Technology Initiative (CRTI)**  
As a step towards improving protection against chemical, biological, radiological and nuclear incidents (CBRN), Defence R&D Canada is coordinating a five-year S&T fund. CRTI will enhance co-ordination and collaboration across three Canadian research sectors: government, private industry and academia to improve Canada's ability to respond to CBRN incidents.

The CRTI is mandated to improve Canada's ability to respond to chemical, biological, radiological and nuclear incidents which includes strengthening coordination and collaboration of capacity, capabilities, research and technology plans and strategies:

- create clusters of federal labs as elements of a federal laboratory response network that will build S&T capacity to address the highest risk terrorist attack scenarios;
  - create a fund to build capability in critical areas, particularly those identified in the scenarios that address biological and radiological attack;
  - accelerate technology into the hands of the first responders community and other operational authorities; and
  - provide funds to those areas where national S&T capacity is deficient owing to obsolete equipment, dated facilities and inadequate scientific teams.
- **Counter Terrorism Technology Centre (CTTC)**

The Counter Terrorism Technology Centre will be constructed at Defence R&D Canada - Suffield over the next two years. This facility will be used to train first responders from across Canada in case of a biological or chemical event.

Several theatres and mock-up sites will be built to provide hands-on training scenarios for emergency crews.

## **DRDC Suffield**

Defence Research and Development Canada Suffield has a new facility for measuring the toxicity of inhaled aerosol particles. The unique design of the facility allows a high level of control over exposure conditions, an extremely safe means of aerosolizing toxic materials and a very accurate means of determining exposure levels. Combined with expertise in aerosol characterization and liposome encapsulation, DRDC Suffield now has a capability for studying the inhalation toxicity of aerosolized agents and the efficacy of inhaled medical treatments. A Level 3 laboratory is located at DRDC Suffield.

## ***Health Canada:***

Health Canada works in partnership with provincial and territorial governments to provide national leadership to develop health policy, enforce health regulations, promote disease prevention and enhance healthy living. Health Canada also administers the Canada Health Act.

Health Canada collaborates internationally and with its provincial and territorial counterparts to protect the health of Canadians against current and emerging health threats. By administering the Food and Drugs Act Health Canada helps protect Canadians from potential health hazards by releasing Advisories and Warnings on foods, drugs, medical devices, natural health products and consumer products, and by providing information and policies on Novel and Genetically Modified Foods and Nutrition Labelling.

The Department also works to maximize the safety and effectiveness of biologics and biotechnology products such as blood, tissues and reproductive technologies in the Canadian marketplace and health system.

It also monitors health and safety risks related to the sale and use of drug products, natural health products, medical marijuana, medical devices, pesticides, radiation-emitting devices, and certain other consumer products. In addition, Health Canada negotiates agreements regarding hazardous materials in the workplace, performs medical assessments for pilots and air traffic controllers and conducts environmental health assessments.

## **Health Intelligence Network**

Through its Health Intelligence Network, the Department works with other levels of government and the health care system in the surveillance, prevention, control and research of disease outbreaks across Canada and around the world. It also monitors health and safety risks related to the sale and use of drugs, food, chemicals, pesticides, medical devices and certain consumer products. In addition, Health Canada negotiates agreements regarding hazardous materials in the workplace, performs medical

assessments for pilots and air traffic controllers and conducts environmental health assessments.

### **First Nations**

Health Canada assists First Nations and Inuit peoples to attain a level of health comparable to that of other Canadians living in similar locations.

Through partnerships and extensive consultations with First Nations and Inuit peoples, the Department is working toward having Canada's Aboriginal peoples administer their own health programs and resources.

## ***Public Health Agency for Canada***

*(Chief Public Health Officer for Canada: Dr. David Butler-Jones)*

The role of the new Public Health Agency for Canada is to promote the health of Canadians and to anticipate and respond to a serious infectious disease outbreak. The Agency will be focused on emergency preparedness and response, infectious and chronic disease prevention and control, and injury prevention, supported by a collaborative, national network.

The Public Health Agency for Canada is made-up of several Centres, Directorates and Laboratories:

- Centre for Healthy Human Development
- Centre for Chronic Disease Prevention and Control
- Centre for Infectious Disease Prevention and Control
- Centre for Emergency Preparedness and Response
- Centre for Surveillance Coordination
- Strategic Policy Directorate
- Management and Program Services Directorate
- Business Integration and Information Services Directorate
- Laboratory for Foodborne Zoonoses
- National Microbiology Laboratory

The following components work directly or indirectly to identify, prevent or control infectious diseases.

## **Centre for Infectious Disease Prevention and Control**

The CIDPC objectives are to decrease transmission of infectious diseases and to improve the health status of those infected. The Centre provides national leadership and conducts, supports and coordinates public health actions on:

- surveillance and epidemiology,
- infectious disease outbreak investigations,
- risk management,

- research including laboratory science,
- health promotion,
- public health policy development, and
- prevention and care programs.

The Centre works in close partnership with Canada's provinces and territories and performs liaison work with international organizations and agencies to actively support global disease eradication initiatives.

The Centre's program areas include:

- immunization and respiratory infections,
- community acquired infections including Hepatitis C,
- blood safety surveillance and health care acquired infections,
- HIV/AIDS policy/coordination/programs, and HIV and retrovirology laboratories.
- The development of national infectious disease guidelines is also a major activity of the Centre.

## **Blood Safety Surveillance and Health Care Acquired Infections Division**

Through surveillance, risk assessment and targeted research, the Blood Safety Surveillance and Health Care Acquired Infections Division provides national leadership in the development and promotion of a national management/policy structure to reduce the risk of bloodborne pathogen infections (including hepatitis, prions and emerging pathogens), transfusion-transmitted injuries and infections resulting from the transplantation of tissues and organs.

### ***Nosocomial and Occupational Infections Section***

The Nosocomial and Occupational Infectious Section implements enhanced infection control and prevention programs in health care facilities and other community settings by collecting, analyzing, interpreting, and disseminating epidemiologic information on nosocomial and occupational infections in the Canadian population.

Programs include:

- Surveillance of nosocomial and occupational infection of national interest
- Providing leadership in the management of nosocomial infection issues of national interest
- Setting national standards for the prevention of nosocomial and occupational infections by developing, expanding, publishing and updating the national infection Control Guideline series
- Identifying and evaluating occupational infection issues related to bloodborne pathogens.

### ***Bloodborne Pathogens Section***

### The Bloodborne Pathogens Section

- Undertakes and supports the surveillance of bloodborne pathogens, including viral hepatitis, parasitic and emerging or re-emerging bloodborne pathogens. This surveillance is performed in collaboration with the National Microbiology Lab (NML).
- Conducts risk assessment, prevention and control of infectious agents transmitted through the use of blood, blood products, tissues, cells and organs, including gene and stem cell therapies.
- The Section is active in developing and supporting national networks, databases and research studies, many of which are relevant to new and emerging bloodborne pathogens.
- Data resulting from surveillance is translated into health intelligence to inform policy decisions and support the development and evaluation of targeted intervention strategies.

The Section also covers xenotransplantation related surveillance and policy development. It develops new methods to identify animal viruses capable of transmission to human hosts, relevant to xenotransplantation. Surveillance for exposure to these agents is conducted and potential intervention measures are assessed, culminating in policy recommendations.

The Bloodborne Pathogens Section also undertakes and supports a variety of surveillance projects with the ultimate goals of enhancing blood safety and supporting targeted research:

- **Enhanced Hepatitis Strain Surveillance System** - initiated in 1998 to obtain a more accurate assessment of current infection levels as well as support the development of evidence-based prevention and control programs for hepatitis B and hepatitis C
- **Rapid Response Surveillance System** - The Rapid Response Surveillance System (RRSS) was established to meet growing concern over new and re-emerging blood borne pathogens.
- **Canadian Viral Hepatitis Network** - The Canadian Viral Hepatitis Network (CVHN) is a network comprised of leading hepatologists, infectious disease specialists and hepatitis researchers from across Canada
- **Canadian Blood and Marrow Transplant Group Mini-Registry** - Coordinated jointly by the Bloodborne Pathogens section and the Canadian Blood and Marrow Transplant Group Mini-Registry (CBMTG), the Registry will monitor the incidence of blood borne pathogens in special population groups such as those who are immuno-compromised and those who receive multiple transfusions.
- **Parasitic Infections Network** - The Division of Blood Safety Surveillance and Health Care Acquired Infections in conjunction with the Parasitic Infection

Surveillance Network are responsible for the evaluation of risks to blood safety associated with parasitic diseases

## **Community Acquired Infections Division**

The Community Acquired Infections Division provides information and programs for:

### ***Sexually Transmitted Infections***

- The Division provides: National leadership and coordination of surveillance, targeted research studies, evidence-based national standards, policy development and information dissemination for sexually transmitted infections.
- It supports a holistic view of sexual and reproductive health and works to ensure access to services and programs, including sexual health education, that help Canadians improve and maintain their sexual and personal health.
- The Division works with provinces, non-governmental organizations, and health care providers to improve and maintain the sexual health of the Canadian population by preventing and controlling sexually transmitted diseases and their complications including infertility and cancer.

### ***Hepatitis C***

- The Division is the focal point for a population health approach to hepatitis C ensuring a coordinated and integrated federal response.
- The Division designs, develops and implements programs that will prevent hepatitis C infection, supports people infected with or affected by the disease and increases public awareness about hepatitis C.
- In addition, the Division manages the financial arrangements for the Hepatitis C Settlement Agreement; administers the Hepatitis C Prevention, Support and Research Program;
- oversees the transfer of funds to the provinces and territories for hepatitis C health care services and hepatitis C look-back/trace-back initiatives.

### ***Tuberculosis***

- The Division provides leadership and co-ordination in the prevention and control of tuberculosis in collaboration with partners at the regional, provincial/territorial, national and international levels.
- Key activities include development of a Canadian Strategy for Tuberculosis Prevention and Control, funding and coordination of the advisory Canadian Tuberculosis Committee, and surveillance reports on TB cases,
- TB drug susceptibility test results and Correctional Service of Canada inmate TB cases plus latent TB infections.

- In addition, it sponsors targeted research, provides policy and program advice as well as training to other government departments and supports the STOP-TB initiative to control TB in developing countries.

## **Foodborne, Waterborne and Zoonotic Infections Division**

This Division implements an enhanced national capacity to conduct surveillance (data collection, analysis, interpretation, dissemination) and investigation of

- food and waterborne diseases, and
- zoonotic diseases (diseases in domestic and wild animals relevant to human health, i.e., West Nile Virus).

These activities include:

- Maintaining and developing a national food and water safety surveillance system and providing national leadership to improve enteric disease surveillance and participate in international surveillance.
- The Division also investigates and coordinates investigations of foodborne and waterborne disease outbreaks across Canada and provides guidance and direction, as requested, by to the Provincial Health Authorities;
- facilitates and coordinates risk analysis and risk management activities with international, federal, provincial and local partner organizations;
- conducts, supports and coordinates targeted research in critical areas; and identifies emerging threats to the health and safety of Canadians.
- The Division currently coordinates the national response to West Nile virus, including coordination with P/T stakeholders, development of guidance documents and maintenance of national surveillance.

## **HIV/AIDS Policy, Coordination and Programs Division**

The HIV/AIDS Policy, Coordination and Programs Division coordinates, implements and monitors the Canadian Strategy on HIV/AIDS (CSHA). The HIV/AIDS Division moves the Strategy towards a nationally shared vision through improved collaboration among all levels of governments, communities, non-governmental organizations, professional groups, researchers institutions and the private sector.

The Division also provides national expertise on key activities under the CSHA such as: strategy management; policy development and information synthesis; prevention care and treatment programs; marketing and communications; as well as strategy monitoring and evaluation.

## **Immunization and Respiratory Infections Division**

The aim of the Division is to reduce or eliminate vaccine preventable and infectious respiratory diseases in Canada. In partnership with provinces and territories, the Division is responsible for:

- National surveillance of vaccine preventable and infectious respiratory diseases, including influenza and SARS,
- Surveillance of vaccine associated adverse events and monitoring of immunization status, including the development of an immunization registry network.
- Providing scientific and administrative support to the National Advisory Committee on Immunization and Pandemic Influenza Committee.
- Investigation and coordination of investigations of vaccine preventable and infectious respiratory disease outbreaks across Canada, and provides guidance and direction, when requested, by provincial or territorial public health authorities when outbreaks of vaccine preventable or infectious respiratory diseases occur in individual jurisdictions.
- Conducting, supporting and coordinating applied public health research in the areas of immunization and infectious respiratory disease, and identifying and communicating emerging vaccine preventable and infectious respiratory disease threats to Canadians.
- Collaboration with other national governments and international organizations to prevent and control vaccine preventable and infectious respiratory diseases.
- The Viral Respiratory Diseases Section produces weekly or biweekly **FluWatch** reports, summarizing influenza surveillance activities in Canada. Weekly reports are produced during the influenza season (October - May) and biweekly reports are produced during the off season (June - September). Influenza surveillance is a collaborative effort between provincial and territorial ministries of health, participating laboratories, The College of Family Physicians of Canada, sentinel physicians, and CIDPC.

## National HIV and Retrovirology Laboratories

The HIV and Retrovirology Laboratory provides comprehensive expertise to national and international partners in human and emerging retrovirus testing and research. These partners include other Health Canada programs (such as regulatory branches of Health Canada), laboratories associated with the provincial ministry of health, and hospital and blood-screening labs.

The Laboratory provides expertise in HIV/HTLV reference service testing and national and international quality assurance programs for HIV serology, viral load testing and lymphocyte enumeration.

The Laboratory also develops, evaluates and transfers related technologies to national and international partners. In addition, the National HIV Laboratories provides laboratory support for HIV and STD surveillance programs through the provision of the specialized laboratory testing necessary for national HIV incidence estimates as well as laboratory support of the Canadian HIV Strain Surveillance and Drug Resistance Surveillance Program (CHSDRSP).

### **Surveillance and Risk Assessment Division**

This Division conducts national surveillance of notifiable diseases, undertakes risk assessments and carries out modeling and projections for infectious diseases, with particular attention being paid to newly emerging threats. The Division also manages a regionally-based network of field surveillance officers to work with provincial and territorial authorities to improve the timeliness and completeness of surveillance data on infectious diseases.

The Division collects and analyses national HIV and AIDS surveillance information and assesses the temporal, geographic and demographic trends in the HIV epidemic. In addition, the Division provides public health intelligence on the size and trend of the HIV/AIDS epidemics in Canada and provides technical and financial support for extramural, targeted research and analysis (including outbreak investigations), performs intramural research and analysis, and hosts national meetings on issues of importance to HIV epidemiology and surveillance.

## **Centre for Emergency Preparedness and Response**

The Centre is Canada's central coordinating point for public health security issues. Its many responsibilities include developing and maintaining national emergency response plans for the Public Health Agency of Canada; monitoring outbreaks and global disease events; assessing public health risks during emergencies; contributing to keeping Canada's health and emergency policies in line with threats to public health security and general security for Canadians in collaboration with other federal and international health and security agencies; being responsible for the important federal public health rules governing laboratory safety and security, quarantine and similar issues; and being the health authority in the Government of Canada on bioterrorism, emergency health services and emergency response.

### **Office of Emergency Preparedness, Planning and Training**

The Office of Emergency Preparedness, Planning and Training is responsible for the Centre's overall strategic and management planning. It manages emergency preparedness and emergency response plans and keeps them up to date. It develops and runs exercises to train emergency workers so they are ready to put those plans into action. This office is also responsible for developing and delivering training courses that teach health workers how to respond to emergency situations.

### **Office of Laboratory Safety**

The office of Laboratory Safety is comprised of three divisions: Biosafety, Emergency and Bioterrorism Response and Laboratory Safety.

### ***Biosafety Division***

The Biosafety Division develops and applies national biosafety policies and guidelines, assesses permit applications for applications for importation of human pathogens, issues permits for importation of human pathogens, certifies level 3 and 4 containment facilities, offers consultative services to microbiological laboratories, and acts as a resource centre by providing training and training services and information and acts as a WHO collaborating centre.

### ***Emergency and Bioterrorism Response Division***

The Emergency and Bioterrorism Response Division develops policies, procedures and guidelines for biosafety emergencies, threat reduction initiatives and biological proliferation prevention programs. It controls and tracks the use of dangerous pathogens in Canada. Monitors the accidental release of biological materials from certified and non-certified facilities and the instances of laboratory-acquired infections. Executes the Emergency Response Assistance Plan (ERAP) for national transportation emergencies involving Risk Group 4 human pathogens and effects a national plan for 24/7 on-scene responses to suspicious packages and other bioterrorism events.

### ***Laboratory Safety Division***

The Laboratory Safety Division has general responsibility for developing and managing safety programs for all the PHAC's laboratories.

## **Centre for Surveillance Coordination**

The mandate of the Centre for Surveillance Coordination is to collaborate with IT professionals, health professionals and policy makers on the development, maintenance and use of health information, tools and skills to enable timely and informed decision making for public health that results in improved public health policies, programs and interventions that protect and promote the health of Canadians.

The vision of the Centre for Surveillance Coordination is to be the national centre of leadership, expertise and excellence in health surveillance coordination.

The Centre promotes knowledge transfer through a variety of means:

- offering training programs that develop relevant skills either in person or on-line;
- developing, adapting and promoting the use of information and communication technologies to improve access to relevant health surveillance information;
- bringing together different levels of government - provincial and territorial, local and regional, and federal - to work on standards and joint strategies, to develop systems for health surveillance; and

- coordinating communication between members in the Network for Health Surveillance in Canada.

The Centre and its partners are involved in several surveillance tools and projects, and provide training programs to support these activities. Some of these activities include:

- **Biotechnology Surveillance Project**

A national system for monitoring the potential health effects of biotechnology products in Canada.

- **Canadian Integrated Public Health Surveillance Project**

A suite of computer applications and databases, including:

- Laboratory Data Management System (LDMS), and
- Public Health Information System (i-PHIS) Outbreak modules.

**i-PHIS** is an automated, integrated, client health record and reporting system that supports public health provider interventions, tracking, follow-up, case management, and reporting. i-PHIS includes immunization tracking, communicable disease case management, and surveillance components and is designed to be used centrally, providing secure access to one client record by multiple public health providers and programs and allowing communicable disease surveillance and immunization information to be shared.

- **Canadian Field Epidemiology Training Program**

A two-year program providing practical public health experience in applied epidemiology

- **Geographic Information Systems Infrastructure**

Spatial data, tools and services to enable and support public health professionals with visually displaying their health data on a map.

- **Network for Health Surveillance in Canada**

A partnership that is building the relationships, tools and connections to access, via the Internet, the information to better meet public health needs

- **Skills Enhancement for Health Surveillance**

An Internet-based training initiative for health professionals in local public health departments and regional health authorities across Canada

## **Laboratory for Foodborne Zoonoses**

The Laboratory for Foodborne Zoonoses (LFZ) located in Guelph, Ontario, provides policy makers and other stakeholders with scientific information and advice on minimizing the risks of human illnesses arising from the interface between humans, animals and the environment. Special emphasis is placed on infections due to enteric pathogens [intestinal disease causing agents].

Satellite units in Lethbridge, Alberta and St-Hyacinthe, Québec, provide opportunities for collaborative projects with universities, (federal and provincial) government agencies, public health, and industry partners in delivery of the programme objectives. The Reference Laboratories of LFZ are accredited by Standards Council of Canada to ISO/IEC 17025 (Accredited Laboratory # 265). The Salmonella Typing Laboratory is designated as an Office Internationale des Epizooties (OIE) Reference Laboratory for Salmonellosis.

The Laboratory Centre consists of the following programs:

- Integrated enteric Pathogen Surveillance
- Population and Agro-Environmental Risk Factor Determinants
- Microbial and Host Determinants Research
- Antimicrobial Resistance in Agri-Food and Aquaculture and the Impact of Human Health
- Health Risk Modelling
- Policy Advice for Policy Effectiveness in Decreasing the Risk of Zoonotic Enteric Infections

## ***National Microbiology Laboratory***

The National Microbiology Laboratory is located in the Canadian Science Centre for Human and Animal Health in Winnipeg. This facility houses the NML's Biological Safety Level (BSL 4) containment laboratories dealing with both human and animal health, currently Canada's only operational BSL 4 laboratory and one of just 15 such high-containment laboratories in the world.

The NML's programs of research and services encompass diagnostic and reference microbiology and virology, disease surveillance, fundamental research and the development of new products and methods in microbiology and infectious diseases.

Researchers in the NML also study emerging pathogens (e.g. hemorrhagic fever viruses) and organisms that have developed resistance to current antibiotic treatment), drawing on their extensive international connections and experience.

Activities of the NML include:

- diagnosis of human diseases
- development of new diagnostic methods
- response to acute outbreaks of diseases across Canada
- training of scientists and health officials
- evaluating methods for controlling and eradicating diseases
- reference microbiology
- infectious disease surveillance
- emergency response
- applied research
- discovery research
- development of new products
- development of new diagnostic techniques
- provision of highly specialized diagnostic services

- emergency response to bioterrorism or biocrimes involving infectious agents

Research programs and services at the NML include:

## **National Laboratory for Host Genetics and Prion Diseases**

*(Chief: Dr. Michael Coulthart)*

The Host Genetics and Prion Disease program (HGPD) concentrates on the infectious agents and host responses of Transmissible Spongiform Encephalopathies (TSEs, also known as prion diseases). TSEs comprise a number of lethal transmissible neurodegenerative conditions affecting both humans (Creutzfeldt-Jakob disease) and animals (bovine spongiform encephalopathy, BSE, in cattle; scrapie in sheep and goats; and chronic wasting disease, CWD, in deer and elk). These rare diseases are widely believed to be caused by unconventional, virus-like infective agents composed largely or entirely of a misshapen host protein.

HGPD is playing an increasingly important role in the national capability for timely detection, aggressive risk management, and advanced research for both conventional and novel forms of TSE (e.g. variant Creutzfeldt-Jakob disease) which pose threats to the health of Canadians. Activities include:

- providing scientific and technical support to the Public Health Agency of Canada's national CJD Surveillance System, including special investigations in connection with particular cases;
- conducting original research on biological mechanisms of TSEs;
- developing new methodologies to detect, monitor and characterize TSEs;
- investigating the unconventional infectious agents of TSEs;
- collaborating with the Canadian Food Inspection Agency on animal TSE initiatives; and
- providing training, education and outreach to professionals and the public.

## **National Laboratory for Enteric Pathogens**

*(Acting Chief: Dr. Clifford Clark)*

The National Laboratory for Enteric Pathogens (NLEP) provides programs directed towards ensuring the health and safety of the Canadian public with respect to the prevention and control of enteric foodborne pathogens causing disease. The NLEP activities are targeted to reduce the risk of outbreaks of human foodborne disease and to ensure that enteric endemic disease is a priority health issue in Canada.

The NLEP program embraces four key activities:

- **National Laboratory Reference Services**

provision of laboratory technology for hazard identification and characterization of enteric foodborne pathogens and emerging infectious enteric diseases affecting humans, which include Salmonella, Shigella, E. coli, E. coli O157:H7 (associated

with hamburger disease), *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Listeria*, *Campylobacter*, *Helicobacter* and *Aeromonas*;

- **Laboratory-Based Surveillance**

collection, collation and dissemination of data nationally and internationally on enteric pathogens associated with sporadic cases and outbreaks of foodborne disease in Canada;

- **Training/Technology Transfer/International Collaboration**

training health care professionals both nationally and internationally to meet the needs of the public health system, provision of technical and professional expert advice and collaborative support to laboratories during outbreak investigations; and

- **Targeted Applied Research and Development**

provision of this component strongly supports national reference capabilities for identification and surveillance activities for tracking infectious disease by developing new technologies and methodologies.

The NLEP addresses program challenges that include: emerging and re-emerging enteric pathogens, antimicrobial resistance, contamination of imported products, globalization and travel. These activities ensure that food safety is a priority health concern in Canada.

## **National Laboratory for Zoonotics and Special Pathogens**

*(Chief: Dr. Harvey Artsob)*

The National Laboratory for Zoonotic Diseases and Special Pathogens consists of multi-complex laboratory research and surveillance programs for the diagnosis, surveillance, prevention and control of zoonotic diseases in humans. This Laboratory performs serological and genetic analysis of pathogenic organisms which are transmitted from animals to man. Such organisms include:

- hantaviruses, which cause pulmonary syndrome and haemorrhagic fever with renal syndrome,
- arboviruses, which cause encephalitis,
- rickettsia, which cause Rocky Mountain spotted fever, endemic typhus fever,
- Q fever and Ehrlichiosis,
- *Leptospira*,
- *Borrelia burgdorferi* which causes Lyme disease and
- *Bartonella* which causes Bartonellosis,
- cat scratch disease angiomatosis, and other syndromes.

Diagnostics for biocontainment Level 4 haemorrhagic fever viruses including ones such as: Ebola, Marburg and Lassa fever viruses which if imported via travelers into Canada could constitute a potential public health emergency are being set up and research and surveillance programs established in collaboration with the World Health Organization and other partners.

## **National Laboratory for Bacteriology**

*(Acting Chief: Dr. Amin Kabani)*

The National Laboratory for Bacteriology consists of multi complex laboratory research and surveillance programs for the diagnosis, surveillance, prevention and control of human bacterial (non enteric and non STD) diseases such as meningococcal disease, tuberculosis, pneumococcal disease, tetanus, diphtheria, meningitis and a wide variety of diseases caused by aerobic and anaerobic infections. It is responsible for the identification and characterization these bacterial pathogens which cause life threatening diseases. There is a responsibility for monitoring the development of bacterial resistance to antibiotics, a serious emerging global issue, particularly in hospital environments.

## **National Laboratory for Viral Diagnostics**

*(Chief: Dr. Tim Booth)*

The National Laboratory for Viral Diagnostics is a centre of excellence, which provides advanced reference services and research in this field. Provides services to support the Canadian public health system by making accurate diagnosis for viral diseases (such as Influenza; RSV; Adeno; Hepatitis A, B, C, D, E; Measles; Rubella, HHV6; Parvovirus B19; Paramyxo and HHV8); outbreak investigations, quality assurance and surveillance.

## **Canadian Public Health Laboratory Network**

In addition to addressing concerns about the increased frequency and potential lethality of bioterrorism agents, the scope of the Network includes other aspects of public health such as water and food safety in response to water-borne outbreaks in Walkerton, Ontario and North Battleford, Saskatchewan. The CPHLN Secretariat is located at the Canadian Science Centre for Human and Animal Health in Winnipeg.

The Network's current mandate is to develop and implement strategies to:

- Coordinate pathogen detection, infectious disease prevention and control;
- Conduct laboratory-based surveillance including the development of early warning systems to monitor and detect emerging pathogens, antibiotic resistant organisms and outbreaks; and
- Counter bioterrorism threats.

CPHLN members include:

- The Laboratory Director or designate of each Provincial Public Health Laboratory;
- The Scientific Director General or designate of the National Microbiology Laboratory (NML);
- Centre for Infectious Disease Prevention and Control (CIDPC);
- Laboratory for Foodborne Zoonoses (LFZ);
- National HIV and Retrovirology Laboratories;
- Centre for Emergency Preparedness and Response (CEPR);
- Defence Research and Development Canada (DRDC);
- Canadian Food Inspection Agency (CFIA);

- Canadian Blood Services (CBS);
- Héma Québec, and
- Council of Chief Medical Officers of Health (CCMOH).

## ***National Research Council of Canada:***

The National Research Council (NRC) is the Government of Canada's premier organization for research and development. NRC is composed of over 20 institutes and national programs, spanning a wide variety of disciplines and offering a broad array of services.

- NRC institutes and programs are organized into three (3) key areas:
- Physical Sciences and Engineering
- Life Sciences and Information Technology
- Technology and Industry Support

The Life Sciences and Information Technology is a portfolio comprised of the five biotechnology institutes (NRC-BRI, NRC-IBS, NRC-PBI, NRC-IBD, NRC-IMB) and the Genomics and Health Initiative, NRC-SIMS, NRC-NINT, NRC-INMS and the information and communications technology institutes of NRC-IMS and NRC-IIT. Their facilities are located in communities across the country.

- **NRC Biotechnology Research Institute: Health Sector**  
(*Director General: Dr. Michel J. Desrochers*)

The Health sector is active in the development of new strategies for the treatment of cancer and infectious diseases, such as research at the molecular level, the use of receptors and signal transduction, and the use of proteases and protease regulation.

- **NRC Institute for Biological Sciences: Immunochemistry Program**  
(*Director General: Dr. Gabrielle Adams*)

The Immunochemistry Program conducts molecular-level research, through a multidisciplinary team, that leads to the development of novel vaccines and immunotherapeutics. These are pursued through the Bioanalysis, Carbohydrate-Protein Systems, Vaccine Design, Infection and Immunity, Immunobiology, Molecular Pathogenesis and Pathogen Genomics Research groups.

NRC-IBS has a strong track record for transferring technology and knowledge to multi-national, small and medium-sized Canadian firms. NRC-IBS is also closely involved with the development and activities of Canadian Centre of Excellence Networks such as Bacterial Diseases, and Stroke.

- **NRC Institute for Biodiagnostics**  
(*Director General: Dr. Ian Smith*)

Research groups at IBD focus on the development of noninvasive techniques for biomedical applications. Work at the Institute also has a strong focus on the

development of better methods for the analysis and interpretation of biomedical data.

### **Biosystems Research Group:**

Biosystems Research Group is one of four research groups that make up the Institute for Biodiagnostics. The Biosystems Group is a multidisciplinary group of research staff with expertise in biochemistry, engineering, magnetic resonance physics, medicine, microbiology, physiology, and pharmacology.

The combined scientific and instrumental skills of Biosystems are used to develop novel methods to monitor physiology, diagnose disease, and evaluate the efficacy of novel therapeutic compounds. These activities are undertaken in three major programme areas one of which is infectious disease.

The Biosystems Group and the National Microbiology Laboratory (NML) of Health Canada have recently established a programme of research in the area of infectious diseases. This programme is motivated by the longstanding social and economic impacts of infectious disease on the world's health.

Areas of interest:

- TSEs (transmissible spongiform encephalopathies)
- Chronic disease and pathogen connections
- National security threats posed by biological and economic terrorism
- Bacterial infections

## **NRC Genomics and Health Initiative**

The National Research Council's Genomics and Health Initiative (GHI) was launched in 1999 in order to bring the benefits of revolutionary advances in the genome sciences and health research to a variety of Canadian industrial sectors and regions. Through this initiative the NRC is making key contributions to national efforts to exploit advances in the areas of genomics and health. These advances are being achieved by building upon NRC's expertise in its biotechnology research institutes, as well as regional innovation networks across the country.

The Genomics and Health Initiative has four primary goals:

- To advance the frontiers of scientific and technical knowledge within the areas of genome sciences and health-related research to create a knowledge base which will contribute to Canada's competitiveness in the 21st Century.
- To create and use new genomics or health-related technologies to support Canadian industrial sectors such as aquaculture, agriculture, environment, and health.
- To support and participate in the development of sectoral, national and international genomics and health-related innovation networks.

- To foster increased cooperation and integration in genomics and health-related research and innovation programs across the National Research Council, as well as with partners in other federal departments and agencies, other levels of government, universities and the private sector.

### ***Human Pathogens and their Host Interaction Programme***

*(Director Biotechnology Horizontal Initiatives and Inter-departmental Relations: Dr. Richard Isnor)*

The GHI is the NRC's first large-scale horizontal research program – managed across the National Research Council's major biotechnology institutes, including the Institute for Marine Biology (NRC-IMB), the Institute for Biological Sciences (NRC-IBS), the Institute for Biodiagnostics (NRC-IBD), the Biotechnology Research Institute (NRC-BRI), and the Plant Biotechnology Institute (NRC-PBI). Several other NRC institutes, including the Steacie Institute for Molecular Sciences (NRC-SIMS), the Institute for Information Technology (NRC-IIT), and the Integrated Manufacturing Technology Institute (NRC-IMTI) are also involved in GHI programs.

Infectious diseases are an increasingly important health concern. The rapid spread of antibiotic resistance within pathogenic bacteria is threatening powerful defensive tools against a wide range of diseases. Fungal infections are also growing in medical importance as AIDS, cancer chemotherapy, and tissue transplantation leave millions of humans in an immune-compromised state that is highly susceptible to systemic infections. For both bacteria and fungi there is a need to identify new targets for therapeutic intervention, particularly for mucosal and intracellular pathogens, where effective strategies for immunological intervention are lacking. Genomic tools are providing radically new means to identify such targets, and to investigate the complex interplay between the host and the pathogen during infection.

The objective of the Human Pathogens Program is to apply new genomics tools to three human pathogens, *Candida albicans*, *Francisella tularensis* and *Campylobacter jejuni*. These three pathogens each have unique characteristics (e.g. *F. tularensis* is an intracellular pathogen; *C. albicans* is a mucosal fungus; and *C. jejuni* is a mucosal bacterium). Collectively, they provide a broad overview of host responses to infectious pathogens. New means of combating these pathogens are being sought from the increased understanding of their behaviour and cellular biology through genomics.

DNA microarray and proteomics methodologies are being used in combination to permit detailed examination of message and protein profiles for both pathogen and host in experiments using in vitro human cell cultures or in vivo mouse models. This program is also exploring the interactions between an invading pathogen and other organisms that live within a human host.

## 5. Provincial Government Agencies

### *Government of Alberta:*

Governmental responsibility for implementation of public health initiatives relating to infectious diseases lies mainly within the Department of Health and Wellness.

### **Department of Health and Wellness**

- **Population Health Branch**

Provides leadership in health surveillance, disease control and prevention, and population health strategy development. Facilitates coordinated approaches to improving public health and medical care through public health policy development. Develops policies and strategies for publicly funded drug programs.

- **Strategic Directions Branch**

Coordinates environmental scanning to identify, track and address strategic issues, prepares the Ministry Business Plan, develops health system policy and strategies, and works with federal/provincial/territorial health departments on current and emerging intergovernmental issues to assist in planning and policy development.

- **Communications Branch**

Provides strategic communications counsel and support to help the department, Minister and government communicate on health issues with the health system and Albertans. Initiates information programs and public education campaigns, and provides services that include media relations, correspondence support and liaising with department staff and other partners

- **Alberta Wellnet**

Alberta's Electronic Health Record is a clinical health information network that links community physicians, pharmacists, hospitals, and other authorized health care professionals across the province. It lets these health care practitioners see and update health information such as a patient's allergies, prescriptions, and lab tests.

- **Alberta Provincial Laboratory for Public Health**

ProvLab is responsible for the provision of outstanding outbreak investigation, population-based screening, and state of the art diagnostic testing to support public health programs. ProvLab is a key partner in providing support for organizations such as Alberta's health regions, universities, hospitals and

government. The high-level laboratory testing conducted at ProvLab is a critical component in patient care and disease control, ensuring rapid response to emerging pathogens and effective health protection and promotion.

## **Government of British Columbia:**

### **Provincial Health Services Authority**

*(President & CEO: Lynda Cranston)*

The Provincial Health Services Authority (PHSA) is responsible for managing the quality, coordination, accessibility and cost of selected province-wide health-care programs and services. This includes selected services provided in facilities governed by other health authorities, as well as those programs and services provided through several provincial agencies one of which is the BC Centre for Disease Control.

### **Office of the Chief Provincial Health Officer**

*(Provincial Medical Health Officer: Dr. Perry Kendall, Dr. Eric Young, Deputy Provincial Health Officer)*

The Provincial Health Officer is the senior medical health officer for British Columbia. Responsibilities are outlined in the *Health Act* and include:

- Providing independent advice on health issues to the Minister and Ministry of Health Services;
- Reporting to British Columbians on the health of the population and other health issues;
- Recommending actions to improve health and wellness;
- Reporting on progress towards achieving BC's health goals;
- Working with the B.C. Centre for Disease Control and
- Prevention and BC's medical health officers to fulfill their legislated mandates on disease control and health protection

### **BC Centre for Disease Control**

*(Mary Jordan - Provincial Executive Director)*

BC Centre for Disease Control (BCCDC) is an agency of the Provincial Health Services Authority that has responsibility to support a comprehensive program of communicable disease and environmental health prevention and control for the province of British Columbia.

Key specialized, yet integrated services within BCCDC operate to support the province's regional health authorities to provide the specialized services necessary to control communicable disease and promote environmental health.

BCCDC collaborates with the University of British Columbia Centre for Disease Control (UBC CDC) in the advancement of public health policy, applied research and clinical

teaching. The following are the key communicable disease control programs and services at BCCDC:

- Hepatitis Services
- Epidemiology Services
- Laboratory Services
- STD/AIDS Control
- Tuberculosis Control

BCCDC staff provide extensive expertise in:

- bacteriology
- environmental testing (food and water)
- mycobacteriology
- mycology
- molecular diagnostics
- parasitology

## ***Government of Manitoba:***

### **Manitoba Ministry of Health**

#### **Public Health Department**

The core functions of the Province's public health are population health assessment, health surveillance, disease and injury prevention health promotion and health protection.

#### **Office of the Chief Medical Officer of Health**

*(Chief Medical Officer of Health: Dr. Joel Kettner)*

The Office of the Chief Medical Officer of Health is part of a network of regional Medical Officers of Health and other members of the public health system in Manitoba and Canada to protect and promote the health of Manitobans. The office provides appropriate and timely information on major health issues that affect the health of Manitobans

#### **Public Health and Epidemiology Branch**

*(Director of Public Health: Dr. Greg Hammond)*

The Public Health Branch aims to provide the leadership and coordination for an integrated approach to public health programs and services. The Branch is organized into the functional units. Those relevant to infectious diseases are:

- **Communicable Disease Control Unit**

The Communicable Disease Control (CDC) Unit's mission is to promote, support and facilitate the prevention and control of communicable diseases in Manitoba.

- **Environmental Health Unit**

The Environmental Health Unit's mandate is to monitor and participate in coordinated responses to chemical, microbiological and social public health issues, including environmental health risk assessment, food protection, tobacco reduction, and dental/oral health.

- **Cadham Provincial Laboratory**

*(Director: Dr. Paul van Caesele)*

Cadham Provincial Laboratory serves as Manitoba's early warning system for a host of communicable diseases that threaten population health.

## ***Government of New Brunswick:*** **Department of Health and Wellness, Division of Public Health Medical Services**

*(Director, Steve Benteau)*

Public Health Services support healthy growth and development, foster healthy lifestyles, control communicable diseases, and protect the public from adverse health consequences of exposure to chemical, physical and biological agents.

## ***Government of Newfoundland and Labrador:***

### **Ministry of Health and Community Services**

#### **Division of Disease Control and Epidemiology**

*(Director: Dr. Faith Stratton)*

This Division is primarily responsible for the epidemiology, surveillance and control of communicable diseases through a comprehensive program of immunization, disease reporting, follow-up, and control of disease occurrences and outbreaks. It also has responsibility for the epidemiology and control of non-communicable and chronic diseases and works as part of a government team to ensure a safe environment.

#### **Divisional Functions:**

**Disease Surveillance** - involves receiving, compiling and analyzing reported communicable diseases as outlined in the Communicable Diseases Act and the Venereal Diseases Act. In addition to producing weekly, monthly and annual reports for the province, and reporting to Health Canada, this includes maintenance of disease

registries. Disease registries maintain demographic, treatment and epidemiologic data on individuals with specific diseases. There are seven current disease registries; Tuberculosis, Syphilis, Hepatitis B, Hepatitis C, HIV and AIDS, Measles, Meningococcal Disease.

**Disease Control** - involves responding to variations in disease patterns, outside that which is normal or expected in the population, with a view to elimination or containment. Some examples include investigation and control of outbreaks of food and water-borne illness, tuberculosis, measles, and unidentified symptoms or disease syndromes in the population.

**Immunization** - involves the immunization of all persons in the province according to national and provincial standards and recommendations. This includes policy development, maintenance of vaccine supply (including budget and monitoring), maintenance of immunization records, and provision of data related to immunization status. Also included in this program are ad hoc immunization programs directed to specific outbreak control measures.

**Environmental Health** - The environmental health program of the Disease Control and Epidemiology Division is responsible for the review and/or development of environmental/public health program areas.

## **Newfoundland and Labrador Public Health Laboratory**

The Newfoundland and Labrador Public Health Laboratory:

- Acts as the provincial laboratory for infectious disease surveillance and control.
- Provides a comprehensive range of specialized and reference laboratory services in clinical and public health microbiology and infectious disease epidemiology to the province and
- Pursues research in these areas.

Roles and functions of the laboratory include:

- Specialized and reference laboratory services in clinical and public health microbiology to all physicians, hospitals, clinics and health-related agencies in the province.
- Laboratory and consultative services in outbreak investigation and control.
- Laboratory-based surveillance of communicable disease incidence and prevalence.
- Research and development activities in the areas of infectious disease epidemiology, immunization, community health, clinical and public health microbiology.

- Maintenance of expertise in the above areas, rapid response to exigencies and provision of timely information to help guide provincial and national policy.

## **Government of Nova Scotia:**

### **Department of Health**

#### **Office of the Provincial Medical Officer of Health**

*(Provincial Medical Officer of Health: Dr. Jeff Scott)*

The Office of the Provincial Medical Officer of Health is responsible for the Department of Health's legislated responsibility to protect and promote the public's health in the following areas:

- Communicable disease control
- Environmental health
- Emergency preparedness and response

The Office, in collaboration with academic expertise at Dalhousie University, function as an expert resource in community health science and an epidemiological resource for the department, the health districts, and other relevant government and community groups.

## **Government of Ontario:**

### **Ministry of Health and Long-term Care**

*(Chief Medical Officer of Health: Dr. Sheela Basrur, Assistant Deputy Minister (Public Health); Director of Infectious Disease: Dr. R. Jin; Executive Director of Public Health R. Hawkins; Director of Strategic Planning and Implementation: P. Jackson; Director of Public Health Capacity Review: Vacant)*

The ministry is responsible for administering the health care system and providing services to the Ontario public through such programs as health insurance, drug benefits, assistive devices, care for the mentally ill, long-term care, home care, community and public health, and health promotion and disease prevention. It also regulates hospitals and nursing homes, operates psychiatric hospitals and medical laboratories, and co-ordinates emergency health services.

### **Ministry of Health and Long-Term Care Research Unit**

The Ministry of Health and Long-Term Care's Research Unit is dedicated to supporting high quality health and health services research, to making research more relevant to decision makers, and to forging stronger links and more effective working relationships between researchers and decision makers.

The Research Unit monitors, coordinates and provides leadership to internal and external research activities that contribute to the development of health policy and for the dissemination of research findings to support evidence based decision making.

The Research Unit is part of the Corporate Policy Branch, within the Integrated Policy and Planning Division.

## **Ontario Provincial Infectious Diseases Advisory Committee (PIDAC)**

*(Co-chairs: Dr. David Williams, Medical Officer of Health for Thunder Bay District, and Dr. Dick Zoutman, Chief of the Department of Medical Microbiology and Medical Director of Infection Control Services, Kingston General Hospital)*

In response to a recommendation by the Expert Panel on SARS and Infectious Disease Control (the Walker Panel) the Ministry of Health and Long-Term Care established the Provincial Infectious Diseases Advisory Committee (PIDAC) to provide a single standing source of expert advice on infectious diseases for Ontario.

PIDAC advises the Chief Medical Officer of Health (CMOH) on prevention, surveillance and control measures necessary to protect the people of Ontario from infectious diseases. PIDAC provides the CMOH with advice on issues such as standards and guidelines for infection control, emergency preparedness for an infectious disease outbreak, protocols to prevent and control infectious diseases, and immunization programs.

PIDAC brings together a high level of expertise from relevant fields across Ontario's healthcare sector, including respected experts in infection control, infectious disease, medical microbiology, public health, epidemiology, and occupational health and safety.

## **Ontario Health Pandemic Influenza Plan**

If an influenza pandemic occurs, it will trigger implementation of the Canadian Pandemic Influenza Plan, Ontario Health Pandemic Influenza Plan and local plans, developed during the pre-pandemic phase. Response measures will be affected by the epidemiology of the pandemic nationally and globally, the age distribution and severity of the illness, and the efficiency of transmission from human to human. Ontario's response plan for the health care system is based on best estimates and may have to be modified if the epidemiology of the outbreak is significantly different from planning assumptions.

## **Emergency Management Unit (Ministry of Health and Long-Term Care)**

The Emergency Management Unit (EMU) supports emergency management activities within the Ministry of Health and Long-Term Care and the healthcare system. EMU collaborates with stakeholders to develop, implement and maintain a comprehensive strategy to prepare for, respond to, and recover from health emergencies of known and unknown origins (a power outage, a biological accident, or contaminated water supply).

## **Government of Prince Edward Island:**

### **Department of Health and Social Services, Office of the Chief Health Officer**

*(Chief Health Officer: Dr. Lamont Sweet)*

The Office of the Chief Health Officer is responsible for administration of the Public Health Act, supervision of related public health programs, and disease surveillance and control.

## **Government of Quebec:**

### **Ministère de la Santé et des Services sociaux**

The mission of the MSSS is to maintain, improve and restore the health and welfare of Québec residents by making available to them an entire range of integrated, high-quality health and social services. The primary role of the MSSS is to ensure that the Québec health care system and its network function well.

Furthermore, it must also ensure that health and welfare policy guidelines are appropriate and evaluate results based on set objectives. The fact that the MSSS is responsible both for establishing the general policies of the system and for reporting on performance enables it to exercise control before as well as after health services are implemented.

Its comprehensive mission, numerous partners and the diversity of its users all call for the use of a variety of levers of intervention on the part of the MSSS:

- Developing, implementing and evaluating health and social service policies;
- Approving regional priorities in accordance with ministerial policies;
- Coordinating the Programme national de santé publique (Québec National Public Health Program) and introducing measures for public health protection;
- Distributing human, material, financial and information resources equitably among the regions of Québec;
- Implementing the management frameworks necessary for efficient and effective resource use;
- Establishing labour policies and guidelines pertaining to the network;
- Coordinating interregional services;
- Coordinating cross-sectoral activities;
- Evaluating the effects of health and social service policies.

### **Institut national de sante publique du Quebec (INSPQ)**

*(Jean-Philippe Weber, Director)*

This government institute was established in 1998 to serve as the primary organization to improve coordination, development and use of expertise in public health. It brought together the public health laboratories with staff previously in government departments and regional health authorities. Its roles include providing public information, working with universities in public health training, and promoting national and international cooperation.

It operates three laboratories institutions:

- Quebec Public Health Laboratory
- Screening Expertise Centre
- Quebec Toxicology Centre

Its activities related to infectious diseases include:

- Specialized advice and assistance – notices in crisis or emergencies; public health recommendations; and program assessments.
- Specialized laboratories – analyses in microbiology, toxicology and physical chemistry; development of new techniques; reportable disease outbreak surveillance; monitoring of side effects following an immunization; and information systems.
- Information -- public and media information and publications.
- Training -- teaching and training positions; seminars, symposiums.
- International cooperation -- exchanges, knowledge sharing.

Among the Institute's six program sectors is one dealing with biological, environmental and occupational risk. Its programs address: control, prevention and monitoring of infectious diseases; immunization; diseases transmitted through blood (STDs and HIV/AIDS); occupational; health; and health and the environment.

## ***Government of Saskatchewan:***

### **Department of Health: Population Health Branch**

The goal of the Population Health Branch is the best possible health status for the entire population. The branch co-ordinates and encourages initiatives that promote and protect health and prevent disease and injury. It actively supports research and evaluation into health status, health trends and the risks to and determinants of health.

The key roles of the branch are to:

- provide leadership in defining and implementing a vision for health and a framework for health systems
- assess, promote and protect the health of the Saskatchewan population
- ensure the provision of essential and appropriate public health services to Saskatchewan residents.

The branch's four units are divided according to primary areas of responsibility:

- Communicable Disease Control Unit
- Epidemiology, Research and Evaluation Unit

- Disease Prevention and Health Protection Unit
- Health Promotion Unit

## **Saskatchewan Provincial Laboratory**

The Provincial Laboratory's mission is to provide leadership in provincial public health and reference laboratory services through quality services to its clients, applying the necessary technology and research.

The Provincial Laboratory offers services in:

- Microbiology
- Chemistry
- Environmental sciences
- Support services.

## ***Government of the Northwest Territories:***

### **Department of Health and Social Services**

*(Chief Medical Health Officer: Dr. Andre Corriveau, Deputy Chief Medical Health Officer Dr. Kami Kandola)*

#### **Communicable Disease Control Program**

The goal of the communicable disease control program is to control and prevent communicable diseases in the NWT. This program provides services to groups and individuals who are infected with, or at risk of contracting, a communicable disease.

#### **Environmental Health**

Environmental health provides for the delivery of various programs and services under the NWT Public Health Act and Regulations, and focuses on:

- preventing disease and injury;
- promoting health; and
- improving the environment through the use of education, consultation, inspection, monitoring, and if necessary, by the enforcement of public health legislation.

## ***Government of Nunavut:***

### **Ministry of Health and Social Services**

*(Chief Medical Health Officer: Dr. Jim Talbot)*

## **Office of the Chief Medical Health Officer**

The Chief Medical officer of Health provides leadership, direction and expertise in defining the mission, principles and strategies for various health protection programs delivered within the Territory of Nunavut to promote public health.

## **Health Protection Unit (HPU)**

The Health Protection Unit provides expert advice and quality support to the regions, which are responsible for the delivery of programs and services dedicated to protecting the health of the population.

The Unit functions as an epidemiology unit to measure association between exposure and disease in individuals to understand the causation of disease in populations to prevent its spread.

The Health Protection Unit comprises of the following program areas:

- Communicable disease control
- Tuberculosis control
- Public health nurse control
- Environmental health program

## ***Government of the Yukon:***

### **Department of Health and Social Services**

*(Dr. Bryce Larke, Medical Officer of Health)*

#### **Environmental Health Branch**

The Environmental Health branch promotes care for the environment in the interest of human health. It engages in consultation and provides information, advice inspections and enforcement services on water quality, sewage and solid waste disposal, food quality, institutional hygiene, special events, recreational facilities, communicable disease control and other related matters.

#### **Health Promotion Branch**

The Health Promotion Branch provides health support and illness prevention services. This includes public awareness campaigns, school and community workshops, supporting development of environments to promote health, and conducting quality reviews of health programs. Information on birth control and STD testing and reproductive health can also be obtained.

#### **Yukon Communicable Disease Control**

YCDC is responsible for prevention, monitoring and control of all infectious diseases throughout the Yukon. YCDC should be contacted for matters such as HIV testing and

treatment, STD testing and treatment, emergency and non-emergency birth control, needle stick injuries, food poisoning, and Hepatitis C.

## Annex 2:

# Discussion Points and Options for NCC-ID Projects

This document was prepared for the National Collaborating Centre on Infectious Diseases. It was compiled from stakeholder information and proposals contained in submissions to inquiries and advisory processes on public health issues.

# **Discussion Points and Options for NCC-ID Projects**

**National Collaborating Centre on  
Infectious Disease**

**August 8, 2005**

## **Overview and Objective**

The purpose of this document is to serve as a basis for discussions to help identify and prioritize the projects and activities that could be undertaken by the National Collaborating Centre on Infectious Diseases.

The information and suggestions contained within this document represent a synopsis of the views of the various organizations listed in the reviewed websites appearing in the appendix. Information was compiled from the websites, usually under headings of “policy”, “advocacy”, “reports”, or “media/news releases”. The issues and proposals have been compiled from various reports and position papers prepared by those organizations.

The numbering assignment and their sequence is not meant to denote or suggest any rank or priority. The presentation in this form reflects a random arrangement of categories. Those categories are as follows:

1. Comprehensive Communication System
2. Public health Recruitment, Education and Profile
3. HIV/AIDS Prevention Education and Awareness
4. Emergency Response Capacity for Outbreaks and Biothreats
5. Aboriginal Health
6. Antimicrobial Resistance
7. Infection Control Standards
8. Work-Related Health Risks and Exposure
9. National Immunization Program
10. Laboratory Reference Standards, Protocols and Surveillance
11. International Connectivity
12. Policy Development
13. Focus on Youth

Comment on this list is welcomed, as are any suggestions about the rationale for the assignment of priorities to one or another of the categories and possible initiatives.

## **1. Comprehensive Communication System**

Develop a communications system that is national in scope and can quickly provide up-to-date information to health professionals, the public and media outlets for disease outbreaks, public emergencies and bioterrorist threats.

### **Considerations:**

- Application to other public health issues beyond infectious disease;
- Links with international, national, provincial and local authorities as well as volunteer sector and Non-Government Organizations, professional associations and community groups;
- Consistent messaging about same issue;
- Information available in language of choice;
- Strategies to reach underserved populations e.g. populations in rural/remote communities, First Nations, homeless, inner city populations,
- Emergency and non-emergency information;
- Multi-layered to respond to varying levels of access according to need/purpose e.g. – researchers, clinicians, general public and media;
- E-mail, website and paper notification systems;
- Testing/evaluation to ensure system meets the needs of various end-users.

## **2. Public Health Recruitment, Education and Profile**

Develop strategies to increase the profile of public health professions among Canadians. Develop educational opportunities for public health professionals to infectious disease prevention and individuals to ensure consistent base-line knowledge is available in all settings.

### **Considerations:**

- Raise the public's awareness of the work done by public health professionals;
- Emphasis on the value of prevention initiatives such as immunization programs and their effect on the health of Canadians;
- Consult with public health and communicable professional organizations and advocacy groups;
- Include a pediatric component;
- Determine availability/develop an inventory of training programs, courses and other educational materials to provide all public health workers with sufficient base-line infection control knowledge e.g. – remote access, distance education, training delivery on-site;

- Availability of upgrading/training for professionals in remote/isolated communities;

### **3. HIV/AIDS Prevention Education and Awareness**

Develop prevention/risk educational information in the form of an awareness campaign to help reduce the spread of HIV/AIDS. Focus prevention/educational programs to target populations demonstrating increased rates of infection.

#### **Considerations:**

- Educational and program ideas sensitive to the needs of specific populations (e.g. Aboriginal communities, women, youth);
- Include a health promotion component to address lifestyle choices that may increase the likelihood of HIV transmission (employment self-esteem, housing);
- Disease prevention, health promotion and harm reduction;
- Link between HIV and other sexually transmitted infections;
- Social and human rights issues – e.g. discrimination, stigmatization;
- Information tools appropriate for school curriculums – elementary through high school;
- Occupational infections;
- Support for front-line prevention and education workers/organizations;
- Private sector involvement;
- Inventory of successful program ideas, best practices and educational materials;
- One part of a more comprehensive blood-borne pathogen strategy;
- Prevention/treatment research.

### **4. Emergency Response Capacity for Outbreaks and Biothreats**

Develop strategies to respond to high-risk infectious disease outbreaks and bioterrorists threats.

#### **Considerations:**

- Involve all levels of government, academic and community emergency preparedness groups;
- Establish a clear reporting chain for suspected events – e.g. designate person(s) and organization to be in charge;
- Establish clear lines of authority and communication (i.e. health care providers, public health officials, ministries of health, Public Health Agency for Canada);

- Include all potential avenues and vectors:
  - Food safety;
  - Environmental (air, water, soil)
  - Workplace safety;
- Identify “priority” agents – i.e. those most likely to be used during a bioterrorist event and those that illicit most serious and wide-spread health effects and are easy to distribute (e.g. small pox, inhalation anthrax);
- Identify characteristics associated with priority agents;
- Recommended outbreak control strategies;
- Investigation techniques;
- Preparedness planning checklists;
- Surveillance/monitoring to identify illnesses from bioterrorist ;
- Practice, training and table-top exercises;
- Program evaluation;
- Quarantine awareness;
  - Why necessary
  - Consequences for not complying
- Consistency with initiatives in other countries (e.g. USA, UK).

## **5. Aboriginal Health**

Develop health promotion/education programs sensitive to the cultural needs of First Nations peoples for infectious diseases that appear at higher rates among the Aboriginal community (e.g. tuberculosis, HIV/AIDS, hepatitis B and Hepatitis C, meningitis).

### **Considerations:**

- Information and educational materials sensitive to First Nations culture;
- Focused prevention programs for youth;
- Lower rates of immunization among First Nations children;
- Consideration of other diseases that also occur in higher rates in First Nations populations;
- Shortage of First Nations health care providers;

## **6. Antimicrobial Resistance**

Coordinate an awareness campaign among health care providers and the Canadian public about the causes and consequences of antimicrobial resistance.

### **Considerations:**

- Consequences from over-use of antibiotics;

- Confusion between bacteria and viruses;
- Preventive program promoting the use other preventive techniques of e.g. hand washing and personal hygiene, safe food preparation;
- Consumer awareness re: antimicrobial products such as hand soap.

## **7. Infection Control Standards**

Co-ordinate/facilitate development of national standards and programs for infection control in health care facilities.

### **Considerations:**

- Include standards for all types of health care settings – e.g. home care, hospitals long-term care facilities;
- Audit techniques;
- Identify best practices;
- Involve local, provincial and territorial officials;
- Include advocacy groups – e.g. nurses unions, physician associations;
- Surveillance for nosocomial infections;
- Use of safety engineered medical devices – e.g. needles

## **8. Work-Related Health Risks and Exposure**

Develop policies, standards and surveillance systems to control occupational infections among workers who may be exposed to infectious disease due to the nature of their work e.g. health care, dentistry, cleaning, flight crews, laboratory workers.

### **Considerations:**

- All types of infections – e.g. bloodborne, airborne, vector-borne
- Applicable to occupations/workplaces beyond health care;
- Laboratory acquired infections;
- Nosocomial infections;
- Costs to the workers compensation systems;
- Consistent compensation standards;
- Compensation for quarantine;
- Standard precautions.

## 9. National Immunization Program

Coordinate a national immunization program for vaccine-preventable diseases to ensure that Canadians have equal access to immunization regardless of their geographic location, and to ensure consistent coverage regardless of geographic location (e.g. non-discriminatory).

### Considerations:

- Comprehensive system – i.e. includes all new vaccines;
- Access hard to reach groups (e.g. homeless, new Canadians)
- Information and educational materials:
  - Disease prevention and necessity for vaccines
  - Adverse reactions
- Comprehensive record keeping/surveillance:
  - national in scope
  - monitoring
  - capacity to identify adverse reactions
- Standardized procurement and distribution;
- Safety guidelines;
- Capacity to evaluate of health outcomes due to vaccine interventions;
- Stockpile of supplies for emergencies;
- Industry involvement – i.e. vaccine producers

## 10. Laboratory Reference Standards, Protocols and Surveillance

Coordinate development of national standards for laboratories and improve connectivity among national laboratories.

### Considerations:

- National database for notifiable diseases;
- Canadian reference laboratory system;
- National database to capture laboratory-acquired infections;
- Protocols for outbreak management and assigned authorities to individuals/organizations for newly identified infectious disease;
- Communication system among laboratories – private, local and hospital, provincial laboratories, National Microbiology Laboratory;
- Integrated laboratory surveillance systems to anticipate, detect, and respond to infectious disease threats – sharing of surveillance information among public health departments, hospitals, provincial laboratories, Public Health Departments, Public Health Agency of Canada and the National Microbiology Laboratory;
- Coordinated national food and water sampling;

- Occupational health and safety protocols for laboratory personnel;
- Appropriate penalties for non-adherence to national standards.

## **11. International Connectivity**

Develop stronger global connections with the World Health Organization, the Pan American Health Organization and other international agencies.

### **Considerations:**

- Timely exchange of information and lessons-learned of global significance/application;
- Promote the control of infectious diseases globally;

## **12. Policy Development**

Provide policy development leadership for issues of national relevance.

### **Considerations:**

- Translate research findings into policies/standards;
- Compensation for lost wages resulting from quarantine orders;
- Export/import policies for vaccines;
- Funding models;
- Health care workers' right to refuse influenza and other vaccines;
- Identify priority areas for academic research;
- Knowledge transfer of research solutions;

## **13. Focus on Youth**

Developing infectious disease prevention programs for children and youth that can be delivered within the school system.

### **Considerations:**

- School curriculum development and delivery methodology;
- HIV/AIDS and other Sexually transmitted infections;
- General infection control principles;
- Consider partnering with information about other key health issues facing youth;

## Appendix – Websites Consulted

Canadian Infectious Disease Society  
Canadian Nurses Association  
Canadian Paediatric Society  
Canadian Hospital Association  
Canadian Medical Association  
Canadian Public Health Association  
Canadian Pharmacists Association  
Canadian Immunization Awareness Program  
Community Health Nurses Association  
Canadian Health Care Association  
Canadian Coalition for Immunization Awareness and Promotion  
College of Family Physicians of Canada  
Canadian Institute of Child Health  
Canadian College of Health Services Executives and Hospital Administrators Association  
Health Council of Canada  
Community and Hospital Infection Control Association  
Canadian Society for Medical Laboratory Science  
Canadian Association of Medical Microbiologists  
Assembly of First Nations

*Contact:*

*Ken Beeson  
Coordinator, National Collaborating Centre on Infectious Diseases  
International Centre for Infectious Diseases  
Phone 604-250-6871  
E-mail [kbeeson@icid.com](mailto:kbeeson@icid.com)*

## Annex 3:

# Foresight Questionnaire

This questionnaire served as the basis for obtaining the initial information base for the Foresight Exercise carried out in July and August 2005.

## **Foresight Exercise on Infectious Diseases in Canada**

The National Collaborating Centre on Infectious Diseases has been asked by the Public Health Agency of Canada to help develop an integrated infectious diseases strategy by ensuring public participation and identifying the trends and emerging issues that will shape the future of public health.

We have been asked to assess the current conditions and environment, and look five years into the future to identify the significant infectious disease issues and opportunities from the perspectives of health professionals, scientists, academics, and advocates. We are to provide an analysis of potential impacts of the anticipated changes and obtain views on how all of us, including governments and institutions, should respond.

This questionnaire has been developed in order to focus discussions with experts such as yourself on infectious disease-related topics and issues that you are currently working on and the directions your work is taking, based on assumptions you have made about future needs and current gaps.

Discussion topics are not constrained by the questionnaire, and you are encouraged to offer any opinions or advice that you think may be relevant or necessary to inform development of an Integrated Infectious Disease Strategy (a question at the end of this questionnaire provides space for additional feedback).

This questionnaire is focused on four main themes:

- An evaluation of future infectious risks that should be considered as part of an integrated infectious disease strategy
- Needs of future users of information
- Perceived gaps that currently exist between what are considered to be future risks and what will be needed to fill those gaps;
- Suggestions on how those gaps should be filled,

### ***Please Note:***

*This questionnaire has already been administered over the telephone, nation-wide, to a cross-section of researchers, lab specialists, public health officials, associations and professional institute personnel, and front-line health care deliverers. Time constraints require that responses from people within government be received in a written form.*

***Please capture your responses to the questions within the body of the questionnaire and return as an attachment to: [corrinebalcaen@shaw.ca](mailto:corrinebalcaen@shaw.ca)***

***Responses must be received by September 13, 2005***

## **Background:**

1. What types of infectious disease-related work or research do you carry-out?
2. What do you hope to accomplish through your work or research?
3. How do you determine the areas/topics on which to focus your research or work?
4. Who are the consumers of your research or beneficiaries of your work?
5. How does your research or work fit into, or contribute to the broader public health picture?

## **Assumptions about the Future...**

1. What do you anticipate will be the focus of your research or work during the next five years?
2. Does this represent a shift in the focus of your research or work – if so, what assumptions are you making that are the basis for the shift or lack of a shift?
3. What factors influence the nature of your research or work? Do you anticipate that those factors will change during the next 5 years?
4. Are there areas of infectious disease research or work that you would like to focus on but cannot? If so, what are these areas?
5. Are there areas, issues or topics related to infectious diseases that you think will require greater emphasis in the next 5 years?
6. What factors do you think are driving the risks you have just identified?
7. What consequences do you think will result from not addressing those risks?
8. Which areas of emerging technology, science or research do you think will have the most significant impact on future infectious disease identification, diagnosis, treatment or prevention?

## **Future Information Needs:**

1. Given the changes you anticipate to the focus of your own research or work 5 years from now, and the issues you believe should receive greater emphasis 5 years from now, what kinds of information/services do you anticipate yourself and others will require to ensure this happens?
  - Technological
  - Access to other experts/expert information
  - Access to integrated and linked data systems, particularly surveillance
  - Knowledge transfer
  - Policy development
  - Educational
  - Communication networks
  - Other areas
  
2. Are there any “wild cards” worthy of consideration that you believe could have an effect on the future detection, identification and prevention of infectious diseases – either positive or negative effects?

### **Existing Gaps:**

1. Based on all of the questions above, where do you perceive there to be the greatest gaps in any aspect of infectious disease detection, identification or prevention – this does not need to be specific to your own work or?
  
2. How could those gaps best be filled?

### **Other:**

1. Is there anything you would like to add that has not been captured in this questionnaire?

## Annex 4:

# Foresight Telephone Interview Summaries

This chart presents an abbreviated set of comparisons of questionnaire responses identified in the telephone survey, segmented by three groupings of interviewees.

## Background – Academic/Private

	<b>Types of Research</b>	<b>Intended Outcome/Hope to Accomplish</b>	<b>What Determines Areas/Topics/Focus of Research</b>	<b>Research Consumers</b>	<b>Research Contribution to Broader Public Health Picture</b>
Microbiologist, Infectious Disease Consultant, Toronto	<ul style="list-style-type: none"> <li>• Cross-transmission of infections in hospitals and nursing homes</li> <li>• Pathogenesis of community acquired infections</li> <li>• Adult vaccinations</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluations of current infection control practice,</li> <li>• Effectiveness of programs such as vaccines, particularly to develop policies to prevent infections in hospitals</li> <li>• Better understanding on how infections develop. E.g. group A streptococcal infections in hospitals, to know how to better prevent.</li> <li>• To better write/develop practices to better prevent infections.</li> </ul>	<ul style="list-style-type: none"> <li>• Combination of three things:</li> <li>• Topic/issue is an area of interest that is also of value;</li> <li>• An identified need (research question) that can be asked, and that the answer can make a difference;</li> <li>• Availability of funding</li> </ul>	<ul style="list-style-type: none"> <li>• Nurses and physicians</li> <li>• Public health department staff</li> <li>• Infection control staff</li> <li>• Governments, at various levels</li> <li>• Vaccine/pharmaceutical companies.</li> </ul>	<ul style="list-style-type: none"> <li>• Contribute small pieces to the development of evidence-based prevention.</li> <li>• Provide evidence where evidence is needed – e.g. Identify true burden of illness, and which interventions are likely to be of benefit.</li> <li>• Actualizing intervention issues.</li> <li>• Helping public health organizations in general to understand which infectious diseases are particular problems, who they are a particular problem to, and what can be done to prevent them.</li> </ul>
Director, Vaccine and Infectious Disease Organization, Saskatchewan	<ul style="list-style-type: none"> <li>• Work on infectious diseases in human and animals and work in the interface between human and animal diseases.</li> <li>• vaccine development for humans and animals</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce economic losses and human and animal suffering.</li> <li>• Hope to be able to also ensure the social fabric of Canada.</li> </ul>	<ul style="list-style-type: none"> <li>• Need to look at what is happening in the world, and whether their technology expertise can make an impact on a specific area.</li> <li>• If they have expertise in the area – if it is an area where others are well in advance, they will not take on projects. Stick with topics/areas where they are the experts.</li> <li>• Want to be globally competitive, don't want to be "me too"</li> <li>• Is the issue important to the end-user – somebody has to pay for it the work.</li> <li>• Research is targeted</li> </ul>	<ul style="list-style-type: none"> <li>• Biopharmaceutical industries – human and veterinary.</li> <li>• Farmers – direct producers – higher productivity</li> <li>• General public</li> <li>• Food processing industry.</li> </ul>	<ul style="list-style-type: none"> <li>• Last year 90,000 people died last year as the result of hospital infections alone.</li> <li>• Have a huge program in genomics and proteomics. When we know how these cause disease, and how a host responds to them, and then can we develop therapeutics to control them (Can use individual's own innate immune defenses to either reduce or eliminate the need for antibiotics).</li> </ul>

	<b>Types of Research</b>	<b>Intended Outcome/Hope to Accomplish</b>	<b>What Determines Areas/Topics/Focus of Research</b>	<b>Research Consumers</b>	<b>Research Contribution to Broader Public Health Picture</b>
Vaccines and Immunotherapeutics, Montreal	<ul style="list-style-type: none"> <li>• Work on HIV and Hepatitis C. More on the immunological aspects on the diseases – what are the messages in the immune system that can control those infections</li> <li>• Developing vaccines for Hep C and HIV</li> <li>• Developing generic platforms to identify correlates of protection</li> <li>• Develop assays something to identify why some individuals are able to control while others succumb to disease</li> <li>• Practical components to identify correlates of protection and vaccines.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and understanding of the disease.</li> <li>• Make better vaccines.</li> <li>• Preventive and interpretive information.</li> </ul>	<p>rather than curiosity driven.</p> <ul style="list-style-type: none"> <li>• Have a very strong expertise in immunology; want to use it in the context of infectious disease. This prompts him in this area.</li> <li>• A much broader motivation is that HIV and HEP C are two major killers of humanity and very important that develop ways to be able to control those.</li> </ul>	<ul style="list-style-type: none"> <li>• Private sector – collaboration a lot, develop</li> <li>• NGOs inside and abroad – especially for HIV to develop strategies that are going to make better vaccines.</li> <li>• Important to work with the consumers, need their support for testing, or won't get anywhere for clinical trials.</li> <li>• Important to work with manufactures, physicians who are going to apply and patients to receive.</li> </ul>	<ul style="list-style-type: none"> <li>• prevent diseases, treating people, will improve public health.</li> <li>• Develop strategies which will be able to be used beyond Hep C and HIV. Many assays were used during SARS epidemic to look at people infected with SARS how they progressed and eventually have assays that are more specific to SARS.</li> <li>• Very transferable to other infectious disease issues.</li> </ul>
Associate Professor Pathology and Molecular Medicine, Ontario	<ul style="list-style-type: none"> <li>• Mostly respiratory pathogens, but some STDs as well.</li> <li>• Using nucleic acid amplification technology for detection of Chlamydia pneumoniae, Chlamydia-like organisms and other respiratory pathogens (M. tuberculosis, S. pneumoniae, Legionella spp., M. pneumoniae) in clinical specimens from patients with respiratory disease.</li> <li>• Using nucleic acid</li> </ul>	<ul style="list-style-type: none"> <li>• Improving diagnostics though testing. Improving the assays that are used.</li> </ul>	<ul style="list-style-type: none"> <li>• Always interested in respiratory pathogens started with TB and Chlamydia, more involved with viruses now because of SARS and Avian Flu and the concerns of being able to detect such diseases more quickly.</li> </ul>	<ul style="list-style-type: none"> <li>• Work in a clinical laboratory some of the impact make its way to actual lab that does the testing. Other people in the field that are looking to make improvements in diagnostic testing – e.g. industry as well, other laboratories was well</li> </ul>	<ul style="list-style-type: none"> <li>• Slow right now because research information gets into others' domain by publication and meetings; could get there a lot faster if there was a better relationship between public health and academic centres. A lot of them work in isolation, need better initiative and joint studies to enhance this allow information to flow smoother and quicker.</li> </ul>

	<b>Types of Research</b>	<b>Intended Outcome/Hope to Accomplish</b>	<b>What Determines Areas/Topics/Focus of Research</b>	<b>Research Consumers</b>	<b>Research Contribution to Broader Public Health Picture</b>
Professor Emeritus, University of Manitoba.	<p>amplification and rapid DNA sequencing technology for typing, identifying, and characterizing infectious agents that may impact on the onset or progression of chronic diseases such as COPD and cardiovascular disease.</p> <ul style="list-style-type: none"> <li>• Optimization of molecular diagnostics for use in the clinical microbiology laboratory and evaluation of their impact on patient care.</li> <li>• No longer conducts research.</li> <li>• Administration of research – president of MRC and spear-headed the creation of CIHR</li> <li>• Involved as a Board Member of NCID in Winnipeg</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
Medical Director, BC Centre for Disease Control, Director, UBC Centre for Disease Control	<ul style="list-style-type: none"> <li>• As Medical Director at the BCCDC, in that function coordinates the research of infectious disease of public health done by members within the centre.</li> <li>• Research that deals with emerging infectious diseases.</li> <li>• Own research focuses on STDs, HIV and Chlamydia.</li> </ul>	<ul style="list-style-type: none"> <li>• Own research – hope to devise scientific strategies to prevent STDS either by vaccines or understanding the sexual networks.</li> <li>• Overall, interested in evaluating programs delivered to public health e.g. infectious diseases,</li> <li>• What causes new diseases to emerge e.g. environmental changes or genetic changes in the organisms?</li> </ul>	<ul style="list-style-type: none"> <li>• In own research – has a long history researching STDs, driven by findings by his own work, and also informed by what is going on more generally in the area of STDs.</li> <li>• Centre research is organized around trying to develop a scientific evidence base for policy development for prevention of infectious diseases. Second is using</li> </ul>	<ul style="list-style-type: none"> <li>• Attempt to really position themselves close to the users of research results e.g. Public health practitioners or public health policy makers within government. What they do is either knowledge discovery, synthesis or translation into public policies</li> </ul>	<ul style="list-style-type: none"> <li>• Oriented to creating a rigorous public health program that is founded on evidence which is able to be evaluated and change as diseases and technologies change.</li> </ul>

	<b>Types of Research</b>	<b>Intended Outcome/Hope to Accomplish</b>	<b>What Determines Areas/Topics/Focus of Research</b>	<b>Research Consumers</b>	<b>Research Contribution to Broader Public Health Picture</b>
Dean, Faculty of Medicine, University of Saskatchewan	<ul style="list-style-type: none"> <li>• Pediatric infectious diseases – currently the dean so not lots right now.</li> <li>• Lots over his career into STDs and laboratory diagnosis of infectious diseases – was director of lab in Edmonton and STDs control in CDC Atlanta Georgia.</li> <li>• More limited amount work around clinical trials of vaccines studies.</li> </ul>	<ul style="list-style-type: none"> <li>• Hope to understand many things about infectious diseases – want to understand the epidemiological principles for infectious diseases.</li> <li>• Pathogenesis of infections.</li> </ul>	<p>science as one of the tools to respond to public health emergencies. E.g. SARS. Avian Flu</p> <ul style="list-style-type: none"> <li>• Mostly opportunistic, somewhat personal interest. Themes that weave through your life that lead you and also tend to look for opportunity wherever your work takes you.</li> <li>• In Saskatchewan Zoonotic infections – relationship between animal plant infection and the food chain lots of work at VIDO so has opportunity to focus on this area.</li> </ul>	<ul style="list-style-type: none"> <li>• Front-line folks, bit of policy mostly with regards to diagnostic testing for infectious diseases.</li> </ul>	<ul style="list-style-type: none"> <li>• Infectious disease is an essential component of public health.</li> </ul>
Vice-President, Pharmaceutical Company	•	•	•	•	•

### Assumptions about the Future – Academic

	<b>Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus</b>	<b>Factors Influencing Nature of Research</b>	<b>Areas Would Like to Focus on But Cannot</b>	<b>Areas that Should Require Greater Focus during Next 5 years</b>	<b>Factors Driving the Risks Identified</b>	<b>Consequences of Not addressing those Risks</b>
Microbiologist, Infectious Disease Consultant, Toronto	<ul style="list-style-type: none"> <li>• Focus of research will not change, but the diseases of interest will change.</li> <li>• New diseases will come along and new control strategies will need to be developed and evaluated.</li> </ul>	<ul style="list-style-type: none"> <li>• Which diseases are coming and going;</li> <li>• Within the diseases, the practicalities of answering questions;</li> <li>• Who can be persuaded to pay for research</li> <li>• If program development and evaluation were to</li> </ul>	<ul style="list-style-type: none"> <li>• Access to integrated information systems would facilitate answers to many relevant questions e.g. similar to those available in US hospitals</li> </ul>	<ul style="list-style-type: none"> <li>• Development/availability of Information technology that can provide access to multi levels of health-based data: hospital-based surveillance information, community, and provincial, federal health data.</li> </ul>	<ul style="list-style-type: none"> <li>• Under-funding of the public health system.</li> <li>• No public health information systems that are functional, Competing with other pressing needs.</li> </ul>	<ul style="list-style-type: none"> <li>• Will not deliver health to the population of Canada – cannot make sure the population is as well as they can be.</li> <li>• Interfere with the ability to deliver</li> </ul>

	<b>Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus</b>	<b>Factors Influencing Nature of Research</b>	<b>Areas Would Like to Focus on But Cannot</b>	<b>Areas that Should Require Greater Focus during Next 5 years</b>	<b>Factors Driving the Risks Identified</b>	<b>Consequences of Not addressing those Risks</b>
Director, Vaccine and Infectious Disease Organization, Saskatchewan	<ul style="list-style-type: none"> <li>• Continue to study disease processes, continue to develop better/safer vaccines,</li> <li>• Eliminate needles from vaccines</li> <li>• Working on single-dose vaccines to improve cost and compliance e.g. many people do not go back for second or third dose.</li> <li>• Using new tools such as genomics and proteomics.</li> <li>• Not a shift, continuous evolution rather than revolution.</li> <li>• Technology is driving the shift, know more</li> </ul>	<p>become a government function (e.g. similar to in Quebec) – this would be a major factor in re-focusing the nature of her research.</p> <ul style="list-style-type: none"> <li>• If this work wasn't done by her, it would not be picked-up by governments.</li> </ul>	<ul style="list-style-type: none"> <li>• At hospital micro department data was captured and available for analysis, many questions could be answered about quality of intervention strategies, and program evaluations.</li> </ul>	<ul style="list-style-type: none"> <li>• Information translation and compilation. Many people cannot do their own “sorting” or “filtering” due to the complexity of information.</li> <li>• Need a group of experts somewhere in the middle who can sort, distil and translate the voluminous amount of information that is now available to the public – and researchers.</li> </ul>	<ul style="list-style-type: none"> <li>• No incentives built-in to health-care system for good information systems and data collection</li> <li>• Federal/Provincial issues have made development of information systems difficult.</li> <li>• Perceived barriers from privacy issues that are not “real” but they slow the process as people attempt to understand them.</li> </ul>	<p>health care cost effectively.</p> <ul style="list-style-type: none"> <li>• Will not have the information to determine if the lesser expensive of two mitigations is equally or more effective.</li> </ul>
		<ul style="list-style-type: none"> <li>• Funding is clearly one of them.</li> <li>• Intellectual capacity. The more things change, the more they stay the same – e.g. can now do things differently, do things faster. But still need to have the intellectual capacity to ask the right questions.</li> <li>• Technology and equipment have very large impacts – can do things today that couldn't have thought of ten years ago.</li> </ul>	<ul style="list-style-type: none"> <li>• Currently constrained by not having a Level 3 laboratory. However, have received funding to build one.</li> </ul>	<ul style="list-style-type: none"> <li>• coordination across the country to reduce duplication</li> <li>• Concentration of areas of specialties/ expertise in certain areas.</li> <li>• Researchers should concentrate on doing one or two things well, concentrated,</li> <li>• Should not have total academic freedom – some research should be targeted, not curiosity driven.</li> <li>• Need to harness expertise to ensure the intellectual capacity of Canada is capitalized upon.</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Canada will fall behind and won't be competitive globally.</li> <li>• Society will continue to suffer from these and other infectious diseases</li> <li>• Won't be able to respond as quickly when something new emerges.</li> </ul>

	<b>Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus</b>	<b>Factors Influencing Nature of Research</b>	<b>Areas Would Like to Focus on But Cannot</b>	<b>Areas that Should Require Greater Focus during Next 5 years</b>	<b>Factors Driving the Risks Identified</b>	<b>Consequences of Not addressing those Risks</b>
Vaccines and Immunotherapeutics, Montreal	<p>about disease processes and host responses.</p> <ul style="list-style-type: none"> <li>• Becoming/embracing the multidisciplinary approaches.</li> <li>• Shift is to be much more inclusive of other disciplines to assist with achieving the ultimate goal of protecting society.</li> <li>• Vaccines. Want to increase the knowledge, but want to move into translation of modus operandus.</li> <li>• Building partnerships with private sector and other organizations around the world. Cannot do this on own, need help.</li> </ul>	<ul style="list-style-type: none"> <li>• Funding. Critical Collaborators – cannot do projects of this magnitude alone. Need strong set of collaborations and complimentary expertise.</li> <li>• Have to work very patients and community those groups to get things moving, and considering their perspectives as well.</li> <li>• Funding may change – more resources available hopefully!</li> <li>• Collaboration from private sector – used to be higher level of synergy and collaboration. Hope to increase this.</li> </ul>	<ul style="list-style-type: none"> <li>• Dealing with bio-defence – important to develop some readiness and infrastructures – need to allot resources to these.</li> <li>• Need to enhance what is available in Winnipeg.</li> </ul>	<ul style="list-style-type: none"> <li>• HIV</li> <li>• Bio-defence</li> <li>• Pandemic Influenza</li> <li>• emerging diseases.</li> <li>• Readiness infrastructure</li> <li>• NCC-ID should coordinate some of these things</li> <li>• Having an infrastructure that oversees and is overarching, strong strategic planning will help a lot</li> </ul>	<ul style="list-style-type: none"> <li>• Bioterrorism, pandemic influenza,</li> <li>• We have had SARS everybody has really opened people's eyes. E.g. awareness</li> <li>• Globalization – is opening our eyes.</li> </ul>	<ul style="list-style-type: none"> <li>• We will have another SARS that could be much worse!!</li> <li>• Good that the Government has created PHAC.</li> <li>• Need to provide PHAC with the structures around them that they need to implement their programs.</li> <li>• Coordination is essential!! Too many cases of ministers, bureaucracies, fall between the cracks.</li> </ul>
Associate Professor Pathology and	<ul style="list-style-type: none"> <li>• Continue on the same thread because respiratory pathogens</li> </ul>	<ul style="list-style-type: none"> <li>• Cost – is a big one. Some technology could be put into place right</li> </ul>	<ul style="list-style-type: none"> <li>• Cost is an issue, a bit more with chronic diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory pathogens should be one focus</li> <li>• Antibiotic resistance – but</li> </ul>	<ul style="list-style-type: none"> <li>• Global travel.</li> <li>• Resistance used to be mainly due to</li> </ul>	<ul style="list-style-type: none"> <li>• We will have more people dying from antibiotic resistant</li> </ul>

	<b>Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus</b>	<b>Factors Influencing Nature of Research</b>	<b>Areas Would Like to Focus on But Cannot</b>	<b>Areas that Should Require Greater Focus during Next 5 years</b>	<b>Factors Driving the Risks Identified</b>	<b>Consequences of Not addressing those Risks</b>
Molecular Medicine, Ontario	<p>will be a big issue.</p> <ul style="list-style-type: none"> <li>• Finding out that the diagnostics that are currently being used are not good enough, need to improve these. Molecular assays are an improvement but costly.</li> <li>• Need to identify ways to demonstrate cost-savings that result to health care system in order to justify using costly diagnosis.</li> <li>• Need to be clinically efficient/effective and cost savings.</li> <li>• New technology coming out that will make improvements as well. Wants to look at new technology in the future.</li> <li>• More research to determine whether new respiratory pathogens that have been human metaneumal (sp?) virus, corona viruses if these are a problem and if we should be trying to diagnose them as well.</li> </ul> <p><b>Assumptions:</b></p> <ul style="list-style-type: none"> <li>• know for sure that technology is</li> </ul>	<p>now but labs, especially in academic centres, have not been given an increase in base budgets for a long time – new tests that could make improvements cannot be implemented because of costs.</p> <ul style="list-style-type: none"> <li>• Have been doing some studies that show a higher-priced lab test and saves the hospital and community money. Difficult research to do.</li> <li>• Does not want to be an economist and wants to be a scientist.</li> <li>• Improving public health laboratories is important because they act as a reference – but hospital laboratories must also have capability to diagnosis – many people with something new present themselves to emergency rooms first. .</li> </ul>	<p>and respiratory pathogens – other research opportunities eg. Asthma, COPD exacerbated by respiratory diseases. But need to improve diagnostics first. Improve patients/physicians with treatment. Until new techniques are improved cannot do this yet.</p> <ul style="list-style-type: none"> <li>• Isn't a good place to get funding for developing diagnostic assays – major funders (e.g. CIHR) do not fund developmental work of assays</li> <li>• May need to go to industry but a perception of bias often results. To do really good research in this area the funding sources do not exist.</li> <li>• Hard to get money to support developmental work as part of a grant – very little money so cost for this research must be</li> </ul>	<p>it is becoming a much bigger issue. Not associated only with hospital infections but also community infections. This will continue to rise and become a bigger issue.</p> <ul style="list-style-type: none"> <li>• Immigrant health and travelers' health. –Should be screening/watching people a little more closely for diseases such as TB and malaria as well as emergent issues.</li> </ul>	<p>use of antibiotics, but now it has spread and probably also results to newer antibiotic-resistant organisms.</p>	<p>organisms.</p> <ul style="list-style-type: none"> <li>• Won't act quickly enough to identify organisms that are causing disease.</li> <li>• If don't improve diagnostics more people will die in hospitals when they could have been treated.</li> <li>• Won't improve on what we are doing right now.</li> <li>• Laboratory – funding needs to be increased to develop these testes because we are falling behind because the technology is already here.</li> <li>• Initiative to fund labs better so they can develop/enhance diagnostic tests. In many cases, new tests are available, but not implemented because of their costs.</li> <li>•</li> </ul>

	<b>Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus</b>	<b>Factors Influencing Nature of Research</b>	<b>Areas Would Like to Focus on But Cannot</b>	<b>Areas that Should Require Greater Focus during Next 5 years</b>	<b>Factors Driving the Risks Identified</b>	<b>Consequences of Not addressing those Risks</b>
<p>Professor Emeritus, University of Manitoba.</p>	<p>changing, continually use the best assays as we can lab should continue to keep up with them</p> <ul style="list-style-type: none"> <li>• Respiratory pathogens are not going away. – becoming an issue and great concern about an influenza pandemic and ability the ability to respond quickly to in.</li> <li>• Genomics have and will continue to have influence on infectious disease research, but on the interaction of infectious agents and mechanism of action and whole range of new ways of intervening.</li> <li>• All of that will over time both in terms of diagnostic tools, diagnostic, specificity.</li> <li>• Uncovering how much we really don't know! Thought we knew how many infectious microbes reside in the mouth, stool etc. of humans. Don't know the nature of 99% of what can cause illness!</li> <li>• Extent of unknown is</li> </ul>	<p>Not his own research but what he sees for the future:</p> <ul style="list-style-type: none"> <li>• People are beginning to address with renewed vigor is the fact that we survive in spite of our ecosystem tells us that there must be some very good natural defence systems/mechanisms at work.</li> <li>• Looking at the natural defence mechanisms that prevent the vast majority – the 99% that we don't know – from leading to the human demise</li> <li>• Very rare that when there is an epidemic that 100% of the population is not affected. E.g. HIV, even among sex</li> </ul>	<p>absorbed by hospitals – very little money to do that.</p> <ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>

	<b>Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus</b>	<b>Factors Influencing Nature of Research</b>	<b>Areas Would Like to Focus on But Cannot</b>	<b>Areas that Should Require Greater Focus during Next 5 years</b>	<b>Factors Driving the Risks Identified</b>	<b>Consequences of Not addressing those Risks</b>
<p>Medical Director, BC Centre for Disease Control, Director, UBC Centre for Disease Control</p>	<p>massive.</p> <ul style="list-style-type: none"> <li>• Until you can find the right conditions to grow agents, cannot really study them. Some genomic analysis allows the identification of the number of these different entities in different orifices.</li> <li>• Threats that develop as countries develop E.g. – many water and food-borne illnesses usually significant compared to developed countries</li> <li>• Will continue to focus on infectious diseases of public health importance – disease that continue to not be fully responsive to public health interventions e.g. STDS.</li> <li>• Will continue to focus on new and emerging disease. Will look at the relationship of these diseases in not only provincial but a national and international context.</li> </ul> <p><b>Assumptions:</b></p> <ul style="list-style-type: none"> <li>• Infectious diseases will continue to be a</li> </ul>	<p>workers a very small percentage despite constant exposure do not develop HIV.</p> <ul style="list-style-type: none"> <li>• Began to look at this anomaly had a genetic mutation o the cell surface so that HIV could not attach itself to the Cells in these individuals. Very simple explanation, once understood – probably lots of other explanations mechanistic genomic analysis that will be fairly revealing</li> <li>• Research agenda is in part driven by addressing the major cause of disease threat or burden.</li> <li>• Responding to political needs also drives agenda – political need to drive policies and so need to ensure there is scientific need.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Relationship between infections disease and chronic disease e.g. infection and cancer.</li> <li>• Infection and relationship to chronic inflammatory diseases that do not have known origin e.g. MS, arthritis, IBD.</li> <li>• Relationship in genetic differences in people and communities –e .g. ethnic communities e.g. Aboriginal</li> </ul>	<ul style="list-style-type: none"> <li>• Relationship of global patterns of disease – given people’s mobility and how much that should determine local priorities. In terms of hw we in Canada would provide security for our citizens and how we should engage more globally in dealing with infectious disease.</li> <li>• Climate change – what kind of impact that may be having on changing the ecology and the environment – linkage there. This is necessary but not in place.</li> <li>• Relationship between</li> </ul>	<ul style="list-style-type: none"> <li>• Linkage has been made between emerging infectious diseases and highly prevalent diseases and national security. E.g. SARS on a global scale was just a blip, but had an unprecedented impact on the economy because it stopped people from freely moving.</li> <li>• Countries are dealing with this because they see it in their economic interest to do that.</li> </ul>	<ul style="list-style-type: none"> <li>• Will continue to see more disease emerge, spread more rapidly and pose large pandemic threads. E.G.AIDS – was not appreciated for many years – now we have the leading, or second leading cause of death in the world today.</li> <li>• If we fail to develop these programs at a regional, national and international scale, do it at risk to ourselves.</li> </ul>

**Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus**

- major cause of human disease and that public health programs will require new and different strategies to respond to them.
- Technology of biology will create new tools that should be applied to public health. Both a needs and an opportunity of technology creating new opportunities to address things. E.g. impact of genomics on microbiology.
- 

**Factors Influencing Nature of Research**

- Always moved around in his career – go from one place to another thinking you will continue, but that is harder to do than you think, opportunities arise in new areas. Very much an opportunity approach.
- Opportunities arise where and when you did not anticipate them, but they arise and you work with them.

**Areas Would Like to Focus on But Cannot**

communities – are there genetic factors that determine vulnerability to infectious diseases

- No, usually if you want to do research in an area and can find the funding can usually do it.

**Areas that Should Require Greater Focus during Next 5 years**

- social development and diseases e.g. poverty, new wealth and how this contributes to either emerging diseases or resurgent diseases.
- Poverty – what is going on in Africa and what is the relationship between extreme burdens of diseases and poverty traps in some of the poorest nations. If public health can free them to do more.
- E.g. environmental degradation, - does this foster diseases such as avian Flu.
- 
- Rapid diagnostic capabilities – would like some real-time ability to diagnose infectious diseases. Have been very sloppy in microbiology because could grow organisms on plates. Chemists have had to do analytical studies and have needed to enhance but microbiology has not.
- Future identification of infectious disease organisms similar to

**Factors Driving the Risks Identified**

- Extreme poverty and relationship with infectious disease and developing nations.
- Motivated by it serves the interest of individuals –e .g. countries provide reservoirs that threaten other countries either by people who can pose threats to others. E.g. terrorists.
- All of this relates to a social and emerging consciousness of our responsibilities. Canada has a long history of having a lot of sympathy for others
- Emerging infectious diseases and bioterrorism.
- 

**Consequences of Not addressing those Risks**

- Global public health community working together now to limit the threat of avian influenza.
- Could have a worst case e.g. 1918 Pandemic.Social fabrics was broken, death camps, moving people in ships.
- Is always bioterrorist threat.
- Also the threat to inadvertent security of the food chain. E.g. BSE for instance. If there were a lot of those around it would really compromise our resources.

Dean, Faculty of Medicine, University of Saskatchewan

**Focus of Research – Next 5 Years, and if a shift, Assumptions for Shift, or Lack of Shift in Focus**

province in more clinical epidemiology.

- Would be a shift – that is the opportunistic aspect. Did a little bit of this work before, so some of the people who are at VIDO got their PHDs with him. Kind of a continuation or return to that area.

- 

**Factors Influencing Nature of Research**

**Areas Would Like to Focus on But Cannot**

**Areas that Should Require Greater Focus during Next 5 years**

sodium and potassium – not enough work in this area.

- Really need to fine-tune understanding of transmission of infectious diseases within populations. Both are related to new and emerging infections and bioterrorism.
- Have not spent nearly enough time on plant infections e.g. through wheat that would make it impossible to develop wheat. People have not spent enough time thinking about, and developing ways to monitor it.
- Contaminated water sources etc. other agents that did not anticipate. Who knows what else could come along and create water sources?

**Factors Driving the Risks Identified**

**Consequences of Not addressing those Risks**

## Future Information Needs and Existing Gaps - Academic

	Future Information Needs	Wild Cards	Anyone Who Should Have Access to Your Research Findings – but do/does not?	Greatest Gaps/How to Fill Those Gaps
Microbiologist, Infectious Disease Consultant, Toronto	<ul style="list-style-type: none"> <li>• Technological</li> <li>• Access to other experts/expert information</li> <li>• <b>Access to integrated and linked data systems</b></li> <li>• Knowledge transfer</li> <li>• Policy development</li> <li>• Educational</li> <li>• Communication networks</li> </ul>	<ul style="list-style-type: none"> <li>• Unpredictability is the frequency and pattern of disasters. Small or large.</li> <li>• Deaths of politicians and politician's children – a single effective political voice can make a significant difference.</li> <li>• Whether the public health agency can be developed into an entity with voice and credibility.</li> </ul>	<ul style="list-style-type: none"> <li>• All researchers and all infection control departments should have access to infection control evaluations that are not published –</li> <li>• Lots of Experience in hospital outbreak strategies that work and that could be shared by hospitals, infection control and public health units, however this information has not been coordinated and is therefore unavailable.</li> </ul>	<ul style="list-style-type: none"> <li>• Access to integrated and linked data systems</li> </ul> <p>How to Fill</p> <ul style="list-style-type: none"> <li>• Adequate funding</li> <li>• Hospitals having incentives to collect data electronically</li> <li>•</li> </ul>
Vaccine and Infectious Disease Organization, Saskatchewan	<ul style="list-style-type: none"> <li>• Technological</li> <li>• Access to other experts/expert information</li> <li>• Access to integrated and linked data systems</li> <li>• Knowledge transfer</li> <li>• Policy development</li> <li>• Educational</li> <li>• Communication networks</li> </ul> <p>All are critical. Unless you have all of these in place will not succeed. Can have all the money in the world, but if don't have an integrated system, won't get anywhere.</p>	<ul style="list-style-type: none"> <li>• Bioterrorism. The global instability that we have today. Today terrorists are using bombs. That may fall out of fashion.</li> <li>• Infectious disease has been used for many generations. This puts additional strain on our society. Tremendous strain on the public health system. As a country we are probably not prepared to deal with those cropping up all over the place.</li> <li>• May be other things that we don't know about – how can we integrate them into the system.</li> <li>• Thinking that we actually know something, but actually don't.</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Coordination among researchers</li> </ul> <p><b>How to Fill:</b></p> <ul style="list-style-type: none"> <li>• Very difficult. All kinds of egos involved! Look at provincial/federal/territorial disputes.</li> <li>• Biggest impediment to coordination is people</li> </ul>
Vaccines and Immunotherapeutics, Montreal	<ul style="list-style-type: none"> <li>• Access to integrated and linked data systems - this is fundamental. Surveillance is of the utmost importance. Need to have databases to</li> </ul>	<ul style="list-style-type: none"> <li>• Is not an integrated network of people working together working on preventive strategies and vaccines.</li> <li>• The negative is that a new</li> </ul>	<ul style="list-style-type: none"> <li>• Bureaucrats! Bureaucracy is not always aware of some of the things they are funding themselves.</li> </ul>	<ul style="list-style-type: none"> <li>• Coordination!!! Strategic planning. E.g. one arm of government proposes one thing, overlap etc.</li> <li>• Funding</li> </ul>

Associate Professor  
Pathology and  
Molecular Medicine,  
Ontario

### Future Information Needs

- make the system more efficient
- Educational – public education. Did a survey 2 years ago on the perceptions of Canadians towards vaccines. 30% of Canadians who were surveyed about why they were vaccinated. 20% thought that vaccines are dangerous. Therefore, education is essential. Cannot invest too much money here!
  - Knowledge transfer – need to have some sort of a medium where public health can get together with the academic hospital labs and let each other know what is good and what is bad. Need to work together on research projects.
  - Integrated and linked data systems – need a common computer system that could be networked so there is a rapid transfer of data and access for everyone would be very useful.

### Wild Cards

- epidemic comes much quicker than we expect. This can set us back 10 years
- Funding! Always need funding for these initiatives. Once a strategic plan has been developed, it should have a funding commitment for 5 – 10 years. Long-term strategies rather than short-term strategies.
  - Saw what SARS did – had a positive effect in a way. Worked with people from Toronto and the public health lab in Toronto to develop better assays and diagnostics – had funding from government and actually worked together.
  - Would be nice to sustain this. Good experience of working together – to define base methods and learn from one another.
  - Found not only methods to really evaluate who was doing something well and who needed to improve, but were also able to make improvements.
  - Some believe no changes have been made after SARS occurred because it was an opportunity to make some changes but have been some improved interactions.

### Anyone Who Should Have Access to Your Research Findings – but do/does not?

- Private labs a bit more as well. Each have different agendas and responsibilities, but on a larger, global scale if we can improve what everyone is doing, can improve the Canadian health of the population. Other communication methods may be important.
- 

### Greatest Gaps/How to Fill Those Gaps

How to Fill:

- Having an overarching organization like the National Collaborating Centre for Infectious Diseases.
- The kind of survey that the NCCID is doing (this one) will provide a sense of awareness. This is already very important to take these steps.
- Not enough lobbying by groups
- Something gets a lot of media attention and becomes the next big thing and money is thrown at it to improve diagnostics, prevention, vaccines. A lot of things that are big health issues are forgotten because they are not in the media at the time. E.g. regular influenza and regular respiratory disease - because public attention has been diverted.
- In Ontario, no strong, central, focused organization that they can go to as a reference laboratory
- Not enough funding to provide decent wages to people in public health – they either do not go into the field or don't get the best qualified people. Need to improve wages.
- Communication issue is a huge gap, finding a means of bringing different laboratories together so that they can interact. Not just the laboratories, people who are involved so projects can be pulled together. Not to just focus on small area that they are responsible for.

## Future Information Needs

## Wild Cards

## Anyone Who Should Have Access to Your Research Findings – but do/does not?

## Greatest Gaps/How to Fill Those Gaps

How to Fill:

Professor Emeritus,  
University of Manitoba.

- Access to integrated and linked data systems – in should be linking groups who are collecting information data to ensure there is a sharing of information with appropriate groups.
- Collection of epidemiological data – when there is suddenly a shift in base patterns, data can provide a warning that something is happening.
- Data bases not easily transferable – not a standardized way of collecting the data.
- Standardization of information is important so important information can be mined from the collection.
- Knowledge/technology transfer - Canada should

- More indicators of what the nature of those surprises are likely to surface from time to time e.g. explosive entry of SARS.
- bioterrorism – probably over-anticipated, over-blown

•

- Need more advocacy, need to join public health and advocacy together, may be able to make more changes to the way we deal with infectious diseases in the country
- Need public health lobby group
- Need a reference organization such as BCCDC.
- Communication issue is a huge gap, finding a means of bringing different laboratories together so that they can interact. Not just the laboratories, people who are involved so projects can be pulled together. Not to just focus on small area that they are responsible for.
- Lack of stewardship of the Canadian Health Care System. E.g. In last ten years we have created 10,000 jobs in other countries due to mindless neglect of this
- Use investment in Health as a spring board to position Canadian developers, and manufacture
- Range of opportunities in infectious disease to provide stewardship – air quality control, design of airflows in emergencies or hospitals, to filters to you name it.
- Would prefer to buy these in Canada. Currently bought off-shore, resulting in 10,000 health care jobs over seas.
- These could be used to finance our health care system through stewardship.
- Impediment is lack of leadership. Those who manage the health system manage the day to day challenge crisis. Public/private debate has affected this. This is about health

	Future Information Needs	Wild Cards	Anyone Who Should Have Access to Your Research Findings – but do/does not?	Greatest Gaps/How to Fill Those Gaps
<p>Medical Director, BC Centre for Disease Control, Director, UBC Centre for Disease Control</p>	<p>given its strength and resources and talents, should be developing strategies to enhance the role of the private sector in building and commercializing any discoveries</p> <ul style="list-style-type: none"> <li>Public health is about information – creating both technology and systems to move information and have mechanisms to sort information into something that is valuable and is able to analyze to draw inferences and conclusions.</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Technology will bring us solutions – may be a time when CDs are highly contained – certain categories of them. Don't know what new technologies are going to bring us. E.g. cervical cancer is caused by a virus, and the virus has been discovered. Vaccine is still in trial and works tremendously well. Significant impact on pap-screening – costs and discomfort to patient. Peptic ulcer diseases caused by bacterial infections – treatable and disappearing quickly. Knowledge and technology is bringing us solutions to diseases that we did not anticipate.</li> <li>Same things could happen to many categories of infectious disease.</li> <li>Environmental integrity – can we continue to have the same level of economic development in the rest of the world and have an environment that does not affect human health. Or will we create the seeds of our own demise.</li> <li>One of the main signs of environmental stress is the</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>An important gap is in dealing with the way science is usually done – individuals, possibly small groups working in competition.</li> <li>New challenge is how to create networks and collaborators, which while have incentives for individuals to excel, create an environment where people can build on one another's results more rapidly.</li> <li>Can work in parallel on problems, complementing to get results out faster. Science can be done more effectively and faster. Particularly important in public health when new diseases require quickly.</li> <li>Restructuring how we work together as a linked science community. Need to work with one another more.</li> <li>Opportunity is there in terms of people accepting this!! <i>(Comment on the fact that ALL who have been canvassed during this survey have asked for more cooperation)</i></li> <li>At academic level will need to change. In academic environment need to develop ways to reward people for working collaboratively. Process of academic promotion should be changed to work within this new world order.</li> <li>Public health has not had a deep investment in research – now recognizes that it needs to have better research and the ability to evaluate its</li> </ul>

Dean, Faculty of  
Medicine

### Future Information Needs

- **Technological** – Need to take biological specimens and get results in minutes to identify an infectious agent.
- **Access to integrated** and linked data systems Essential for monitoring. Where there are small outbreaks and individual cases through a data source could get things well out of control before was a problem. CDC Atlanta was doing some remarkable work in that area.
- HIV epidemic was picked-up because of monitoring prescriptions for fungal agents. Cluster of prescriptions for pentamazine (sp?) – following up on it identified the HIV epidemic in California. Therefore, need monitoring to pick-up unusual events.
- **Knowledge transfer** - very important between disciplines. Doing work in one particular area e.g. veterinary information may need similar information when dealing with human health.

### Wild Cards

emergence of infectious disease. E.g. avian influenza - raising poultry in extremely dense farms, creating the conditions for new strains to evolve.

- Don't understand enough about things like BSE, but if infectious agents that compromise the food chain arose, that could be a serious problem. Have insufficient information about some of the dynamics as we understand them.
- Epidemiology of food production is a very complex operation. Don't have enough information about this and it is something that could be a definite wild card.
- Canada should be particularly concerned about bioterrorism. Rate of exchange of human beings and products between Canada and the United states.
- 1918 influenza pandemic – something similar to that was very infectious and very fatal it would change things
- Globalization - even though something may not be an issue here in Canada, when they occur else where it affects the entire stability of the planet. E.g. infectious conditions that do not exist in Canada will effect the political and economic stability of the entire globe. Rationale for Canada to

### Anyone Who Should Have Access to Your Research Findings – but do/does not?

•

### Greatest Gaps/How to Fill Those Gaps

- programs.
- Medical research is not always addressing the needs of public health – needs to begin to recruit scientist to focus on pressing issues of public health.
  - Have not been focused national efforts at developing a strategy for infectious disease.
  - Linkages between federal/provincial programs and the role of universities in those programs is also a gap.
  - Federal agencies tend to do things within house and often don't have the expertise they need
  - Need to develop a far more robust system than what we have already.

## Future Information Needs

- **Policy Development** - Always have problems with provincial jurisdiction. Need something like CDC in the US – helps so much for robust and rigorous detection across provincial areas. Need to develop federal policies.
- **Educational** - More more and more! Need expanded access and interface between the clinical domain and original research domain. Need the ability to bring groups of top-notch scientists and clinical experts together to learn from one another.
- **Communication Networks** –Important to establish linkages with datasets and also the ability to communicate on a very regular basis with colleagues. E.g. Emergent infectious network in the USA. Different people can ask questions and determine that something is relevant to others. Know what questions are being asked and then

## Wild Cards

put money into things that are not immediately or apparently relevant to Canadian society.

## Anyone Who Should Have Access to Your Research Findings – but do/does not?

## Greatest Gaps/How to Fill Those Gaps

## Background – Professional/Advocacy Groups

	<b>Purpose/Objectives of Organization</b>	<b>Who Makes up Membership, How Large, Contributors</b>	<b>Infectious Disease Related Activities Performed</b>	<b>Infections Disease Services/ information or programs Delivered</b>	<b>Contribution to Broader Public Health Picture</b>
<b>Canadian Infectious Disease Foundations</b>	<ul style="list-style-type: none"> <li>• Two foundations which are the fund-raising arms of are AMMI Canada,</li> <li>• Primary purpose is to develop research programs in infectious disease.</li> <li>• Educational role related to infectious disease and advocacy related to infectious disease</li> <li>• Raise funds, partnerships with others to sponsor infectious disease related research</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Membership is AMMI membership essentially</li> <li>• Contributors is a moving target. Organization started in response to changes in legislation w.r.t. pharmaceutical companies.</li> <li>• Large pharmaceutical companies are moving away from infectious disease – looking more broadly for support. E.g. partnering with CIHR in granting.</li> </ul>		<ul style="list-style-type: none"> <li>• Would like to, but currently focused on fund-raising and research.</li> <li>• Have a couple of major fund-raising initiatives and would like to target a couple of groups: own membership (specialists), health care workers, general public.</li> <li>• Want to deliver (as a group of experts) unbiased opinions on issues and advocate for the population. Feel they are a good group to speak to the Canadian population without being fettered by potential of conflict of interest/political federal political issues.</li> <li>• E.g. if they think something should be done – will recommend that something be done. No political, manufacturing, profiting issues to deal with.</li> <li>• Federal programs, tied up in knots trying to figure out legal relationships with industry with provinces.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Members already (AMMI) sit in a variety of National Advisory Committees. Past chair of CATMAT (Committee to Advance Tropical Medicine and Travel), Public Health Agency Committees</li> <li>• Sit as experts on committees across the country, including the National Advisory Committee on Vaccinations - a number of members sit on this committee.</li> </ul>
<b>Canadian Society for Medical Laboratory Science</b>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Memberships of 16,000 laboratory technologists and medical laboratory assistants across Canada. E.g. laboratory analysts. Also work in clinical microbiology laboratories. More chemists and chemical analyzers.</li> </ul>	<ul style="list-style-type: none"> <li>• Continuing Education - offer many courses for membership.</li> <li>• Draft mission statements e.g. SARS outbreak was very taxing on their profession. When issues</li> </ul>		<ul style="list-style-type: none"> <li>• Laboratory technologists account for 90% of infectious disease testing across the country!</li> </ul>

	<b>Purpose/Objectives of Organization</b>	<b>Who Makes up Membership, How Large, Contributors</b>	<b>Infectious Disease Related Activities Performed</b>	<b>Infections Disease Services/ information or programs Delivered</b>	<b>Contribution to Broader Public Health Picture</b>
<b>Alberta Public Health Association,</b>	<ul style="list-style-type: none"> <li>provincial not-for-profit association that strengthens the impact of those who promote and protect the health of the public by speaking out for health, advocating on issues that affect health, and facilitating educational and networking opportunities.</li> </ul>	<p>Very multidisciplinary organization.</p> <ul style="list-style-type: none"> <li>Have various people who do various things across the country. Carry-out testing that facilitate diagnosis Have many technologists who work in academic research labs, public health laboratory system.</li> <li>Have people that are in practice across a variety of disciplines within public health – academic, communications, NGOs, consultants</li> </ul>	<p>are relevant to their membership will wade into the public discussions on them.</p> <ul style="list-style-type: none"> <li>Advocacy re: skills shortage</li> <li>Provide advocacy on public policy issues,</li> <li>Organization addresses advocacy in relation to education, resources, public policy.</li> <li>Address issues regarding capacity building and sharing across and within the province and across regions of the province.</li> <li>Have done some survey work in relation to the continuing education of public health professionals – e.g. CD and large outbreaks.</li> </ul>	<ul style="list-style-type: none"> <li>Focus on a number of areas in terms of promoting the information to the public – e.g. public awareness of issues related to public health e.g. partnering on social determinants of health issues in the last year.</li> <li>Working with several large networks in Alberta related to chronic disease. Health and health equity issues – determinants.</li> <li>Smoke free Alberta campaign –</li> </ul>	<ul style="list-style-type: none"> <li>Advocacy</li> <li>Education</li> <li>Awareness of public health</li> <li>Address/bring awareness of public health issues to the public and government.</li> </ul>
<b>Canadian Centre for Occupational Health</b>	<ul style="list-style-type: none"> <li>Purpose is generally to advance workplace health and safety, advance the prevention of fatalities, illnesses in the workplace by engaging stakeholders and players in workplace health and safety.</li> <li>This is accomplished through the application</li> </ul>	<ul style="list-style-type: none"> <li>Constituents are from three sectors: governments (national, provincial, territorial) employer associations and national bodies, and large organized unions across Canada).</li> <li>Form national stakeholders and board of Director's</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Provide information services on many levels – uneducated, or lay people can deal with information through publications or face to face advisory services.</li> <li>Or, if necessary can do best evidence research work.</li> <li>Most advanced information pulled from world leading experts in infectious disease – e.g. collaborations with WHO</li> </ul>	<ul style="list-style-type: none"> <li>Fits in that the Canadians that use this information reaches into the workplace via internet or via publication or via a free telephone service – 1-800 number that people can call from anywhere in Canada.</li> <li>Encourage the information to be disturbed widely – e.g.</li> </ul>

	<b>Purpose/Objectives of Organization</b>	<b>Who Makes up Membership, How Large, Contributors</b>	<b>Infectious Disease Related Activities Performed</b>	<b>Infections Disease Services/ information or programs Delivered</b>	<b>Contribution to Broader Public Health Picture</b>
<b>Canadian Public Health Association</b>	<p>of best evidence of knowledge and health and safety and social determinants of that</p> <ul style="list-style-type: none"> <li>• Engaging those three parties allows for an unbiased front to reach out as many workplaces as is possible.</li> <li>• Services/information is unbiased.</li> <li>• Removes the adversarial part of health and safety and delivers an unbiased approach, non-political.</li> </ul> <ul style="list-style-type: none"> <li>• Canadian public health association has been in business since 1908 - established by an act of parliament due to an outbreak of cholera in this country – needed a way in a pan Canadian way to look at disease because they cross borders.</li> <li>• NGO that advocates and on behalf of public health issues in Canada – from professional and public perspectives.</li> </ul> <p><b>Three main focuses:</b></p> <ul style="list-style-type: none"> <li>• ensure continue to have national leadership in public health</li> <li>• adequately, prepared trained workforce</li> <li>• sustained public health</li> </ul>	<ul style="list-style-type: none"> <li>• Made up of anyone who is interested in public health – bulk from professional community, e.g. docs, nurses, inspectors, academics, ID specialists etc.</li> <li>• Not a professional association – not like medical or nursing associations – advocacy.</li> <li>• Speak out on issues that affect their professions and membership – e.g. training education, work on PHAC with accreditation public health standards etc indirect professional association.</li> </ul>	<ul style="list-style-type: none"> <li>• A program that is very much related is they are the convener of the Canadian Coalition of Immunization Awareness and promotion (21 non-governmental organization and 5 corporate partners work on promoting vaccinations from childhood through to adult hood, work on promoting the influenza vaccine).</li> </ul> <p>Work with infectious disease a-priori.</p> <ul style="list-style-type: none"> <li>•</li> </ul>	<p>and national researchers.</p> <ul style="list-style-type: none"> <li>• Broad-based globally gathered information that is created in such a way to meet the diverse nature of Canadian work-force. E.g. illiteracy to post-doctorate level.</li> </ul> <ul style="list-style-type: none"> <li>• Do many things – take on contract for national and international work e.g. run health literacy coalition in Canada = have a major program in health literacy</li> </ul>	<p>not a one-time download.</p> <ul style="list-style-type: none"> <li>• Information is shared with health and safety committees to develop new practices in diseases prevention, emergency planning, return to work, prevention methods. Try to focus on source of infectious diseases are relevant to workplaces. E.g. far-fetched to deal with Ebola, but pandemics, avian flu, West Nile and Hantavirus are all relevant to Canadian workplaces</li> <li>• Both through the coalition and training and education for public health professionals asked to sit on many coalitions that have to do with infectious disease.</li> <li>• E.g. ran the first bioterrorism conference on behalf of the PHAC.</li> <li>•</li> </ul>

Purpose/Objectives of Organization	Who Makes up Membership, How Large, Contributors	Infectious Disease Related Activities Performed	Infections Disease Services/ information or programs Delivered	Contribution to Broader Public Health Picture
funding at all levels in the country. • •	•	•	•	•

### Assumptions about the Future – Professional/Advocacy Groups

	Factors Currently Influencing Organizations Priorities	Changes in Needs or Priorities	Assumptions/Basis for Changes in Needs or Priorities	Services/Programs would like to deliver but can't/ Services/Programs that "others" should be delivering	Issues that require greater emphasis during next 5 years	Consequences of Not Addressing Risks
<b>Canadian Infectious Disease Foundations</b>	<ul style="list-style-type: none"> <li>• Currently migrating AMMI to its foundation at CFID.</li> <li>• Anticipate a much greater degree of fund-raising, and therefore having more funds to disperse.</li> <li>• Anticipate having more partnerships developed so that there is more research funding available despite industry being less supportive/</li> <li>• Need to work more broadly. Have a fund-raising walk up Kilimanjaro. Hope to involve industry</li> <li>• Need to raise consciousness of potential funders.</li> </ul>	<ul style="list-style-type: none"> <li>• Will be revising the priorities on an on-going basis, based on success in fund-raising. E.g. May be more success with one fund or another.</li> <li>• Will listen to investigators.</li> <li>• Work hand-in-glove with a grants and awards committee of AMMI.</li> <li>• Responsive to investigators – If investigators want them to change their focus, they will listen</li> </ul>	<ul style="list-style-type: none"> <li>• Assume that issues will change on an on-going basis.</li> <li>• There will always be evolution in research needs.</li> </ul>	<ul style="list-style-type: none"> <li>• Have had through AMMI a grants and awards program that there has been frustration because amounts of money have been too small to impact community of infectious disease investigators. Want to get big enough to make an impact.</li> <li>• CIHR, Institute of Infection and Immunity has a primary role in public sector. Public Health Agency should have a role as well, in partnership or alone with CIHR. Public Health Agency was supposed to have funds for research, but doesn't know what has happened to those funds.</li> </ul>	<ul style="list-style-type: none"> <li>• Nobody is developing new antimicrobials</li> <li>• have to pursue curiosity driven research, but have to have flexibility of funding to deal with old and new threats</li> <li>• Need surveillance of the old diseases to know what is happening</li> <li>• Non-antibiotic means of dealing with infections</li> <li>• Need to identify better mechanism of infection control for different infections e.g. hand-washing, new filters, air ducts etc.</li> <li>• Identify mitigation strategies that work</li> </ul>	<ul style="list-style-type: none"> <li>• If we're not prepared to address emerging threats, impact will be greater. E.g. more people will die from flu, or other disease because hospitals can't cope. Possibility of catastrophic effects from emerging issues.</li> <li>• Antibiotic resistance, in pre-antibiotic era, analogous to this when there was not chemical mitigation only surgery or nothing. Outcomes of disease will be worse!</li> </ul>

Factors Currently Influencing Organizations Priorities	Changes in Needs or Priorities	Assumptions/Basis for Changes in Needs or Priorities	Services/Programs would like to deliver but can't/ Services/Programs that "others" should be delivering	Issues that require greater emphasis during next 5 years	Consequences of Not Addressing Risks	
<b>Canadian Society for Medical Laboratory Science</b>	<ul style="list-style-type: none"> <li>• Labour shortages across country,</li> <li>• Proper training in the profession.</li> <li>• Provincial societies who advocate provincially. Very closely affiliated with CSLMS</li> </ul>	<ul style="list-style-type: none"> <li>• Don't think the priorities will change.</li> <li>• Have a new strategic plan to be released this fall. Developed around shortage of professionals and advocacy.</li> <li>• Organization will become more and more involved with decision-makers and stakeholders.</li> <li>• Foreign trained individuals. Process in place for immigrants to get certified in this country. This demand will increase and tie-up resources and office time for the</li> </ul>	<ul style="list-style-type: none"> <li>• Higher demand for lab technologists and assistants.</li> <li>• Higher specialty areas to get into specific training.</li> <li>• Graying workforce. Big gap in the system as people retire. Skills not passed-on because there is nobody to pass skills onto. Creating a major impact in terms of historical memory.</li> <li>• Lack of full-time positions across the country. E.g. many entry level positions into laboratory medicine is through a casual position.</li> <li>• Brain-drain out of the country – bigger shortage in the United</li> </ul>	<ul style="list-style-type: none"> <li>• Trying to build-up their Continuing Education Courses, but have difficulty finding people to write and administer the courses.</li> <li>• More educational material available the better off everybody is.</li> <li>• Employers don't make time available for workers to upgrade their skills.</li> <li>• Funding for upgrading is also limited – hospitals don't have funding to send their people.</li> <li>• Attendance in annual congress is dropping due to funding limitations, lack of sponsorship from their employers – many are losing out on this very valuable professional</li> </ul>	<p>and which ones do not, and then allocate resources accordingly</p> <ul style="list-style-type: none"> <li>• Prevention is great, but also need to remember that need to treat diseases – therefore need funding for treatment, not all should go to prevention.</li> <li>• All will have to get together to work together on infectious diseases.</li> <li>• Need to have a general understanding among all health professionals out there to better protect ourselves and our families.</li> <li>• Develop a sense of preparedness for whatever comes along.</li> <li>• Need to focus on rural settings as well – usually centered around urban settings but infectious diseases affect rural areas too.</li> <li>• Containment of</li> </ul>	<ul style="list-style-type: none"> <li>• Don't want to see another SARS – all need to work together</li> <li>• An event could happen in a rural area, so need to have all prepared and able to deal with such events.</li> <li>• Have to get a good handle on these things and put mechanism in place to better prevent, contain and rapidly diagnose the disease states</li> </ul>

Factors Currently Influencing Organizations Priorities	Changes in Needs or Priorities	Assumptions/Basis for Changes in Needs or Priorities	Services/Programs would like to deliver but can't/ Services/Programs that "others" should be delivering	Issues that require greater emphasis during next 5 years	Consequences of Not Addressing Risks	
	organization.	States. People leaving to those jobs. • Difficulty attracting people into the profession.	upgrading, interaction and, networking with colleagues.	infectious disease and understanding. the implications of not containing things effectively. • Need to develop a Canadian Health Information Network - Should have access to an individual's health information no matter where they are in Canada.		
<b>Alberta Public Health Association</b>	<ul style="list-style-type: none"> <li>• Look for areas in which some leadership is required to address issues in public health.</li> <li>• Process is that membership works through the development of resolutions through annual meeting.</li> <li>• Issues that they address annually are partially identified by membership through annual process. This will create planned actions related to some key issues.</li> <li>• These will change as issues in public health</li> </ul>	<ul style="list-style-type: none"> <li>• Social determinants of health are becoming more of a priority</li> <li>• Priorities changing to a broader health and addressing social and chronic disease prevention, partnership with Alberta Healthy Living Network.</li> <li>• Some of these areas are receiving more focus and will be receiving more focus.</li> </ul>	<ul style="list-style-type: none"> <li>• Changing patterns of disease – shift from infectious to chronic has been a societal change.</li> <li>• Public Health focuses follow shifting patterns of disease.</li> <li>• Health disparities and broadening income gap in Canada – broader social determinants focus – an increasing income gap and lack of investment in addressing some of the social inequities, leading to increasing health disparity. Tend to come up with shifts in public policies.</li> <li>• Partially related to</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about the capacity in public health to address emergent diseases and epidemics – responsiveness.</li> <li>• Patterns of losing middle managers - and their experience.</li> <li>• Capacity assessments within the system. Trying to strengthen public health capacity – need to be aware of the trends within the actual allocation of resources and staffing patterns and skills sets.</li> <li>• Expanding education available for public health.</li> <li>• Planning a degree program for public health at U Lethbridge.</li> </ul>	<ul style="list-style-type: none"> <li>• Emergent diseases</li> <li>• Epidemics</li> <li>• Questions about how to access immunization information – often get these questions and direct people to resources.</li> <li>• Therefore need better education of the public on how to access this information. E.g. province to improve website, etc. E.g. on-line health networks, telephone health lines.</li> <li>• Changes to governmental department names/Ares etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Public health responsiveness, SARS was a wake-up call for Canadians to be aware of Public Health System and need for responsiveness.</li> <li>• Pandemic flu has had lots of media attention – awareness is built on this. Potential catastrophic implications if preparedness is not addressed.</li> <li>• Emergent disease – able to identify quickly</li> <li>• Communication with physicians, aware of</li> </ul>

	<b>Factors Currently Influencing Organizations Priorities</b>	<b>Changes in Needs or Priorities</b>	<b>Assumptions/Basis for Changes in Needs or Priorities</b>	<b>Services/Programs would like to deliver but can't/ Services/Programs that "others" should be delivering</b>	<b>Issues that require greater emphasis during next 5 years</b>	<b>Consequences of Not Addressing Risks</b>
	<ul style="list-style-type: none"> <li>expand/change.</li> <li>• Always have a broad agenda that is identified from the membership.</li> </ul>		<p>epidemiological principles – broad scanning that is looking at the health of populations. Population health and the factors related to broad determinants of health.</p> <ul style="list-style-type: none"> <li>• More information is available – epidemiological and social science information.</li> </ul>	<ul style="list-style-type: none"> <li>• Need to increase number of qualified people to meet needs as funding increases.</li> <li>• Continuing education needs of people across diverse disciplines in Public Health.</li> <li>• Health Networks and Partnerships – to build capacity with partners</li> </ul>	<p>change and difficult for the public to access this.</p>	<p>new symptoms – examples as to how some system improvements may be important for emergent disease.</p>
<b>Canadian Centre for Occupational Health</b>	<ul style="list-style-type: none"> <li>• Will change to a great deal – influence is the demographics of the Canadian workforce. Diversity of workplace hazards. Emergence of the recognition of psycho-social factors and organizational design and management techniques.</li> <li>• Nature of workplaces focus on health and safety based on compliance with laws. Very insufficient.</li> <li>• Workplaces are social dynamics. Health and safety to just focus on</li> </ul>	<ul style="list-style-type: none"> <li>• Planning to introduce the psycho-social elements and non-legislated elements of health and safety, safety culture, and design e.g. expanding the social side of health and safety.</li> <li>• Understanding that public health initiatives are very narrow and limited in workplaces.</li> <li>• Need input from field of occupational hygiene to help address ventilation, hospital design issues - E.g. no local exhaust ventilations near hospital beds</li> </ul>	<ul style="list-style-type: none"> <li>• Assumptions are that there is not an integrated approach to infectious disease across this land. Still a silo approach</li> <li>• Workplaces not having managers, employees versed in prevention mentalities etc.</li> <li>• No national emergency system to deal with a pandemic on those who will be affected. SARS was a wake-up call but we have not learned. Impact on economy was devastating and cannot deal with that yet in workplaces. Are not ready to lose 20% of workplaces during</li> </ul>	<ul style="list-style-type: none"> <li>• Planning to assist all workplaces to have an infectious disease preparedness plan in place.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Mass-hysteria that resulted during SARS has not been dealt with. To do what is necessary to form alliances where people want to play outside silos e.g. ministries, WCB's, public health all need to partner and network. Need to work with all together and do promoting and awareness and integrate passions.</li> <li>• Players are not really talking to each other.</li> <li>• Healthcare system has not had a prevention focus,</li> </ul>	<ul style="list-style-type: none"> <li>• Hospitals will do the same thing again during the next infectious disease event because as employers they have not been taken to task</li> </ul>

Factors Currently Influencing Organizations Priorities	Changes in Needs or Priorities	Assumptions/Basis for Changes in Needs or Priorities	Services/Programs would like to deliver but can't/ Services/Programs that "others" should be delivering	Issues that require greater emphasis during next 5 years	Consequences of Not Addressing Risks
<p>chemical biological radiation is inadequate – taking a broad-based integrated approach that allows all dimensions of human health to be taken into account. Human health is human health!</p> <ul style="list-style-type: none"> <li>• CCOHS is not limited by any legislation therefore, can help Canada improve its ability to prevent illness and injury beyond statutory obligations.</li> <li>• Hospitals will do the same thing again during the next infectious disease event because as employers they have not been taken to task.</li> <li>• Mass-hysteria that resulted during SARS has not been dealt with.</li> <li>• Besides the funding, the other thing that has changed in their environment is the establishment of the Public Health Agency of Canada</li> </ul>	<p>or isolation wards, use of best respiratory protection.</p> <ul style="list-style-type: none"> <li>• Three top level priorities (identified above) are going to be pretty stable over the foreseeable future, will not be solved quickly.</li> </ul>	<p>a pandemic. No way of predicting WHICH 15% or 20% of the workforce this will be.</p> <ul style="list-style-type: none"> <li>• NGOs can do many things that government can't and vice versa – sorting out which activities are best placed external/internal to</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<p>and is probably not equipped to deal with a massively infectious illness in the broader-sense.</p> <ul style="list-style-type: none"> <li>• They don't have health care workers, others, patient isolated from the rest of the population.</li> <li>• Do not have this kind of thinking in the health care setting.</li> <li>• Arrogance of health care profession! Not encouraged to do this, do not have the funding to look at more innovative ways.</li> <li>• it is a matter of time when the pandemic strikes – this will be the biggest one that will hit us.</li> <li>• Even before Pandemic strikes,</li> </ul>	<p>The consequences are going to be exactly like SARS – only much greater. During SARS we lost 42 people but in terms an influenza pandemic there will be</p>

Factors Currently Influencing Organizations Priorities	Changes in Needs or Priorities	Assumptions/Basis for Changes in Needs or Priorities	Services/Programs would like to deliver but can't/ Services/Programs that "others" should be delivering	Issues that require greater emphasis during next 5 years	Consequences of Not Addressing Risks
<p>and what the respective rolls are. Until that time they were the only one that was speaking out now a GOV agency - what are their respective rolls how do they partner –</p>	<ul style="list-style-type: none"> <li>• Issues that they work with or address within each of those may change</li> </ul>	<p>government.</p>		<p>many things hinder us with dealing with infectious disease – e.g. health care professionals will not immunize against influenza, and all residents in long-term care and acute care facilities – flu vaccines for all of these would cut-down on over-crowding in emergency and deaths each year.</p> <ul style="list-style-type: none"> <li>• Do not have adequate linkages in acute, primary and public health care. Abysmal communication between these!</li> <li>• Silos and territory – cannot afford this during pandemic. E.g. SARS – physicians in Alberta who volunteered to assist with SARS bureaucracy hinders so much in terms of infectious diseases.</li> <li>• Hospitals are not linked with public health – e.g. c-diff in hospitals do not deal with c-diff and do</li> </ul>	<p>a much, much larger economic and Not to mention the loss of like that will occur, the kind of thing that has governments fall, the panic among society – e.g. deteriorating of social fabric if something much bigger comes along.</p> <ul style="list-style-type: none"> <li>•</li> </ul>

Factors Currently Influencing Organizations Priorities	Changes in Needs or Priorities	Assumptions/Basis for Changes in Needs or Priorities	Services/Programs would like to deliver but can't/ Services/Programs that "others" should be delivering	Issues that require greater emphasis during next 5 years	Consequences of Not Addressing Risks
•	•	•	•	<p>not put measures in place – divide between hospital and community acquired infectious. No communication between hospital and public health</p> <ul style="list-style-type: none"> <li>• Antibiotic resistance – huge problem up front as we move down the road new and different ones will come along e.g. BSE, West Nile.</li> <li>• Zoonoses piece and lack of linkages between veterinary and human medicine – and agri food business and a safe food supply and a safe water supply.</li> </ul> <p>•</p> <p>•</p>	•

### Future Information Needs and Existing Gaps - Professional/Advocacy Groups

	Future Information Needs	Wild Cards	Organizations that would Like to Work With	Greatest Gap/How can those Gaps be Filled	Areas of Research Not being Conducted, but Necessary
<b>Canadian Infectious Disease Foundations</b>	<ul style="list-style-type: none"> <li>• <b>Educational</b> requirements - public, nurses, physicians. Essential, vaccines, hand-washing other</li> </ul>	<ul style="list-style-type: none"> <li>• Outbreaks can change a lot of things.</li> <li>• Major progression of</li> </ul>	<ul style="list-style-type: none"> <li>• Already working with PHAC and CHIR. Smaller groups</li> </ul>	<ul style="list-style-type: none"> <li>• Money!!! Have more ideas than money at this point. When they</li> </ul>	

## Future Information Needs

- issues
- **Regulatory/governance** - very important during crisis management – in terms of who is in charge. Federal/provincial issues cramp ability to know what is going on
  - **Technological** – better/more rapid diagnostic techniques to be able to identify illness now, rather than later. Need good Information Technologies
  - **Access to experts/expert information** – obligation of specialist physicians to find-out what they need to know in a timely fashion. Can be done better, more efficiently.
  - **Access to integrated and linked data systems** – knowing this information in a timely fashion is essential to any approach to infectious disease.

- Educational requirements
- Regulatory/governance
- Technological
- Access to experts/expert information
- Access to integrated and linked data systems
- Research
- Knowledge transfer
- Communication networks
- All of the above are important and need to do all of these. Need to cooperate more!

## Wild Cards

retrenchment of industry – if they bail from antibiotics, antifungals. E.g. if they were less profitable. If these were undermined there could be reductions in new products by industry

- Global travel and immigration – has an impact on spreading diseases rapidly.
- Globalization results in people leaving Canada to work in more lucrative areas.
- Demoralization of the health care work force

## Organizations that would Like to Work With

- CACMID CHICA, larger affiliations.
- Have had limited discussions with a variety of other organizations
  - Covering big bases, but would like to promote and enhance those.

•

## Greatest Gap/How can those Gaps be Filled

- are more successful then they will have an idea in.
- Fund-raising, partnering could assist with this.

- Human resources – skills shortage will just get worse. Already a threat in many parts of the country, will affect the rest of the country very soon.
- Job satisfaction – need to get on this!
- 

## Areas of Research Not being Conducted, but Necessary

- Information/surveillance is not available to front-line workers. Need this information to inform decision-making. Could be making the wrong decisions and costly decisions simply because information is not available.

**Canadian Society for Medical Laboratory Science**

**Alberta Public Health Association**

- Educational requirements
- Regulatory/governance
- Technological

- Patterns of vaccines – slight reduction in uptake of vaccines by public.

Already work with many partners – e.g. Council of Medical Officers of Health, PHAC, Cdn

- Turf wars in addressing some issues related disease. Jurisdictional issues –

•

## Future Information Needs

- Access to experts/expert information
- Access to integrated and linked data systems
- Research
- Knowledge transfer
- Communication networks
- All of the above are important

## Wild Cards

- Have not had consistency of vaccine programs across the country. Have such very different priorities across the country in terms of how much they are going to invest in that. Hopefully some of the investments from the PHAC.
- Infectious diseases and health disparity and social inequities – disparity between who gets sick, lack of access to resources.

## Organizations that would Like to Work With

- Public Health Association.
- Work with the province – partnering in a variety of consultations on public health.
  - Alberta health is considering partnering with the Alberta Public Health
  - Alberta Social Health and Equity Network.
  - Tobacco groups – ASH Campaign for Smoke Free Alberta.
  - Centre for Health Promotion Studies - University of Alberta gives them office space. Looking at ways to support public health research in province.

## Greatest Gap/How can those Gaps be Filled

- collaboration across provinces, regions, nationally. Ease of working across systems a little better. E.g. sharing education, marketing of information, Primary prevention. Segmented too much!
- Social inequities – across all levels of health, not just infectious disease. Aboriginal health sticks out greatly!

### Fill gaps:

- Moving forward with more integrated information systems
- Lack of geographic displays of disease patterns across the country. Cannot see this information on websites – make this information available to all jurisdictions – especially small ones.
- Linkages between health information and other statistics, e.g. ethnicity, income, immigration patterns
- Need to do more to collect information on social determinants in relation to disease patterning.
- Preparedness at every level! Do not educate

## Areas of Research Not being Conducted, but Necessary

- Make this a societal issue and emphasizing

## Canadian Centre for Occupational Health

- Technological – more logical organization of health-care

- Politicians – how do we prepare politicians –

- NCCID

## Future Information Needs

- settings, transfer of ventilation of hospital settings in terms of LEV at beds etc. Proper respiratory protection.
- Knowledge transfer - need to use knowledge and more. Need more knowledge transfer. Need to do this effectively

## Wild Cards

briefing by ministers is insufficient – ministers are usually not qualified in areas they are responsible for.

- 

## Organizations that would Like to Work With

## Greatest Gap/How can those Gaps be Filled

properly, a wide range of areas. Not just health-care providers. E.g. commerce people need to know how to be a leader during a pandemic that results in many people not being able to be at work in their workplace.

- 

## Areas of Research Not being Conducted, but Necessary

the preparedness.

- Demographics – people who are at risk are the very young and very old. Have a huge crop of people becoming very old very soon. Baby-boomer bulge is moving through the snake very fast. 10 years from now the susceptible population will be expanded up to 30% when you have the young and old – should incorporate knowledge for all groups of society.

## Canadian Public Health Association

- **Education** - Need better training in risk communications and communication generally, but also for the media. need to be able to understand this in a way that is accurate and not fear-mongering.
- **Regulatory/governance** – biggest challenge is the ability to have a Pan-Canadian response to anything. Pandemic Influenza cannot be provincial – bugs don't like these boundaries – Need surveillance systems that can talk to one another. Need agreement on who should be a spokes person!!! Not 5 people being spoke persons!!
- **Technological** - data systems, current computers, secured sites – ability to transmit along secure lines. Adequate surveillance – e.g. who did this person come into contact with

- the whole issue that this is a global issue – countries where most of these diseases are going to arise from do not have the infrastructure and technical capacity to deal with this and nip it in the bud. As a global community – what does this mean??
- Pharmaceutical industry – its ability gear up and create vaccines and the cost of those vaccines – e.g. global cost of pharmaceuticals and what that means.
- 

Have covered these (see above)

-

## Future Information Needs

## Wild Cards

## Organizations that would Like to Work With

## Greatest Gap/How can those Gaps be Filled

## Areas of Research Not being Conducted, but Necessary

- **Access to experts/expert information** – vitally important – big thing about who is the expert – who is the spokes person – need to trust these people! Need one message and as wholesome as can be. Public can understand and make decisions about taking action! Do not have to be covered-up.
- **Access to integrated and linked data systems** - surveillance need adequate surveillance systems – cannot only link data bases – need to collect primary data.
- **Research** – doing quite excellent research in Canada – research can always use more money but money into targeted research – not just investigator initiatives, need to be able to act and react quickly and not go through the hoops to get research dollars quickly.
- **Knowledge transfer** – educational, communication, knowing what to get to what audience at this time. E.g. family practitioners in this country are not linked together except for billing practices –how do you get alerts to many practitioners. E.g. cell phones and text messaging – many countries are using as part as emergency network – blast message to every cell phone

## Background – Front Line Professionals

### Mandate

### Constituents/Consumers of Services/Programs

### Services, Information or Programs Delivered

### Contribution to Broader Public Health Picture

	<b>Mandate</b>	<b>Constituents/Consumers of Services/Programs</b>	<b>Services, Information or Programs Delivered</b>	<b>Contribution to Broader Public Health Picture</b>
Medical Health Officer, Communicable Disease Control Section, British Columbia	<ul style="list-style-type: none"> <li>• Mandate of CD Control Section is to deliver communicable disease services to Vancouver.</li> <li>• Also provide some regional services as well – resource base is concentrated in Vancouver so assist with other areas.</li> <li>• Immunization programs, communicable disease follow-up, contact tracing, policy implementation of actions to prevent communicable diseases</li> <li>• Surveillance activities and reporting of communicable diseases.</li> <li>• Every communicable disease is reported to their office and they in turn report to the BCCDC.</li> <li>• Use surveillance to analyze, interpret and report on data.</li> <li>• Monitor/decide whether there is an unusual occurrence of a CD and determine if there is a need to act – e.g. implement an immunization campaign in a certain group.</li> <li>• Contact tracing for enteric diseases.</li> </ul>	<ul style="list-style-type: none"> <li>• People of Vancouver</li> <li>• School boards</li> <li>• Day Care Centres – respond to inquires of whether children need to be removed when they have a CD.</li> <li>• Down-town East Side of Vancouver – TB initiative.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• HIV reporting and contact tracing</li> <li>• Public health follow-up of public health diseases</li> <li>• Implementation of immunization policies – in conjunction with family care</li> <li>• Coordinate influenza programs – e.g. immunization in facilities (hospitals, long-term care facilities) for both residents and staff</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Population health – adjusting determinants of health.</li> <li>• Don't' as much address determinants of health, but let determinants of health guide them.</li> <li>• Will identify vulnerable groups based on many factors e.g. income, behavior of these groups, security, poverty etc.</li> <li>• Addressing TB specifically and training/involving residents of the down-town East Side.</li> </ul>
Director, Public Health Laboratory, Alberta	<ul style="list-style-type: none"> <li>• Provide clinical microbiology services to Province of Alberta from a Public Health View-point</li> <li>• Provide acute care microbiologic services to all regions of the province of Alberta.</li> </ul>	<ul style="list-style-type: none"> <li>• Population of Alberta</li> </ul>	<ul style="list-style-type: none"> <li>• ProvLab Provides microbiological assays for anything to do with microbiology.</li> <li>• Provide Acute care and microbiologic library to all areas of the province.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide diagnostics for all microbiological disease in the province – no infectious diseases in Canada unless the lab tells people that these diseases are present.</li> <li>• Provide all diagnostics for entire province of Alberta – with the acute care labs.</li> </ul>
Medical Director, Provincial Laboratory, Saskatchewan	<ul style="list-style-type: none"> <li>• Provide reference testing, specialized screening and diagnostic testing;</li> <li>• Conduct communicable disease detection, surveillance, infection</li> </ul>	<ul style="list-style-type: none"> <li>• Physicians, health care facilities, medical health officers, population health branch of Saskatchewan</li> </ul>	<ul style="list-style-type: none"> <li>• Provide reference testing, specialized screening and diagnostic testing;</li> <li>• Conduct communicable disease detection, surveillance, infection control and prevention;</li> </ul>	<ul style="list-style-type: none"> <li>• Public health is enhanced</li> <li>• Diagnosis for microbiological diseases.</li> </ul>

	<b>Mandate</b>	<b>Constituents/Consumers of Services/Programs</b>	<b>Services, Information or Programs Delivered</b>	<b>Contribution to Broader Public Health Picture</b>
Provincial Medical Officer of Health, Nova Scotia	<p>control and prevention;</p> <ul style="list-style-type: none"> <li>• Test and monitor environmental health;</li> <li>• Maintain laboratory standards and quality assurance regulations;</li> <li>• Anticipate, detect and respond to outbreaks of communicable diseases, food borne illnesses and pandemic threats;</li> <li>• Facilitate and support scientific research and training activities;</li> <li>• Provide biosafety, containment, biohazard spill response programs;</li> <li>• Serve as a centre for integrated disease and data management;</li> <li>• Develop and evaluate public health policies.</li> <li>• Basically the public health arm of the province of Nova Scotia – legislated mandate under health protection act.</li> <li>• Have to protect the health of novascotians, and to protect by existing and emerging communicable diseases.</li> </ul>	<ul style="list-style-type: none"> <li>• People of Nova Scotia</li> </ul>	<ul style="list-style-type: none"> <li>• Test and monitor environmental health;</li> <li>• Maintain laboratory standards and quality assurance regulations;</li> <li>• Anticipate, detect and respond to outbreaks of communicable diseases, food borne illnesses and pandemic threats;</li> <li>• Facilitate and support scientific research and training activities;</li> <li>• Provide biosafety, containment, biohazard spill response programs;</li> <li>• Serve as a centre for integrated disease and data management;</li> </ul> <p>Develop and evaluate public health policies.</p> <ul style="list-style-type: none"> <li>• Part of the system. Department of health is responsible for policies, standards and funding of the health system. Tends to go to the districts. Provide funding for docs, nurses, and public health staff. Information and control of CD, immunization, programs, vaccines.</li> <li>• Also involve in provincial programs, surveillance and primary prevention strategies such as sexual health.</li> <li>• Provide expertise and legislative authority if orders are acquired in certain situations Office is both a service provider to medical officers but also provides direction to other health care professionals and advice to the public. Public education and</li> <li>• Public health act has 54 notifiable diseases – any of those and anything that is new and emerging e.g. varies from TV, Hep C, Head Lice, West Nile, Rabies – e.g. anything within that</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery of these services to the population of Nova Scotia</li> <li>•</li> <li>• Public health services are essential for safety and security of public. Preventive programs contribute to containing costs of health care.</li> </ul>
Communicable Disease and Immunization Programs Coordinator, Chief Health Office	<ul style="list-style-type: none"> <li>• CD and Immunization programs for PEI</li> <li>• Other areas such as public health in restaurants and slaughter houses.</li> </ul>	<ul style="list-style-type: none"> <li>• People of Prince Edward Island</li> <li>• Other health care providers who seek guidance, direction and advice and referrals etc.</li> </ul>		

Mandate	Constituents/Consumers of Services/Programs	Services, Information or Programs Delivered	Contribution to Broader Public Health Picture
Prince Edward Island		gamete	

## Future Assumptions – Front-Line Professionals

	Anticipated/Planned Changes – Next 5 Years	Assumptions about what will happen – Next 5 years	Programs would Like to Deliver but Cannot	Programs Someone Else Should be Delivering	Areas that Should Require Greater Emphasis - Next 5 Years	Consequences for not Addressing Those Areas/Gaps
<p>Medical Health Officer, Communicable Disease Control Section, British Columbia</p>	<ul style="list-style-type: none"> <li>• Hiring an epidemiologist to do more rigorous CD surveillance.</li> <li>• Understanding and addressing the antibiotic resistance emergence will become a priority</li> <li>• Setting up a surveillance/emergency preparedness system for 2010 Olympics</li> <li>• Enhanced focus on emergency preparedness</li> <li>• Bridging the immunization program delivery divide between public and primary health. Hoping that public health programs will be delivered by public health people again.</li> <li>• Changes to public health will depend on the evolution on primary care reform</li> <li>• HIV reportability will become more widely accepted. Became law 2 years ago with the purpose of preventing infection in others. Still resistance due to concerns about</li> </ul>	<ul style="list-style-type: none"> <li>• Assuming that another disease does not emerge and things will go on pretty much as they have been – not expecting the “unexpected”.</li> <li>• Assuming that public health has gained some prominence/awareness since SARS. Assuming it will remain an important issue in the overall health strategy.</li> <li>• Assuming that CD will not be the most important part of public health. Chronic disease prevention will be the largest focus. CD will still happen, but more and more people will be involved with chronic disease prevention because of the public health impact of chronic diseases.</li> </ul>	<ul style="list-style-type: none"> <li>• STDs are a huge and important issue and there is not enough being done to prevent them – people are still getting them.</li> <li>• Antibiotic resistant organisms are an important issue and need to quantify the contribution of agricultural practices to them.</li> <li>• Need to provide diagnostic support to primary care physicians who are doing most of the diagnosing of CDs.</li> <li>• New messaging for HIV – still many newly acquired cases and people have been experiencing messaging fatigue and becoming complacent – should not be having new cases of HIV</li> </ul>	<ul style="list-style-type: none"> <li>• Family care physicians should be paid to provide immunization counseling to patients – currently no such fee, so family doctors cannot spend time/money to convince parents and others about the benefits of immunization – need to fund prevention counseling as part of MSP</li> <li>• Public health needs to reach out in various areas such as urban development to have an impact on prevention.</li> <li>• Public Health needs to establish collaborations with local governments – e.g. no French fries in schools.</li> </ul>	<ul style="list-style-type: none"> <li>• Antibiotic resistant organisms</li> <li>• Nosocomial infections</li> <li>• Increased immunization</li> <li>• Need record keeping, and registry and surveillance of immunization programs</li> <li>• Hepatitis B should continue to be a priority</li> <li>• HPV and HSV prevention programs</li> <li>• Should new vaccines for HSV and HPV be priorities? Diseases are rarely fatal, but have an effect on quality of life.</li> <li>• Debate on whether vaccines for non-fatal CDs are a priority.</li> <li>• New vaccines for STDs – ethical</li> </ul>	<ul style="list-style-type: none"> <li>• New cases of diseases such as HIV will occur – this is unacceptable because it is entirely preventable.</li> <li>• Antibiotic resistant organisms – will lose some of the gains made in the antibiotic era. People may start succumbing to diseases we were able to address 20 or more years ago.</li> </ul>

### Anticipated/Planned Changes – Next 5 Years

- confidentiality.
- Increased international scope due to emerging infectious diseases.

### Assumptions about what will happen – Next 5 years

- Microbiology is constantly evolving.
  - Testing is shifting toward molecular detection assays – all diagnostic labs in Canada are using more PCR, molecular-sub typing based testing.
  - Things are, and will continue to change.
  - From research point of view things will continue to change as techniques and technology is enhanced/improved
  -
- Microbiology is constantly changing; techniques are becoming better, more sensitive, more specific.
  - Have to introduce new things into laboratory would not have detected the “new things” that have emerged e.g. HIV, Legionella.
  -

### Programs would Like to Deliver but Cannot

- because it is completely preventable
- Program to encourage health care workers to immunize against influenza – rates are still very low.

- Lots, but always funding driven. Makes it difficult. Want to introduce new assays but funding is difficult to achieve, new micro array assays, but very costly.

### Programs Someone Else Should be Delivering

- CD follow-up should be done by staff in patient’s region. Regional staff should be informed but are not, only those at hospital of intake have information, but patient could be from anywhere in province.
- National lab should take a bigger presence in a number of services i.e. Proficiency services.
- National Lab should be involved in acute care protection – should be involved in mandating how efficient other labs should be e.g. patient specimens.
- Clinical labs across Canada are developing their own detection methodologies because no cross the board standards exist so they are doing what they can people are trying. Currently have a standardization committee but not

### Areas that Should Require Greater Emphasis - Next 5 Years

- issues such as when to vaccinate for these e.g. vaccinating children/adolescents for STDs.
- New vaccines developed due to public health input, not mfg driven.
- Resources to develop front-line capacity
- 60% of outbreaks in last 5 years are Noro virus related.
- Not sure how much research goes on in Canada re: NORO or influenza.
- Funding should be put into issues that are most pressing – currently these diseases don’t get looked at because they are not commonly fatal to healthy people.
- However, huge costs associated with people who become ill from Noro and influenza viruses
- Granting agencies should start considering research into Noro virus and influenza

### Consequences for not Addressing Those Areas/Gaps

- These diseases will continue to affect population – e/g/ will always be there.
- Will always be high morbidity,
- Will always be a high dollar cost associated with illnesses.
- As population gets larger, more people will get sick and cost us more money

Director,  
Microbiology  
and Public  
Health  
Laboratory,  
Alberta

	<b>Anticipated/Planned Changes – Next 5 Years</b>	<b>Assumptions about what will happen – Next 5 years</b>	<b>Programs would Like to Deliver but Cannot</b>	<b>Programs Someone Else Should be Delivering</b> up and running yet.	<b>Areas that Should Require Greater Emphasis - Next 5 Years</b>	<b>Consequences for not Addressing Those Areas/Gaps</b>
Medical Director, Provincial Laboratory, Saskatchewan	<ul style="list-style-type: none"> <li>• More nucleic acid applications will be added. Doing some of this right now but will be increased.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• More tools will be developed for moving things around electronically</li> </ul>	<ul style="list-style-type: none"> <li>• More nucleic acid application tests – limited resources make this difficult.</li> <li>• More quality assurance services</li> <li>• Cervical screening for HPV</li> <li>• Time and money to speak with physicians in the community about public health</li> <li>• Deal with succession planning – graying workforce is causing skills shortage.</li> </ul>	<ul style="list-style-type: none"> <li>• Quality Assurance and accreditation should be done by National Laboratory in Winnipeg.</li> <li>• NLM should have an information person to work as a point-person with other labs, so all have someone to go to.</li> <li>• More pre-planning for bio-terrorism etc.</li> <li>• Succession planning for microbiology</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• viruses as priorities. Morbidity also requires attention.</li> <li>• Bioterrorism network needs to be improved. Have a system on paper, but not enough resources have gone into providing equipment and training. Planning on using the pandemic Influenza model for emergency infectious disease planning, but do not have equipment/resources in labs for this.</li> <li>• Keeping base-line minimum core public health functions in each provincial laboratory across the country – some are being subsumed by universities – need to guarantee a minimum service in a timely manner in each province.</li> <li>•</li> <li>• Vaccines – will see more. Adult immunization is an obvious issue. Coming down the</li> </ul>	<ul style="list-style-type: none"> <li>• If we don't get our act together on bioterrorism we're going to look stupid when something happens.</li> <li>•</li> </ul>
Provincial Medical Officer of Health, Nova Scotia	<ul style="list-style-type: none"> <li>• Post-SARS there has been a bit of past separation of acute diseases and public health, need to work much more across the</li> </ul>	<ul style="list-style-type: none"> <li>• Forgotten many of the basic things and need to reinvest in those. Will likely be faced with, a couple of things –</li> </ul>	<ul style="list-style-type: none"> <li>• Like to provide more immunization – national strategy is a good start – but want to implement and</li> </ul>	<ul style="list-style-type: none"> <li>• Need a strategy – for infectious diseases. Right now have duplication across jurisdictions</li> </ul>	<ul style="list-style-type: none"> <li>• Vaccines – will see more. Adult immunization is an obvious issue. Coming down the</li> </ul>	<ul style="list-style-type: none"> <li>• Will not reduce morbidity and mortality.</li> <li>• Will not use cost-effective treatments.</li> <li>• Faced with so many</li> </ul>

### Anticipated/Planned Changes – Next 5 Years

- continuum, not be just involved with the public health part but also with the infectious disease side.
- Responsibilities tend to stop at the hospital door, but post SARS need to be integrated with infection control within the and without of the hospital system.
  - CD cuts across many of the delivery systems. More integration

### Assumptions about what will happen – Next 5 years

- international travel so have to be prepared to deal with emerging things – core system – speed of cmu and travel – opportunity for new diseases
- Heightened public anxiety and media is involved, need to do appropriate risk assessment/management and surge capacity. Need a strong core functional. Trying to implement Naylor recommendations. This will also help with other epidemics. Really need to demonstrate that progress has been made.

### Programs would Like to Deliver but Cannot

- fund all nationally recommended vaccines. As new ones come along (e.g. cervical cancer) fund/ implement those that are recommended.

### Programs Someone Else Should be Delivering

- need something akin to the UK infections disease strategy. “Behind the Curve”.
- UK strategy has been Completed and endorsed. It is now being implemented and chief medical officer of health in the UK is required to provide incremental updates.
  - Should model the strategy on the UK work – why reinvent the wheel? UK process is interactive and open.

### Areas that Should Require Greater Emphasis - Next 5 Years

pike.

### Consequences for not Addressing Those Areas/Gaps

- challenges we tend to respond to public and political concerns on issues and public demands.
- Need to do this but need to be economic focused as well.

Communicable Disease and Immunization Programs Coordinator, Chief Health Office Prince Edward Island

- Major workforce renewal – currently..
- Don't anticipate changes other than continuing to lobby for the prevention/promotion of public health.
- Review of the *Public Health Act*
- Continuing to meet the needs of emerging issues e-g. Pandemic or whatever comes along.
- Continuing to meet the status quo.

- On-going discussion with federal/provincial colleagues e.g. through clinical research centres, conferences et.c.
- Recognizing that there is a need to address certain issues, whether with new vaccines, new treatment, better prevention campaigns.
- An awareness that there are some things coming down the tube that will have to be dealt with.
- New vaccines will be

- Would like to have more human resources dedicated to developing preventive programs and going out into the community to deliver these – would like more emphasis of this. Do bits and pieces but nobody to deliver in a dedicated way.

- Really need a surveillance system for CD and immunization that is consistent across provinces.
- Have just spend 3 years working with Health Canada and the project has gone down the tubes!
- All provinces are saying that they are being surveyed to death but nobody is coming up with a system.

- Want a user-friendly surveillance system that they can get data out of and will be efficient and feed data into Health Canada that they need!
- Have an immunization system in PEI that is probably further ahead of anything that has been developed federally.
- Desperately need human resources!

- Inefficiently using human resources to get information in another means – continuing to go around that route – still have to get the information from people but not a system that can do it so human resources and inefficient!
- Probably not getting the best information and most through information and not able to use the information.

**Anticipated/Planned Changes – Next 5 Years**

**Assumptions about what will happen – Next 5 years**

available for things like HPV vaccine, rotovirus vaccines, herpes, shingles vaccines.

- Lots of work on immunization over the past few years, most routine vaccinates have good uptake – programs to some extent that were not there a few years ago.

**Programs would Like to Deliver but Cannot**

**Programs Someone Else Should be Delivering**

- Time and energy put into the last effort that all thought was going to come about was phenomenal and nothing came out of it!
- 

**Areas that Should Require Greater Emphasis - Next 5 Years**

- Need to get these done and use them to the best capacity that they can
- If \$ money comes to the province – needs to come ear-marked for surveillance, not from general funding.
  - Provinces willing to take federal money, but unless the money is ear-marked specifically, may or may not get the \$.

**Consequences for not Addressing Those Areas/Gaps**

## Future Information Needs and Existing Gaps – Front-Line Professionals

	<b>Future Information Needs</b>	<b>Wild Cards</b>	<b>Information/Programs/ Services Available “Out There” that cannot be accessed</b>	<b>Other Organizations That would Like to be Working With</b>	<b>Greatest Gaps – How to Fill them</b>
<p>Medical Health Officer, Communicable Disease Control Section, British Columbia</p>	<ul style="list-style-type: none"> <li>• Access to integrated and linked data systems – e.g. immunization registry. Have implemented one in their region – electronic health record for family care. Challenge is how they are going to get their system to talk to other systems. Integration is very important</li> <li>• Research – front-line driven research is very important</li> <li>• Knowledge transfer – sometimes information that is being passed-on is not practical or easy to implement.</li> <li>• Need to ensure bi-directional information flow – for both data and clinical practice guidelines.</li> <li>• Need communication networks</li> </ul>	<ul style="list-style-type: none"> <li>• Pandemic Influenza – will it happen</li> <li>• Emerging diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Need more access to front-line epidemiology and the basic science of CD control.</li> <li>• Cross-training in CD control. Docs in Public Health have a specialty called community medicine. Need an infectious disease fellowship that would provide cross-training.</li> </ul>	<ul style="list-style-type: none"> <li>• Are doing ok themselves especially because of their proximity to BCCDC.</li> <li>• Much more difficult for front-line public health providers in remote areas to have a relationship with BCCDC – need to develop a way for them to have a closer relationship with BCCDC.</li> </ul>	<ul style="list-style-type: none"> <li>• Quality of data and scientific rigor</li> <li>• Human resources</li> <li>• Financial resources</li> <li>• Front-line control and input of resource decisions. Sometimes they get money for things they don't need because they do not have an influence/say on funding.</li> </ul> <p>Filling Gaps:</p> <ul style="list-style-type: none"> <li>• Need to put effort into the information and data gaps – know they are here, need to do something about them</li> <li>• Need to engage other academics in information system development – currently developed by doctors and nurses, but need IT expertise to influence. People in medicine need to value IT expertise.</li> <li>• Possible to develop good information systems – e.g. can get your bank records on the 'net but can't get your immunization</li> </ul>

	<b>Future Information Needs</b>	<b>Wild Cards</b>	<b>Information/Programs/ Services Available “Out There” that cannot be accessed</b>	<b>Other Organizations That would Like to be Working With</b>	<b>Greatest Gaps – How to Fill them</b>
<p>Director, Microbiology and Public Health Laboratory, Alberta</p>	<ul style="list-style-type: none"> <li>• <b>Regulatory/governance</b> - need to know the roles of different agencies.</li> <li>• Need a strong public health infrastructure and need government to support, not just monetarily, but to designate responsibilities and flow of information.</li> <li>• Private labs do not want to participate – want to keep things to themselves – won't participate with public health labs and they don't get enough information to do things.</li> <li>• Needs to be closer integration with acute care labs and public health labs</li> </ul> <p><b>Access to experts/expert information</b></p> <ul style="list-style-type: none"> <li>• People need to know where to look and who to call e.g. Feds, Provincial Authorities, Key word is <b>access</b> – lots of experts.</li> <li>• Access to integrated and linked data</li> </ul>	<ul style="list-style-type: none"> <li>• Pandemic influenza – is big and important to be aware of. Need to keep heads up for this.</li> <li>• Bioterrorism probably won't really affect Canadians that much. Do not have the political profile in the world to make it profitable in any way to come after us.</li> <li>• New emerging diseases – have to wait and see.</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• No. Wherever they need access can usually get it.</li> </ul>	<p>records!</p> <ul style="list-style-type: none"> <li>• Lack of political will to build a good public health infrastructure in the Province.</li> <li>• Need a strong public health infrastructure supported by governments who are committed to it.</li> <li>• Laboratories need to be arms length away from the government.</li> </ul>

**Future Information Needs**

systems – would be great if this could happen but is very costly.

**Research –**

- More research into common diseases that infect Canadians – need more research in these areas.
- Exotic diseases – affect a very small minority of Canadians Should not always be the priority.

**Communication networks**

- Public health agency of Canada is trying to bring this up to speed.

**Educational requirements**

- Clinical microbiology labs in Canada are in desperate need of lab techs! Not enough training.
- Chronic shortage of microbiologists as well
- Technological – technology transfer – between NLM and Infectious disease networks
- Communication networks - two levels, have to communicate better with NLM and

**Wild Cards**

- Universities will want to get into public health – so many players on the block. Only so many resources to go around.
- Some data can be enhanced with

**Information/Programs/ Services Available “Out There” that cannot be accessed**

- Feds should put training modules together so people can access them on the internet – these need to be available for people who cannot get away from their jobs or who are in remote/rural areas.

**Other Organizations That would Like to be Working With**

- 

**Greatest Gaps – How to Fill them**

- Epidemiologists are making more demands on labs and labs have not received resources. Consequently unable to provided them with enhance surveillance. This pushes epidemiologists into

Medical Director,  
Provincial Laboratory,  
Saskatchewan

	<b>Future Information Needs</b>	<b>Wild Cards</b>	<b>Information/Programs/ Services Available “Out There” that cannot be accessed</b>	<b>Other Organizations That would Like to be Working With</b>	<b>Greatest Gaps – How to Fill them</b>
Provincial Medical Officer of Health, Nova Scotia	<p>microbiology labs within Saskatchewan. Needs software resources to tie-in across the country. Need money for meetings etc.</p> <ul style="list-style-type: none"> <li>Information accessibility/streamlining. Whatever is done around this is critical. Difficult to identify what is “good” information. Using more IT technology and the speed of decision-making and information becomes harder to deal with. IT has not made life any easier in many cases!.</li> </ul>	<p>communication systems. Some universities do not understand what public health labs do.</p> <ul style="list-style-type: none"> <li>Need to ensure NCCID will enhance rather than diminish public health capacity.</li> <li>Testing at site. More and more physicians are getting the ability to do testing in the office. Clinical diagnosis, lab tests, goes to labs.</li> <li>More and more diagnosis in physicians offices will have implications. Surveillance data not being collected into the general data bases – not from laboratories. Physicians are terrible at reporting. Therefore red flags will be missed or get there late</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>One of the problems from Atlantic provincial perspective is in small jurisdictions they face the same issues as CD in other provinces. What would be really useful to have in the Atlantic provinces coordinated equivalent of BCCDC. Coordinate across Atlantic provinces and regional public health agencies. For surveillance, guidelines. Etc. A site working across with each other – then serving a population of 2 million. Need to cooperate across jurisdictions in the Atlantic provinces. Cohort of expertise available to all of the Maritimes. Currently have 4 governments doing immunization plans 4 governments doing surveillance. Should not recognize boundaries here</li> </ul>	<p>universities.</p> <ul style="list-style-type: none"> <li>Put resources into strengthening networks and to support a field officer whose main job is to move information between provinces and federally.</li> <li>Lack of an infectious disease strategy is a gap – don’t have a strategy and overall targets. Need to have coordination here!</li> <li>Look at the UK model</li> </ul>
Communicable Disease and Immunization	<ul style="list-style-type: none"> <li>All parts of what need to do work – to be best</li> </ul>	<ul style="list-style-type: none"> <li>How to allot resources during a pandemic??</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Antibiotic resistant organisms – need clear</li> </ul>

	<b>Future Information Needs</b>	<b>Wild Cards</b>	<b>Information/Programs/ Services Available “Out There” that cannot be accessed</b>	<b>Other Organizations That would Like to be Working With</b>	<b>Greatest Gaps – How to Fill them</b>
<p>Programs Coordinator, Chief Health Office Prince Edward Island</p>	<p>informed, to inform others to carry things out in the proper manner, to put best practices in place and to educate staff on the front-line.</p> <ul style="list-style-type: none"> <li>• Have a broad range of issues that they need to be informed about and need to keep up to date on.</li> <li>• Research centres in Halifax and Vancouver – depend heavily on those in PEI. Depend on excellent work that is done in larger provinces where there may be expertise.</li> <li>• Borrow that kind of expertise – e.g. procedure manuals, policy manuals and reports.</li> <li>• Need to know all the experts – <b>and who has the patience to receive their calls.</b> Halifax clinical research centre – wonderful resource to them.</li> </ul>	<p>Who/how to make decisions. Very significant in small place.</p>			<p>direction on whether they should be trying to be doing something about this – should they be doing something about this in the community – or not be doing anything at all.</p> <ul style="list-style-type: none"> <li>• Need good infection control practices – not enough emphasis to good IC practices in the long-term care, small hospitals, community base services. <b>DO NOT HAVE STAFF DEVELOPMENT – NEED TO HAVE THIS ORGANIZED!!!</b></li> <li>• Need good certification in this area – people who have the certification seem to be the only ones who have the confidence to make these decisions and can be over-ruled? Infection Control – is a whole issue!</li> <li>• E.g. nursing homes are taking patients with multidrug resistant organisms – e.g. c-diff. They have to know from the minute they have contact with the patient and have to deal with this and normalize the</li> </ul>

**Future Information  
Needs**

**Wild Cards**

**Information/Programs/  
Services Available  
“Out There” that  
cannot be  
accessed**

**Other Organizations  
That would Like to be  
Working With**

**Greatest Gaps – How  
to Fill them**

life of staff and  
residents.

## Annex 5:

### Foresight Exercise

### Workshop Discussion Documents

These two papers – Discussion Points and Summary of Assumptions About the Future – reflected the information and perspectives provided through the questionnaire and telephone interview processes. They provided the points of reference for the workshop discussions with experts from across Canada.

# Foresight on Infectious Diseases: Discussion Points

This note is a categorized summary of key points expressed in the telephone questionnaire process and discussions carried out by ICID/NCC to develop foresight on infectious diseases. It is meant to serve as a reference point and checklist for discussion about the validity of assumptions and requirements in Canada's public health system.

## (1) Future Information and Technology Needs

### *1.1 Educational requirements*

- Public education about infectious disease topics and issues - e.g. importance of receiving vaccinations and the safety of vaccinations.
- Expanded access and interface between the clinical domain and original research domain, involving the ability to bring groups of top-notch scientists and clinical experts together to learn from one another.

### *1.2 Regulatory/Governance*

- Clarification of the roles of different federal, provincial and local agencies during in crisis events, preparations and prevention.
- Problems have persisted with provincial jurisdiction over public health and infectious disease issues; needing national approach and collaboration to ensure robust and rigorous detection across provincial boundaries.
- Guidance from authorities (provincial/federal/territorial/municipal) to ensure that someone is responsible/accountable for issues – and the responsibility to administer funding where it is needed

### *1.3 Technology transfer*

- Technology transfer from other disciplines such as engineering and occupational hygiene to promote more logical organization of health-care settings, transfer of ventilation of hospital settings e.g. Local Exhaust Ventilation at beds and isolation rooms and proper respiratory protection.
- More technology transfer from federal to provincial government laboratories – e.g. development of reference standards.

### *1.4 Access to experts/expert information*

- Need to be able to guide people where they can look and who they can call for infectious disease information – e.g. Federal, Provincial, Municipal authorities. Key word is **access** – lots of experts, but many lay people and practitioners are unable to access information due to the complexity, and constant changes of governmental organizations.
- Streamlining and synthesizing of information. Voluminous amount of information that is available electronically makes it difficult to identify what is “good” and credible information.
- Need to identify the experts, and where they are across the country so that all Canadians can have access to them when they are needed

### **1.5 Access to integrated and linked data systems and Comprehensive Surveillance Systems**

- At hospital micro department level data was captured and available for analysis, and many questions could be answered about quality of intervention strategies and program evaluations.
- An integrated and linked data system would permit access by public, private and hospital laboratories. This would allow for earlier detection of outbreak clusters and individual cases before things get out of control – and facilitate answers to many relevant questions.
- National immunization registry that could “talk” to other systems.
- Engage other academics (beyond public health professionals) in information system development – currently developed by doctors and nurses, but need IT expertise to ensure multiple systems can link with other systems to make information exchange and extraction easier.

### **1.6 Research**

- Front-line driven research that can target and address relevant issues.
- More research into common diseases that affect the health of Canadians – e.g. Noro virus, HPV, HSV and regular influenza viruses.
- Need to ensure research is conducted into any disease that affects even a single Canadian – cannot discriminate and not allot research resources/funding just because only a small number of individuals are affected.

### **1.7 Knowledge transfer**

- A means to transfer information and knowledge between public health labs and academic hospital labs so that each can know what works and what does not work in practice, and give feedback.
- Public health and hospital labs need to work together on research projects.
- Need to ensure knowledge transfer works both ways – sometimes information that is being passed-on to front-line practitioners is not practical or easy to implement at the front-line.
- Knowledge transfer between disciplines is essential. Doing work in one particular area (e.g. veterinary information) may benefit from similar approach when dealing with human health.

### **1.8 Communication networks**

- National Microbiology Laboratory should communicate better with provincial laboratories.
- Need better communication between public health and acute care labs and provincial labs.
- Face-to-face meetings across the country could expand -- cannot do everything electronically.

## **(2) Areas Requiring More Emphasis During Next 5 Years**

### ***2.1 Make infectious disease information and education more accessible and available to the public***

- Experts somewhere in the middle of the information continuum could sort, distil and translate the voluminous information that is available to both general public and researchers.
- Education for the public on how to access information directly on public health issues.
- Information about infectious diseases for the public and media should be developed and disseminated in an organized and proactive way.

### ***2.2 Readiness infrastructure for bioterrorism and pandemic influenza***

- Develop preparedness/responses for bioterrorism – move beyond a paper system and expend resources on equipment and training
- Pandemic preparedness for workplaces – need to prepare the workforce to protect themselves. Also need workplace strategies in place for being able to conduct business/carry-on while up to 50% of the workforce is unable to attend work.
- Consider public health and infectious diseases will affect Canadian workplaces and half of population.
- Public education on how to prepare for, and protect during an influenza pandemic – avoiding the hysteria and marginalization based on ethnicity that occurred in Toronto during SARS.

### ***2.3 Antimicrobial resistance***

- Developing new antimicrobials
- Antibiotic resistant organisms
- Public education about appropriate use of antimicrobials

### ***2.4 Continued focus on known infectious diseases***

- More research into HIV prevention
- Continued education on the prevention of Hepatitis, B and Hepatitis C and HIV – with new messaging – seems to be fatigue from present messaging.
- Continued surveillance of known infectious diseases such as HIV, Hepatitis B and Hepatitis C
- Nosocomial infections – need to enhance surveillance and prevention activities
- Develop infection control strategies for MRSA (Methicillin-resistant *Staphylococcus Aureus*)

## **2.5 Globalization**

- Travelers' and Immigrants' health – influence of global travel on global patterns of diseases.
- Relationship between social development and diseases – poverty in the poorest nations and new wealth in some countries contribute to emerging or resurgent diseases.
- Understand transmissions of infectious diseases in global populations.
- How infectious disease events that occur elsewhere on the planet – even if it may not be an issue here in Canada will affect the political and economic stability of the entire globe.

## **2.6 Coordination among researchers, governments and professionals**

- Coordination of research across the country to reduce duplication and competition for same scarce resources.
- Organize and target research so that it answers questions – not only curiosity driven
- Enhanced cooperation between professionals from many disciplines to combat infectious diseases – e.g. include social science, economics, engineering and occupational hygiene
- Develop Canadian Health Information Network to include person-specific health information accessible from anywhere in Canada
- Break down federal/provincial silos – impedes the flow of information and hampers progress.

## **2.7 Address skills shortage in microbiology and laboratory professions**

- Increase wages/training for laboratory professionals to increase attractiveness of these fields to the right kinds of people – e.g. need decision makers and interpretive skills in these professions.
- Job satisfaction in health-care is generally poor – need to find ways to improve this in order to retain people in helping professions and meet recruitment shortfalls.

## **2.8 Address infectious diseases common to Canadians**

- Noro-virus has caused 60% of outbreaks in last 5 years – has been very little prevention or research emphasis
- Annual influenza – little emphasis is assigned despite costs to workforce and medical system.
- HSV and HPV virus prevention – significant morbidity in population but little emphasis on prevention or vaccine development.
- Granting agencies should fund research into prevention and vaccinations for common illnesses that have serious economic impacts on the Canadian economy – even though they are not typically associated with mortality.

## **2.9 Laboratory**

- Making rapid diagnostic capabilities available in provincial and hospital laboratories.
- Cooperation between provincial, hospital and private laboratories
- National Microbiology Laboratory to provide leadership in developing reference standards and opening information access.
- Reference standards developed by experts in certain areas – not just NLM – should be acknowledged and recognized and the standards should be made accessible and available to all laboratories (e.g. where there is localized expertise, that should be shared within entire laboratory system, regardless of which laboratory the expertise resides).
- Maintain base-line minimum core public health functions in each provincial laboratory throughout Canada.

## **2.10 Vaccines**

- Develop programs to increase immunization utilization – for both existing and emerging vaccines – e.g. influenza vaccines among health care workers
- Vaccines developed due to necessity/issues facing public health – not manufacturer driven
- Address ethical issues of when to vaccinate for STDs – e.g. when to administer new vaccines – children/adolescents
- Provide Canada-wide coverage for new adult vaccines – e.g. cervical cancer – vaccine provisions currently differ among provinces.

## **2.11 Global climate change**

- Impact of climate change is on the ecology of the environment and emerging infectious diseases
- As a member of the global community, Canada should consider issues that may not directly affect Canadians, but that if not addressed could affect the stability of the planet

## **2.12 Control strategies other than vaccines**

- Develop mitigation strategies/mechanisms for infection control besides vaccinations – e.g. hand-washing, air filters, hospital design, and local exhaust ventilation.

## **2.13 Social determinants of health**

- More emphasis on collection of information on social determinants in relation to disease patterning – e.g. income, ethnicity
- Assign resources/planning to ensure rural areas are as able to deal with infectious disease events as urban areas

### **(3) Areas Considered to be the Greatest Gaps**

- Lack of integrated and linked data systems
- Lack of coordination among researchers
- Lack of national coordinated infectious disease strategy and strategic planning in the area of infectious disease generally
- Lack of preparedness at every level for influenza pandemic and bioterrorist attacks. Not just health-care providers but also commerce/business people need to know how to respond during a pandemic situation.
- Skills shortage in laboratory professions – e.g. laboratory technologists and assistants, microbiologists
- No public health lobby groups work on an on-going basis to bring infectious disease issues to the attention of governments and the public as priorities.
- Topical issues receive lots of media attention and become the “next big thing” in health care. Money is thrown to improve diagnostics, prevention, vaccines – which is good, but other serious and big health issues are overlooked and funding is diverted.
- Limited understanding/acknowledgement of the impact that animal health and diseases have on human health – most of the viruses that have had an impact on human health have originated with animals.
- Social inequities – across all levels of health, not just infectious disease. Aboriginal health especially.
- How science is being done – it needs to change from being a competition between individuals to being networks of collaborations. Need to work on problems in parallel, complementing each other’s work to find solutions much faster.
- Lack of front-line input into resource allotment and policy decisions – sometimes money is made available for things that are unnecessary, and unavailable for other necessities because there is no front-line input into resource decisions.
- Lack of political will to build a good public health infrastructure – need a strong infrastructure supported by governments who are committed to it.
- Laboratories need to be arms length away from the government – too much political interference.
- Federal agencies tend to do policy and resource decisions in-house and often don’t have the expertise and information they need to make fully-informed decisions.
- Silos among governmental agencies and within professions, and among clinical and community health.

### **(4) Wild Cards Deserving Consideration**

- Unpredictability in the frequency and pattern of disasters and diseases crises – small or large

- A single event and effective political voice could make a significant difference in future decisions about the resources for infectious diseases research and public health investment.
- Whether or not the Public Health Agency of Canada can grow and be developed into an entity with clout and credibility.
- Bioterrorism and the resultant global instability. Today, terrorists are using bombs – that may fall out of fashion and they may turn to infectious agents.
- Outbreaks can change a lot of assumptions, strategies and public opinion about public health, as SARS showed.
- Withdrawal of industry funding from development of antibiotics, antifungals, antivirals – e.g. if they become less profitable or controversial as they did for HIV.
- Global travel, immigration and economic activity could be dramatically reduced as an impact of rapidly spreading diseases.
- Globalization could result in the loss of key infectious diseases specialists and personnel who move to work in more lucrative areas -- brain-drain results.
- Demoralization of the health care workforce from insufficient resources or excessive strain on resources.
- Pandemic influenza's arrival timing, speed of transmission, and communicable patterns – with dramatic economic and political consequences.
- Emerging infectious diseases – difficulty in coping when combined with influenza and other strains on the health care system.
- Lack of integrated network of people developing preventive strategies and vaccines.
- Possible irrelevance of long-term disease mitigation plans in light of unique nature of influenza pandemic or other emerging diseases.
- Patterns of vaccines – slight reduction in uptake of vaccines by public could have a large impact on the ability to prevent infectious diseases.
- Technology will bring us solutions – may be a time when infectious diseases are highly contained, or certain categories of them.
- Knowledge and technology is bringing us solutions to diseases that we did not anticipate – e.g. vaccine for cervical cancer
- Environmental integrity – can we continue to have the same level of economic development in the rest of the world and have an environment that does not affect human health...or will we create the seeds of our own demise.
- Government leaders and politicians – are they prepared to cope – and how will they make decisions in the circumstances of infectious disease crises
- More and more diagnosis in physicians' offices will have implications on the collection of surveillance data not being collected into the general data bases – Physicians are notorious for not reporting their findings – therefore, red flags could be missed or get noticed too late.
- We do not understand enough about things like BSE, and the extent to which Zoonotic diseases could compromise the food chain.

- Epidemiology of food production is very complex – we don't have enough information about this.

## **Foresight on Infectious Diseases**

### **Summary of Assumptions about the Future**

Respondents to the telephone questionnaire conducted by ICID/NCC were asked what assumptions they were making about the future that would cause them to change the focus of their work – or would cause them to not change their focus. The responses to this question and others related to it were varied, largely related to the source of the comments – academic researchers, advocacy and professional organizations, and front-line and program-delivery providers. Still, several common themes about the future related to infectious diseases emerged (numbering does not denote priority):

#### ***1. Focus of work/research will stay the same, but shift to new diseases***

Most believe that there will not be a large shift in the focus of their work or research. There will be an evolution in that new diseases will come along that will require immediate attention:

- New diseases will emerge and new control strategies will need to be developed and evaluated.
- Issues and conditions requiring research will change on an on-going basis.
- Research into respiratory pathogens will become more and more important as new viruses emerge.
- Things will go on pretty much as they have been – not anticipating the “unexpected”, but reacting.

#### ***2. Technology will drive shifts in research, detection and diagnosis***

Many respondents believe that technology, especially improved diagnostic tools and techniques, will drive changes in the focus of their work or research.

- Technology will drive any shifts in research – increasing the extent of knowledge about disease processes and host responses will determine the extent of the shift.
- New study tools will be used, such as genomics and proteomics; new techniques will be more sensitive and more specific.
- We will need to demonstrate net cost-savings that result to the health care system in order to justify using costly new diagnostic techniques.
- Technology will continue to produce better assays.
- Technology of biology will create new tools that should be applied to public health – both a need and an opportunity.
- More tools will be developed for moving and sharing information electronically.
- New technology in laboratories should ensure we don't miss the next “big one” e.g. AIDS, Legionella, at the early stage.

- Technology will become more accessible to clinicians and brought to the bedside of patients. The broader population will benefit from the innovative prevention programs that are developed.

### ***3. Multidisciplinary approach will become more common***

All survey respondents assumed that there will be (and must be) increased cooperation among disciplines and between researchers and those who deliver front-line infectious services and programs.

- Multidisciplinary approaches will become more necessary and embraced.
- The shift to conducting research that is much more inclusive of other disciplines to achieve the ultimate goal of protecting society.
- Partnerships will be established with private sector and other organizations; these will be global in breadth.

### ***4. Skills shortages and graying workforce will challenge Canada's capability***

Most assume that skills shortages in infectious diseases fields will be primarily among laboratory and microbiology professions due to both an increased domestic and international demand for these specialized skills and concurrent aging of the current medical and research workforce.

- There will be an even higher demand than now in Canada for laboratory technologists and assistants.
- There will be a higher demand for on-going specialized training and skills upgrading, but not enough people will be trained unless current trends change.
- The graying workforce will particularly create a skills shortage in the field of microbiology
- The recent lack of full-time entry level positions is discouraging people from getting into laboratory technology fields.
- Brain-drain to other countries is contributing to the skills shortage.

### ***5. Pandemic preparedness concerns will expand***

Many respondents assume that an influenza pandemic is inevitable and that Canada will have to increase its readiness to respond to such an event.

- The influenza pandemic is expected, and we are not necessarily taking all the steps necessary to increase our ability to respond soon enough.
- Global travel provides the opportunity for much faster spread of pandemic influenza, and the nature of work creates conditions of risk and exposure.

## **6. Social factors will emerge and become more significant**

Respondents assume that social factors will need to be addressed in order to more effectively reduce the impact of infectious disease.

- Health disparities and broadening income gap in Canada will require a broader focus on social determinants of health as primary causes.
- Increased social inequities will lead to increased health disparities.
- Public policies will be required to deal with effects of the broadening income gap and provide more accessibility to health care.
- Changing patterns of disease will result in a shift of attention from infectious to chronic disease as a broad change of public health emphasis.
- Heightened public anxiety and media coverage will make infectious diseases a matter requiring more immediate government responses.

## **7. Enhanced public health programs will be required**

Many respondents assume that there will need to be increased effort and resources allotted to public health programs generally.

- Public health programs will require new and different strategies to respond to infectious diseases.
- Public health has gained some prominence/awareness since SARS. It will remain an important aspect of the overall health strategy.
- There will be more investment in basic core functions of public health.
- Recommendations of Naylor Report will be implemented and will result in a strengthened core public health functions.

## **8. Silos will be broken and networks and collaborations will be developed**

Many respondents felt that silos among agencies, between provincial, federal and municipal governments interfered with the ability of public health to move forward in a collaborative way, and assume that out of necessity, this will change in the future.

- A strong network will be developed among various disciplines and between front-line clinicians and research scientists
- Cultures will change and funding agencies will encourage collaborative efforts and discourage competition among researchers.
- Models where there is an interface between epidemiology and laboratory research will be embraced
- NCC-ID will be a valuable partner in technology transfer and training sessions.
- Experts from across the country will be identified so that all Canadians can have access to their expertise when it is needed

## Annex 6

### Contacts Listing

The following contact listing is the beginning of what will serve as a database of infectious disease and public health professionals from all regions of Canada. This is a living document that will be expanded on an on-going basis in order to capture an inclusive listing of public and infectious disease professionals from across Canada.

## Contacts for Public Health/Infectious Diseases Professionals

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
<b>British Columbia</b>					
Blatherwick, John	Dr.	Chief Medical Health Officer, Coastal Health Authority	<a href="mailto:john.blatherwick@vch.ca">john.blatherwick@vch.ca</a>	(604) 714 - 5608	Corporate Office 10th Floor, 601 West Broadway Vancouver, BC, V5Z 4C2
Bowring, David	Dr.	Chief Medical Officer, Northern Health Authority		Ph: (250) 565-2649	Northern Health Authority Corporate Office 300-299 Victoria Street Prince George, BC, Canada V2L 5B8
Bozoian, Ann	Ms.	Director, Office of the President & CEO, Vancouver Island Health Authority	<a href="mailto:Ann.Bozoian@viha.ca">Ann.Bozoian@viha.ca</a>		Victoria BC
Brunham, Bob	Dr.	Medical Director, BC Centre for Disease Control, Director, UBC Centre for Disease Control	<a href="mailto:robert.brunham@bccdc.ca">robert.brunham@bccdc.ca</a>	Ph: 604 660-2626 Ph: 604 660-6066	BC Centre for Disease Control 655 West 12 <sup>th</sup> Ave Vancouver BC, V5Z 4R4
Bryce, Elizabeth	Dr.	Department of Microbiology, Vancouver General Hospital (Director, Standards and Guidelines Community and Hospital Infection Control Association - Canada (CHICA Canada)	<a href="mailto:ebryce@vanhosp.bc.ca">ebryce@vanhosp.bc.ca</a>	Tel: (604) 875-4759 Fax: (604) 875-4359	Vancouver General Hospital 1855 West 12 <sup>th</sup> Avenue, Vancouver, BC V5Z 1M9
Butcher, David	Dr.	Vice-President Medicine, Northern Health Authority		Ph: (250) 565-2154	Northern Health Authority Corporate Office 300-299 Victoria Street Prince George, BC, Canada V2L 5B8
Chow, Anthony	Dr.	University of British Columbia	<a href="mailto:tonychow@interchange.ubc.ca">tonychow@interchange.ubc.ca</a>	Ph: 604 875-4148 Ph: 604 875-4013	452D HP, 2733 Heather St, Vancouver BC
Conroy, Mike	Mr.	Executive Vice President & Chief Operating Officer, Vancouver Island Health Authority	<a href="mailto:Mike.Conroy@viha.ca">Mike.Conroy@viha.ca</a>		Victoria BC
Davies, Julian	Dr.	Scientific Director, Canadian Bacterial Diseases Network, University of Calgary, University of British Columbia	<a href="mailto:jed@interchange.ubc.ca">jed@interchange.ubc.ca</a>	604-822-4737	
Fulton, Tom	Mr.	Leader, Professional Practice and Chief Nursing Officer			2180 Ethel Street Kelowna, B.C. V1Y 3A1
Gamage, Bruce	Mr.	Infection Control Consultant, BC Centre for Disease Control (Director, Programs & Projects, CHICA)	<a href="mailto:Bruce.gamage@bccdc.ca">Bruce.gamage@bccdc.ca</a>	Ph: 604-660-6076 Fax: 604-660-6073	655 West 12 <sup>th</sup> Ave Vancouver BC, V5Z 4R4
Goodrea	Ms.	President and Chief			Corporate Office

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
u, Ida J.		Executive Officer, Coastal Health Authority			10th Floor, 601 West Broadway Vancouver, BC, V5Z 4C2
Hancock, Robert	Dr.	Director, UBC Centre for Microbial Diseases and Immunity Research, (Centre for Microbial Diseases & Host Defence Research (cmdr))	<a href="mailto:bob@cmdr.ubc.ca">bob@cmdr.ubc.ca</a>	Ph: 604 822-2682 604 822-3489	Lower Mall Research Station, UBC 2259 Lower Mall Vancouver, BC V6T 1Z4
Hardwick, Steve	Dr.	Senior Medical Director, Interior Health Authority	<a href="mailto:dr.steve.hardwick@interiorhealth.ca">dr.steve.hardwick@interiorhealth.ca</a>	Tel (250) 862-4264; Fax (250) 862-4201	2180 Ethel Street Kelowna, B.C. V1Y 3A1
Hasselback, Paul	Dr.	Senior Medical Health Officer, Interior Health Authority	<a href="mailto:Paul.hasselback@interiorhealth.ca">Paul.hasselback@interiorhealth.ca</a>	Ph: 250-862-4300, ext. 5511	2180 Ethel Street Kelowna, B.C. V1Y 3A1
Hill, Peter	Dr.	Vice-President, Academic Development and Clinical Innovation, Fraser Health Authority			
Jordan, Mary	Ms.	Provincial Executive Director, BC Centre for Disease Control	<a href="mailto:Mary.jordan@bccdc.ca">Mary.jordan@bccdc.ca</a>	Ph: Fax:	655 West 12 <sup>th</sup> Avenue Vancouver, BC V5Z 4R4
Kendall, Perry	Dr.	Provincial Medical Health Officer, Province of British Columbia	<a href="mailto:perry.kendall@gems9.gov.bc.ca">perry.kendall@gems9.gov.bc.ca</a>	Ph: (250) 952-1330 Fax: (250) 952-1362	Office of the Provincial Health Officer 4th Floor, 1515 Blanshard Street Victoria BC V8W 3C8 Victoria BC
Lowther, Glen	Dr.	Executive Vice President & Chief Medical Officer, Vancouver Island Health Authority	Glen.Lowther@vicha.ca		
MacDonald, Lynn	Ms.	Best Medicine Coalition representative			Westbank, BC
Maxwell, Malcolm	Mr.	Chief Executive Officer, Northern Health Authority		Ph: (250) 565-2649 Fax: (250) 565-2640	Northern Health Authority Corporate Office 300-299 Victoria Street Prince George, BC, Canada
Morshed, Muhammad G.	Dr.	Head, Zoonotic and Emerging Pathogens, Laboratory Services, BC Centre for Disease Control	<a href="mailto:Mohammad.morshed@bccdc.ca">Muhammad.morshed@bccdc.ca</a>	Ph: 604-660-6074 Fax: 604-660-6073	655 West 12 <sup>th</sup> Avenue Vancouver, BC V5Z 4R4
Patterson, Katharina	Ms.	Director of Aboriginal Health, Northern Health Authority		Ph: (250) 565-2134.	Northern Health Authority Corporate Office 300-299 Victoria Street Prince George, BC, Canada V2L 5B8
Petric, Martin	Dr.	Clinical Virologist, Laboratory Services, BC Centre for Disease Control	<a href="mailto:Martin.petric@bccdc.ca">Martin.petric@bccdc.ca</a>	Ph: 604-660-9697	655 West 12 <sup>th</sup> Avenue Vancouver, BC V5Z 4R4
Purych, Dale Ramsden	Dr.	Fraser Health Authority Chief Executive Officer,	<a href="mailto:Dale.purych@fraserhealth.ca">Dale.purych@fraserhealth.ca</a>	Ph: (250) 862-4200	2180 Ethel Street

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
, Murray		Interior Health Authority		Fax: (250) 862-4201	Kelowna, B.C. V1Y 3A1
Reiner, Neil	Dr.	Division Head, Department of Medicine, Division of Infectious Disease, University of British Columbia	<a href="mailto:ethan@interchange.ubc.ca">ethan@interchange.ubc.ca</a>	Ph: 604 875-4013 Fax: 604 875-4013	452D HP, 773 Heather St., Vancouver.
Roscoe, Diane	Dr.	Vancouver General Hospital	<a href="mailto:droscoe@vanhosp.bc.ca">droscoe@vanhosp.bc.ca</a>		Vancouver, British Columbia
Skowronski, Danuta	Dr.		<a href="mailto:Danuta.skowronski@bccdc.org">Danuta.skowronski@bccdc.org</a>		Communicable Disease Epidemiology Services BC Centre for Disease Control 655 West 12th Avenue Room 2104 Vancouver, BC V5Z 4R4
Smit, John	Dr.	Canadian Society of Microbiologists, Department of Microbiology, University of British Columbia	<a href="mailto:jsmit@interchange.ubc.ca">jsmit@interchange.ubc.ca</a>	Ph: 604-822-4417 Fax: 604-822-6041	No. 300-6174 University Blvd. Vancouver, BC V6T 1Z3
Stanwick, Richard	Dr.	Chief Medical Health Officer, Vancouver Island Health Authority	<a href="mailto:Richard.Stanwick@viha.ca">Richard.Stanwick@viha.ca</a>		Victoria, BC
Tunner, Sharon	Ms.		<a href="mailto:coordinator@pha.bc.org">coordinator@pha.bc.org</a>	250-595-8422	#219 - 2187 Oak Bay Ave Victoria BC V8R 1G1
Ulrich, Cathy	Ms.	Vice President, Clinical Services, Chief Nursing Officer, Northern Health Authority		Ph: (250) 565-7343	Northern Health Authority Corporate Office 300-299 Victoria Street Prince George, BC, Canada V2L 5B8
Waldner, Howard	Mr.	President & Chief Executive Officer, Vancouver Island Health Authority	<a href="mailto:Howard.Waldner@viha.ca">Howard.Waldner@viha.ca</a>		Victoria, BC
Young, Eric	Dr.	Deputy Provincial Medical Health Officer, Province of British Columbia	<a href="mailto:eric.young@gem.s8.gov.bc.ca">eric.young@gem.s8.gov.bc.ca</a>	Ph: (250) 952-1330 Fax: (250) 952-1362	Office of the Provincial Health Officer 4th Floor, 1515 Blanshard Street Victoria BC V8W 3C8
<b>Alberta</b>					
Campbell, Bob	Dr.	President, Alberta Public Health Association, Director of Population Health, Chinook Health Region	<a href="mailto:info@apha.ab.ca">info@apha.ab.ca</a>	Fax: (780) 492-9579	Alberta Public Health Association 5-10 University Extension Centre 8303-112th Street University of Alberta Edmonton, Alberta T6G 2T4
Chaconas, George	Dr.	Chair, Bacterial Pathogenesis Research Group, University of Calgary	<a href="mailto:chaconas@ucalgary.ca">chaconas@ucalgary.ca</a>	Ph: 403-210-9692 Fax: 403-283-5241	
Church, Dr.	Dr.	University of Calgary	<a href="mailto:deirdre.church@ucalgary.ca">deirdre.church@ucalgary.ca</a>	Ph: (403) 209-5281	Faculty of MEDICINE

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Dierdre		Institute of Infection, Immunity and Inflammation	<a href="mailto:crha-health.ab.ca">crha-health.ab.ca</a>		(Medical School) Medicine Pathology and Laboratory Med University of Calgary
Dickson, Jim	Dr.	The Alberta Morbidity Reporting and Research Network, University of Calgary			
Henderson, Elizabeth	Dr.	Epidemiologist, Foothills Medical Centre (Director of Education, CHICA)	<a href="mailto:Elizabeth.henderson@calgaryhealthregion.ca">Elizabeth.henderson@calgaryhealthregion.ca</a>	Ph: 403-944-4373 Fax: 403-944-2484	1403 29 <sup>th</sup> St. NW, Calgary AB, T2N 2T9
Honish, Agnes	Ms.	Manager, Communicable Disease Control, Capital Health Authority, Community and Public Health	<a href="mailto:ahonish@cha.ab.ca">ahonish@cha.ab.ca</a>	Tel: (403) 413-7944 Fax: (403) 413-7950	Suite 300, 10216 – 124 <sup>th</sup> Street Edmonton, AB T5N 4A3
Hope, Karen	Ms.	Infection Control Practitioner, Foothills Medical Centre (President-Elect, CHICA)	<a href="mailto:Karen.hope@calgaryhealthregion.ca">Karen.hope@calgaryhealthregion.ca</a>	Ph: 403-944-2897 Fax: 403-944-2484	1403 29St NW Calgary, AB, T2N 2T9
Joffe, Mark	Dr.	University of Alberta	<a href="mailto:mjoffe@ualberta.ca">mjoffe@ualberta.ca</a>	Ph: (780) 735-5678	Royal Alex Hosp Edmonton, Alberta Canada
Kovacs-Burns, Katarina	Dr.	Director Research Planning & Development, Faculty of Nursing, University of Alberta	<a href="mailto:kathy.kovacsburns@ualberta.ca">kathy.kovacsburns@ualberta.ca</a>	Office (780) 492-3769	4-103A, Clinical Sciences Edmonton, Alberta Canada, T6G 2G3 Edmonton, Alberta
Kubes, Paul	Dr.	Immunology Research Group, University of Calgary	<a href="mailto:pkubes@ucalgary.ca">pkubes@ucalgary.ca</a>	(403) 220 3012 (403) 220-8558	3330 Hospital Drive N.W. Calgary, AB, T2N 4N1
Kureishi, Amar	Dr.	Director, Infection and Prevention Control Service, Foot Hills Hospital			12 <sup>th</sup> floor Foothills Hospital 1403-29 <sup>th</sup> Street N.W. Calgary, AB T2N 2T9
Marrie, Tom	Dr.	Professor & Dean, Department of Medicine, University of Alberta	<a href="mailto:Tom.marrie@ualberta.ca">Tom.marrie@ualberta.ca</a>	Ph: 780-492-9728 Fax: 780-492-7303	Faculty of Medicine and Dentistry 8440-112 Street 272.00 WC Mackenzie Health Sciences Centre University of Alberta Edmonton, AB T6G 2R7
O'neil, Laurie	Mrs.	Infection Prevention Practitioner, Foothills Hospital	<a href="mailto:laurieoneil@home.com">laurieoneil@home.com</a>	(403) 282-2340	1403-29 <sup>th</sup> St N.W. Calgary, AB, T2N 2T9
Saxinger, Lynora	Dr.	Assistant Professor, Infectious Disease, University of Alberta	<a href="mailto:Lynora.saxinger@ualberta.ca">Lynora.saxinger@ualberta.ca</a>	(780) 407-7920	2E4.19, WMC Edmonton, Alberta Canada, T6G 2R7
Sharkey, Keith	Dr.	Chair, Gastrointestinal Research Group, University of Calgary	<a href="mailto:ksharkey@ucalgary.ca">ksharkey@ucalgary.ca</a>	Ph: 403-220-4601 Fax: 403-283-8731	
Taylor, Geoffrey	Dr.	Department of Medicine, Division of Infectious Diseases, University of Alberta	<a href="mailto:Geoff.taylor@ualberta.ca">Geoff.taylor@ualberta.ca</a>		21E4.11 Walter Mackenzie Centre, Edmonton, AB T6G 2B7
Thomas, Roger	Dr.	Professor of Family Medicine, University of Calgary	<a href="mailto:rthomas@ucalgary.ca">rthomas@ucalgary.ca</a>	Ph: 403-210-9208	Calgary Alberta
Tyrell, Greg	Dr.	University of Alberta	<a href="mailto:gjt@ualberta.ca">gjt@ualberta.ca</a>	780-407-8949	8440-112 St. Edmonton, AB

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Yanicki, Sharon	Ms.	Executive Director, Alberta Public Health Association	<a href="mailto:sharon.yanicki@apha.ab.ca">sharon.yanicki@apha.ab.ca</a>		T6G 2J2 Alberta Public Health Association 5-10 University Extension Centre 8303-112th Street University of Alberta Edmonton, Alberta T6G 2T4

## Saskatchewan

Albritton, Bill	Dr.	Dean of Medicine, University of Saskatchewan	<a href="mailto:william.albritton@usask.ca">william.albritton@usask.ca</a>	(306)966-6149	University of Saskatchewan Room B103 Health Sciences Building 107 Wiggins Road Saskatoon, SK S7N 5E5
Babiuk, Lorne	Dr.	Director, Vaccine and Infectious Disease Organization, Western College of Veterinary Medicine, University of Saskatchewan	<a href="mailto:lorne.babiuk@usask.ca">lorne.babiuk@usask.ca</a>	Ph: 306 966-7475	
Berg, Lynnda	Ms.	Vice President, Primary and Community Care, Prince Albert Parkland Health Region			1200-24 <sup>th</sup> Street West, Prince Albert, SK S6V 5T4
Bornyk, Mr.	Mr.	Executive Director, Community Services, Sunrise Health Region			Sunrise Health Region Park Unit - 270 Bradbrooke Drive Yorkton SK S3N 2K6
Bretscher, P.	Dr.	Professor, Department of Microbiology and Immunology College of Medicine, University of Saskatchewan	<a href="mailto:bretschr@duke.usask.ca">bretschr@duke.usask.ca</a>	Tel: 306-966-4322 Fax: 306-966-4311	Rm. A231 Health Sciences Bldg. University of Saskatchewan, Saskatoon SK
Cleaveley, Julie	Ms.	Director of Community Health Services, Kelsey Trail Health Region		Telephone: (306) 873 3100 Fax: (306) 873 3224	P.O. Box 1780 Tisdale, Saskatchewan S0E 1T0
Dumelie, Patrick	Mr.	Senior Vice President, Health Services, Qu'appelle Health Region	<a href="mailto:patrick.dumelie@rqhealth.ca">patrick.dumelie@rqhealth.ca</a>	Phone: 766-3427 Fax: 766-3550	1440-14th Avenue, Regina, SK S4P 0W5 Phone: 766-3427 Fax: 766-3550
Firnesz, Bob	Mr.	Executive Director, Provincial Laboratory	<a href="mailto:bfirnesz@health.gov.sk.ca">bfirnesz@health.gov.sk.ca</a>	Ph: (306) 787-3129 Fax: (306) 787-1525	3211 Albert Street, Regina, SK S4S 5W6
Fisher, Kelvin,	Mr.	Vice President, Rural Health, Saskatoon Health Region		Ph: (306) 655-3300	3rd Floor 410-22nd Street East Saskatoon SK S7K 5T6
Hodgson, Paul	Dr.	Pathogenics Manager, GenomePrairie	<a href="mailto:Paul.hodgson@usask.ca">Paul.hodgson@usask.ca</a>	Ph: 306-966-1523 Fax: 306-966-7478	120 Veterinary Road, Saskatoon, SK S7N 5E3
Horsman, Greg	Dr.	Medical Director, Provincial Laboratory	<a href="mailto:ghorsman@health.gov.sk.ca">ghorsman@health.gov.sk.ca</a>	Ph: (306) 787-8316 Fax: (306) 787-1525	3211 Albert Street, Regina, SK S4S 5W6
Labatt, John	Mr.	Vice President, Primary Health Care Initiatives, Qu'appelle Health Region	<a href="mailto:john.labatt@rqhealth.ca">john.labatt@rqhealth.ca</a>	Phone: 766-7807 Fax: 766-7811	2110 Hamilton Street, Regina, SK S4P 2E3

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Lawrence, John	Dr.	Canadian Society of Microbiologists, NWRI Environment Canada		Ph: 304-975-5789 Fax: 306-975-5143	11 Innovation Boulevard, Saskatoon SK, S7N 3H5
Levett, Paul	Dr.	Assistant Clinical Director, Provincial Laboratory, Saskatchewan Health	<a href="mailto:plevett@health.gov.sk.ca">plevett@health.gov.sk.ca</a>	Tel: 306-787-3135 Fax: 306-787-1525	3211 Albert Street Regina, SK S4S 5W6
McDonald, Georgina	Ms.	Chief Executive Officer, Athabasca Health Authority	<a href="mailto:gmacdonald@athabascahealth.ca">gmacdonald@athabascahealth.ca</a>	Ph: (306) 439-2200 Fax: (306) 439-2211	Box 124 Black Lake, SK. S0J 0H0
Nelson, Dwight	Mr.	President and Chief Executive Officer, Regina Qu'appelle Health Region	<a href="mailto:dwright.nelson@rhealth.ca">dwright.nelson@rhealth.ca</a>	Ph 306-766-5279 Fax: 306-766-5222	2180-23rd Avenue, Regina, SK S4S 0A5
Neudorf, Cory	Dr.	Chief Medical Officer of Health, Saskatoon Health Region		Ph: (306) 655-3300	3rd Floor 410-22nd Street East Saskatoon SK S7K 5T6
Peters, George	Mr.	Executive Director, Population Health Branch, Ministry of Health	<a href="mailto:gpeters@health.gov.sk.ca">gpeters@health.gov.sk.ca</a>	Ph: (306) 787-3629	3475 Albert Street, Regina, SK S4S 6X6
Shahab, Saqib	Dr.	President, Saskatchewan Public Health Association	<a href="mailto:saqib.shahab@hr.sk.ca">saqib.shahab@hr.sk.ca</a>		Sunrise Health Region Park Unit - 270 Bradbrooke Drive Yorkton SK S3N 2K6
Shahab, Saqib	Dr.	Medical Health Officer/Director of Public Health, Sunrise Health Region	<a href="mailto:saqib.shahab@hr.sk.ca">saqib.shahab@hr.sk.ca</a>		Royal University Hospital, Room 3729 103 University Avenue, Saskatoon, SK S7N 0W8 Saskatoon, SK
Tan, Ben	Dr.	Division of Infectious Diseases, Royal University Hospital, Department of Paediatrics, Saskatchewan Transplant Program	<a href="mailto:ben.tan@usask.ca">ben.tan@usask.ca</a>	Phone: (306) 655-1777 Fax: (306) 975-0383	
Teplinsky, Susan	Ms.	Saskatchewan Transplant Program			
Thornhill, Jim	Dr.	Associate Dean, Research and Basic Sciences, College of Medicine, University of Saskatchewan	<a href="mailto:Jim.thornhill@usask.ca">Jim.thornhill@usask.ca</a>	Ph: 306-966-4338 Fax: 306-966-6164	B 103 Health Science Building 107 Wiggins Road Saskatoon SK S7N 5E5
Toni, Dale	Dr.	Chair, Five Hills Health Region,		Ph: (306) 694-0296:	Five Hills Health Region 455 Fairford St. E. Moose Jaw, SK. S6H1H3
Wong, Alice	Dr.		<a href="mailto:Alice.wong@saskatoonhealthregion.ca">Alice.wong@saskatoonhealthregion.ca</a>		
Xiao, W.	Dr.	Department Head, Faculty of Medicine, Department of Microbiology and Immunology, University of Saskatchewan	<a href="mailto:xiaow@sask.usask.ca">xiaow@sask.usask.ca</a>	Ph: 306-966-1308, Lab: 306-966-4309 Fax: (306) 966-4311	Department of Microbiology and Immunology Health Sciences Building 107 Wiggins Road University of Saskatchewan Saskatoon, Saskatchewan Canada S7N 5E5

## Manitoba

Aoki, Fred	Dr.	Professor, Medical Microbiology, Pharmacology & Therapeutics, University of Manitoba	<a href="mailto:nelsonak@ms.umt.ca">nelsonak@ms.umt.ca</a> (Admin assistant??)	tel: (204) 789-3625 fax: (204) 783-5255	730 William Avenue, 510 Basic Medical Sciences Building, Winnipeg, MB R3E 0W3
Artsob, Harvey	Dr.	Chief, National Laboratory for Zoonotics and Special Pathogens, National	<a href="mailto:Harvey_artsob@hc-sc.gc.ca">Harvey_artsob@hc-sc.gc.ca</a>	(204) 789-2134	1 <sup>st</sup> Floor, Canadian Science Centre 1015 Arlington Street Winnipeg, Manitoba

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Becker, Marissa	Dr.	Microbiology Laboratory University of Manitoba	<a href="mailto:umbecker@cc.umanitoba.ca">umbecker@cc.umanitoba.ca</a>		R3E 3R2
Booth, Tim	Dr.	Chief, National Laboratory for Viral Diagnostics		Ph: (204) 789-2022 Fax: (204) 789-7049	
Butler-Jones, David	Dr.	Chief Public Health Officer for Canada		Ph:(204) 789-2146 Fax: (204) 784-5939	1015 Arlington St Winnipeg, Manitoba Canada R3E 3R2
Clark, Clifford	Dr.	Acting Chief, National Laboratory for Enteric Pathogens, National Microbiology Laboratory	<a href="mailto:Clifford.Clark@hc-sc.gc.ca">Clifford.Clark@hc-sc.gc.ca</a>	(204) 789-2094	1 <sup>st</sup> Floor, Canadian Science Centre 1015 Arlington Street Winnipeg, Manitoba R3E 3R2
Clarkson, John	Mr.	Deputy Minister, Manitoba Energy, Science and Technology		(204) 945-2771	Winnipeg
Coulthart, Michael	Dr.	Chief, National Laboratory for Host Genetics and Prion Diseases	<a href="mailto:mike_coulthart@hc-sc.gc.ca">mike_coulthart@hc-sc.gc.ca</a>	(204) 789-6026	1015 Arlington St., Winnipeg, Manitoba R3E 3R2
Currie, Jan	Ms.	Vice-President and Chief Nursing Officer, Winnipeg Regional Health Authority	<a href="mailto:jcurrie@wrha.mb.ca">jcurrie@wrha.mb.ca</a> (may not be the correct e-mail address)		Winnipeg Regional Health Authority Suite 1800, 155 Carlton Street Winnipeg, Manitoba R3C 4Y1
Embree, Joanne	Dr.	University of Manitoba Department of Medical Microbiology, Paediatric Infectious Diseases	Contact Admin Assistant Robin Scott: <a href="mailto:scottr@ms.umanitoba.ca">scottr@ms.umanitoba.ca</a>	Ph: 204-789-3524 Fax: 204-789-3926	730 William Avenue, Room 530, Winnipeg, MB R3E 0W4
Farrell, Tom	Mr.	Acting Chair, Workers Compensation Board of Manitoba, Former Deputy Minister of Labour			Winnipeg
Fast, Neil	Mr.	Vice Chairman, Winnipeg Regional Health Authority			Winnipeg
Friesen, Henry	Dr.	Chair, Genome Canada, Board Member, International Centre for infectious Diseases, Distinguished Professor Emeritus, University of Manitoba	<a href="mailto:henry_friesen@umanitoba.ca">henry_friesen@umanitoba.ca</a>	204 789 3423	A115 Chown Bldg University of Manitoba Winnipeg, MB
Hammond, Greg	Dr.	Director of Public Health, Manitoba Health	<a href="mailto:ghammond@gov.mb.ca">ghammond@gov.mb.ca</a>		Winnipeg, Manitoba
Hicks, Sue	Ms.	President, Manitoba Public Health Association	<a href="mailto:suehicks@mts.net">suehicks@mts.net</a>		
Kabani, Amin	Dr.	Acting Chief, National Laboratory for Bacteriology, National Microbiology Laboratory	<a href="mailto:Amin.kabani@hc-sc.gc.ca">Amin.kabani@hc-sc.gc.ca</a>	(204) 789-7060	1 <sup>st</sup> Floor, Canadian Science Centre 1015 Arlington Street Winnipeg, Manitoba R3E 3R2
Kettner, Joel	Dr.	Chief Medical Officer of Health, Manitoba Health		ph. (204) 788-6666 fax (204) 948-2204	Manitoba Health 4 <sup>th</sup> Floor – 300 Carlton Street

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Kitching, Paul	Dr.	Director, Canadian Food Inspection Agency, Winnipeg Laboratory	<a href="mailto:kitchingp@inspection.gc.ca">kitchingp@inspection.gc.ca</a>	Ph: (204) 789-2102 Fax: (204) 789-2038	Winnipeg MB R3B 3M9 1015 ARLINGTON ST WINNIPEG, Manitoba Canada R3E 3M4 Winnipeg
Langstaff, John	Dr.	President & CEO, Cangene Corporation, Board Member, International Centre for Infectious Disease			
Mulvey, Michael	Dr.	Head, Nosocomial Infections, Health Canada National Microbiology Laboratory	<a href="mailto:Michael_Mulvey@phac-aspc.gc.ca">Michael_Mulvey@phac-aspc.gc.ca</a>	Tel: 204-789-2133 Fax: 204-789-5020	National Microbiology Laboratory 1015 Arlington St Winnipeg, MB R3E 3R2
Nicolle, Lindsay E.	Dr.	H.E. Sellers Professor, Department of Internal Medicine, Health Sciences Centre (Chair, Steering Committee on Infection Control Guidelines)	<a href="mailto:nicolle@cc.umanitoba.ca">nicolle@cc.umanitoba.ca</a>	Tel: (204) 787-7772 Fax: (204) 787-4826	St-Boniface Hospital 820 Sherbrooke Street Winnipeg Manitoba R3N 1R9
O'Neil, John	Dr.	Director, Department of Community Health Sciences, University of Manitoba	<a href="mailto:oneilj@ms.umanitoba.ca">oneilj@ms.umanitoba.ca</a>	Ph: 204 789 3677	715 J Buhler Research Ctr University of Manitoba Winnipeg
Phippen, Diane	Ms.	Epidemiologist Nurse Coordinator, Cadham Provincial Laboratory			Cadham Provincial Laboratory Box 8450, 750 William Avenue Winnipeg, Manitoba R3C 3Y1
Plummer, Frank	Dr.	Professor of Microbiology, University of Manitoba, Director of the National Microbiology Laboratory	<a href="mailto:frank_plummer@phac-aspc.gc.ca">frank_plummer@phac-aspc.gc.ca</a>	204 789 2070	University of Manitoba Winnipeg, MB, Canada R3T 2N2
Postl, Brian	Dr.	President & CEO, Winnipeg Regional Health Authority		ph: (204) 926-7000 Fax: (204) 926-7007	1800 - 155 Carlton Street Winnipeg MB R3C 4Y1 Winnipeg, Manitoba
Ronald, Allan	Dr.	Professor, Emeritus, University of Manitoba, Visiting Professor, Makerere University, Nairobi	<a href="mailto:aronald@ms.umanitoba.ca">aronald@ms.umanitoba.ca</a>		
Rubenstein, Nathan	Dr.	Winnipeg Regional Health Authority			
Rubinstein, Ethan	Dr.	Head, Section of Adult Infectious Diseases, Internal Medicine	Contact Administrative Assistant Ingrid Heinrichs: <a href="mailto:Heinric0@cc.umanitoba.ca">Heinric0@cc.umanitoba.ca</a>	Ph: 204-977-5681 Fax: 204-789-3926	Room 543 Basic Medical Sciences Building 730 William Avenue Winnipeg, MB R3E 0W3
Smith, Ian	Dr.	Director General, NRC Institute for Biodiagnostics		(204) 983-7526	435 Ellice Avenue Winnipeg, Manitoba Canada R3B 1Y6 University of Manitoba, Winnipeg Manitoba R3T 2N2
Sparling, Richard	Dr.	Canadian Society of Microbiologists, Department of Microbiology, University of Manitoba	<a href="mailto:sparling@cc.umanitoba.ca">sparling@cc.umanitoba.ca</a>	Ph: 204-474-8320 Fax: 204-474-7603	
Stirton, Scott	Mr.	President, Smith Carter Architects and Engineers		Ph: (204) 477-1260 fax: (204) 477-6346	1600 Buffalo Place, Winnipeg, MB R3T 6B8

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Tipples, Graham	Dr.	National Microbiology Laboratory	<a href="mailto:Graham_tipples@hc-sc.gc.ca">Graham_tipples@hc-sc.gc.ca</a>	Ph: 204-789-6080 Fax: 204-789-5009	1015 Arlington Street Winnipeg, MB R3E 3R2
van Caesele, Paul	Dr.	Director, Cadham Provincial Laboratory	<a href="mailto:cvancaeselle@ov.mb.ca">cvancaeselle@ov.mb.ca</a>	Ph: 204-945-6456	750 William Avenue Winnipeg MB R3E 3J7
Worobec, Betty	Dr.	Canadian Society of Microbiologists, Department of Microbiology, University of Manitoba	<a href="mailto:eworobe@ms.umanitoba.ca">eworobe@ms.umanitoba.ca</a>	Ph: 204-474-8473 Fax: 204-474-7603	University of Manitoba Winnipeg Manitoba R3T 2N2

## Ontario

Adams, Gabrielle	Dr.	NRC Institute for biological Sciences: Immunochemistry Program		(613) 993-7506	1200 Montreal Road Ottawa, Ontario Canada K1A 0R6
Aslanyan, Gary	Dr.	President, Ontario Public Health Association	<a href="mailto:gaslanyan@opha.on.ca">gaslanyan@opha.on.ca</a>	Phone: (819) 997-4871	
Basrur, Sheela	Dr.	Chief Medical Officer of Health, Ministry of Health and Long-term Care			
Bosse, Judith	Dr.	Vice President, Science Branch, Canadian Food Inspection Agency	<a href="mailto:bossej@inspecti.on.gc.ca">bossej@inspecti.on.gc.ca</a>	Ph: (613) 225-2342 Ext:(4326)	CAMELOT Floor 1, Room 123 E 59 CAMELOT DR OTTAWA ON K1A 0Y9 1230 North Shore Blvd, Burlington ON L7R 4C4
Brown, Adrienne	Ms.	Manager, Infection Control Services, Joseph Brant Memorial Hospital, Burlington (Past President, CHICA)	<a href="mailto:Adrienne.brown@jbmh.com">Adrienne.brown@jbmh.com</a>	Ph: 905-632-3737, Ext. 5538 Fax: 905-681-4890	
Cameron, William	Dr.	Director, Canadian HIV Trials Network, Ottawa General Hospital		613-737-8923	Ottawa, Ontario
Chan, Ivy	Ms.	Director, Environmental Health Division, First Nations and Inuit Health Branch	<a href="mailto:ivy_chan@hc-sc.gc.ca">ivy_chan@hc-sc.gc.ca</a>	Ph: (613) 948-7773	Tunney's Pasture Ottawa, Ontario Canada K1A 0K9
Clark, Ron	Mr.	Programme Manager, Communicable Disease Control Division, First Nations and Inuit Health Branch	<a href="mailto:ron_clarke@hc-sc.gc.ca">ron_clarke@hc-sc.gc.ca</a>	Ph: (613) 948-6406 Fax: Fax:(613) 948-9254	Tunney's Pasture Ottawa, Ontario Canada K1A 0K9
Conly, John	Dr.	Hospital Epidemiologist and Associate Professor of Medicine, Toronto Hospital	<a href="mailto:John.conly@calgaryhealthregion.ca">John.conly@calgaryhealthregion.ca</a> <a href="mailto:John.conly@cls.ab.ca">John.conly@cls.ab.ca</a>	Ph: 403-944-8222	Room 117-NU13 200 Elizabeth Street, Toronto, ON M5G 2C4
Culbert, Ian	Dr.	Manager, Health Resources Centre, Canadian Public Health Association	<a href="mailto:iculbert@cpha.ca">iculbert@cpha.ca</a>	Tel: (613) 725-3769 Fax: (613) 725-9826	Canadian Public Health Association 400-1565 Carling Avenue Ottawa, Ontario K1Z 8R1 Tel: (613) 725-3769 Fax: (613) 725-9826
Davis, Kurt	Mr.	Executive Director, Canadian Society for Medical Laboratory Science	<a href="mailto:khdavis@csmls.org">khdavis@csmls.org</a>	Ph: 905-528-8642 Fax: 905-528-4968	P.O. Box 2830, LCD1 Hamilton Ontario, L8N 3N8
D'Cunha, Colin	Dr.	Chief Medical Officer of Health and Director	<a href="mailto:dcunha99@mail1.moh.gov.on.ca">dcunha99@mail1.moh.gov.on.ca</a>	Tel: (416) 327-7392 Fax: (416) 327-7438	5700 Yonge Street, 8th Floor

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Downey, Bernice	Ms.	Public Health Branch Ontario Ministry of Health Chief Executive Officer, National Aboriginal Health Organization	<a href="mailto:bdowney@naho.ca">bdowney@naho.ca</a>	Ph: 613-237-9462, ext. 222 Fax: 613-237-1810	North York, Ontario M2M 4K5 220 Laurier Avenue West, Suite 1200 Ottawa, ON K1P 5Z9
Edge, Lois	Ms.	Senior Research Officer, Metis Centre, National Aboriginal Health Organization	<a href="mailto:ledge@naho.ca">ledge@naho.ca</a>	Ph: 613-237-9462, ext.557 Fax: 613-237-1810	220 Laurier Avenue West, Suite 1200 Ottawa, ON K1P 5Z9
Evans, Gerald	Dr.	Queens University	<a href="mailto:evansg@post.queensu.ca">evansg@post.queensu.ca</a>		Kingston Ontario
Fearon, Margaret	Dr.	Executive Medical Director, Medical Microbiology, Canadian Blood Services	<a href="mailto:Margaret.fearon@bloodservices.ca">Margaret.fearon@bloodservices.ca</a>	Ph: 416-313-4598 Fax: 416-974-9757	67 College St. Toronto, ON M5G 2M1
Figeys, Daniel	Dr.	Ottawa Institute of Systems Biology, University of Ottawa	<a href="mailto:dfigeys@uottawa.ca">dfigeys@uottawa.ca</a>	Phone: (613) 562- 5800 Ext: 8674 (Office); Fax: (613) 562-5452	Room 4204, Guindon Hall, Faculty of Medicine 451 Smyth Road Ottawa, Ontario K1H 8M5
Ford-King, Lee	Dr.	Paediatric Infectious Disease, Hospital For Sick Children, University of Toronto Division of Infectious Diseases	<a href="mailto:Lee.ford-jones@sickkids.on.ca">Lee.ford-jones@sickkids.on.ca</a>	Ph: (416) 813-5443 Fax: (416) 813-5032	555 University Avenue Black Wing, Room 7304 Toronto, ON M5G 1X8
Gregson, Daniel	Dr.	Medical Microbiology and Infectious Diseases, St. Joseph's Health Centre	<a href="mailto:dan.gregson@cls.ab.ca">dan.gregson@cls.ab.ca</a>		Box 5777 London, Ontario N6A 4L6
		Medical Microbiology and Infectious Diseases, Calgary Laboratory Services, University of Calgary, 1638 10th Avenue S.W., Calgary, AB T3C 0J5. E-mail: dan.gregson@cls.ab.ca.			Medical Microbiology and Infectious Diseases, Calgary Laboratory Services, University of Calgary, 1638 10th Avenue S.W., Calgary, AB T3C 0J5.
Howard, Gillian	Ms.	Vice-President, University Health Network	<a href="mailto:gillian.howard@uhn.on.ca">gillian.howard@uhn.on.ca</a>	416-340-4636	Toronto Ontario
Isnor, Richard	Dr.	Biotechnology Horizontal Initiatives, National Research Council of Canada Genomics Health Initiative		(613) 998-5517	100 Sussex Drive Ottawa, Ontario Canada
Jha, Prabhat	Dr.	Centre for Global Health Research, University of Toronto Public Health	<a href="mailto:Prabhat.jha@utoronto.ca">Prabhat.jha@utoronto.ca</a>	Ph: 416-864-6042 Cell: 1-416-839-0332	K1A 0R6 Toronto, Ontario
Jin, R.	Dr.	Director of Infectious Disease, Ministry of Health and Long-term Care			
Kingsbury, Linda	Ms.	Nurse Consultant, Nosocomial and Occupational Infections. Bureau of Infectious Diseases Laboratory Centre for Disease Control, Health Canada	<a href="mailto:Linda.Kingsbury@hc-sc.gc.ca">Linda.Kingsbury@hc-sc.gc.ca</a>	Ph: (613) 957-0328 Fax: (613) 952-6668	Postal Locator 0603E1, Ottawa, ON
Krell, Peter	Dr.	Canadian Society of Microbiologists, Department of Microbiology, University of	<a href="mailto:pkrell@uoguelph.ca">pkrell@uoguelph.ca</a>	Ph: 519-824-4120 Fax: 519-837-1802	University of Guelph, Guelph Ontario N1G 2W1

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Lem, Marcus	Dr.	Guelph Community Medicine Specialist, Communicable Disease Control Division, First Nations and Inuit Health Branch	<a href="mailto:marcus_lem@hc-sc.gc.ca">marcus_lem@hc-sc.gc.ca</a>	Ph: (613) 957-3393 Fax: (613) 948-9254	Tunney's Pasture Ottawa, Ontario Canada K1A 0K9
Low, Donald	Dr.	Microbiologist-in-Chief, Toronto Medical Laboratories/Mount Sinai Hospital, Toronto	<a href="mailto:dlow@mtsinai.on.ca">dlow@mtsinai.on.ca</a>		Toronto
Lyons, Donna	Ms.	Director, First Nations Centre, National Aboriginal Health Organization	<a href="mailto:dlyons@naho.ca">dlyons@naho.ca</a>	Ph: 613-237-9462, ext. 501 Fax: 613-237-1810	220 Laurier Avenue West, Suite 1200 Ottawa, ON K1P 5Z9
Mandell, Lionel	Dr.	Head, Infectious Diseases, Hamilton Civic Hospital			
Matlow, Anne	Dr.	Director of Infection Control, Hospital for Sick Children (Director, Standards & Guidelines, CHICA)	<a href="mailto:Anne.matlow@si.ckkids.ca">Anne.matlow@si.ckkids.ca</a>	Ph: 416-813-5996 Fax: 416-813-4992	555 University Avenue Toronto, ON M5G 1X8
Mazzulli, Tony	Dr.	Microbiologist, Lab Medicine & Pathobiology Mt. Sinai Hospital	<a href="mailto:tmazzulli@mtsinai.on.ca">tmazzulli@mtsinai.on.ca</a>	Ph: 416-586-4695 Fax: 416-586-8746	600 University Ave. Rm 1485 Toronto, ON M5G 1X5
McCoy, Richard	Mr.	Executive Director, Association of Medical Microbiology and Infectious Disease Canada (AMMI)	<a href="mailto:exc.ammicanada@magma.ca">exc.ammicanada@magma.ca</a>	Ph: 613-260-3233 fax: 613-260-3235	405-2197 Riverside Drive Ottawa, ON K1H 7X3
McGeer, Allison	Dr.	Microbiologist, Infectious Disease Consultant, Department of Microbiology	<a href="mailto:amcgeer@mtsinai.on.ca">amcgeer@mtsinai.on.ca</a>	Ph: 416-586-3118 Fax: 416-586-3140	Department of Microbiology, Room 1460 Mount Sinai Hospital 600 University Ave. Toronto, Ontario, M5G 1X5
Mindorff, Catherine	Ms.	Community and Institutional Infection Prevention and Control			202 Yahara Place, Ancaster, ON
Mulvale, Catherine	Ms.	Director of Development, Canadian Foundation for Infectious Diseases	<a href="mailto:camulvale@reseaarchid.com">camulvale@reseaarchid.com</a>	Ph: 905-827-6008 Fax: 905-827-5167	2511 Scotch Pine Drive Oakville, ON L6M 4C3
O'Brian, Paul	Dr.	Chair, Department of Medicine, Division of Infectious Diseases, McMaster University			
O'hearn, Tracy	Ms.	Director, Ajunnginig (Inuit) Centre, National Aboriginal Health Organization	<a href="mailto:tohearn@naho.ca">tohearn@naho.ca</a>	Ph: 613-237-9462, ext.237 Fax: 613-237-1810	220 Laurier Avenue West, Suite 1200 Ottawa, ON K1P 5Z9
Paton, Shirley	Ms.	Chief, Nosocomial and Occupational Infections, Bureau of Infectious Diseases, Laboratory Centre for Disease Control, Health Canada		Ph: (613) 957-0326 Fax: (613) 946-0678	Postal Locator 0603E1 Ottawa, Ontario
Petrich, Astrid	Dr.	Molecular Biologist, Lab Medicine St. Joseph's Hospital	<a href="mailto:petricha@mcmaster.ca">petricha@mcmaster.ca</a>	Ph: 905-522-1155 ext: 3270 Fax: 905-521-6083	St. Joseph's Hospital 50 Charlton Ave E Rm L314 Hamilton, ON L8N 4A6

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Piaskowski, Pat	Ms.	Thunder Bay Regional Health Sciences Centre (Editor-in-Chief Canadian Journal of Infection Control)	<a href="mailto:piaskowp@tbh.net">piaskowp@tbh.net</a>	Ph: 807-684-6040 Fax: 807-684-5878	Thunder Bay Regional Health Sciences Centre 980 Oliver Road Thunder Bay ON P7B 6V4
Plante-Jenkins, Cynthia	Ms.	Clinical Informatics Specialist – Lab Trillium Health Centre – THINK Ctr. (Director of Finance, CHICA)	<a href="mailto:Cplante-jenkins@thc.on.ca">Cplante-jenkins@thc.on.ca</a>	905-848-7100 Ext.3754 Fax: 905-804-7772	500-90 Burnhamthorpe West, Mississauga ON L5B 3C3
R. Hawkins		Executive Director of Public Health, ministry of Health and Long-term Care			
Rachlis, Anita	Dr.	Director HIV Clinic, Sunnybrook/Women's College Health Sciences Centre, University of Toronto	<a href="mailto:a.rachlis@utoronto.ca">a.rachlis@utoronto.ca</a>		Toronto, Ontario
Ramotar, Karam	Dr.	Assistant Professor Pathology & Laboratory Medicine Ottawa Hospital	<a href="mailto:kramotar@ottawahospital.on.ca">kramotar@ottawahospital.on.ca</a>	Tel: 613-737-8324 Fax: 613-737-8315	Ottawa Hospital, General Campus Ottawa, ON
Reading, Jeff	Dr.	Scientific Director, CIHR Institute of Aboriginal Peoples' Health			
Richardson, Susan	Dr.	Head, Division of Microbiology Paediatric Laboratory Medicine, Hospital for Sick Children	<a href="mailto:Susan.richardson@sickkids.ca">Susan.richardson@sickkids.ca</a>		Toronto Ontario
Roifman, Chaim	Dr.	Programme Head, Infection, Immunity, Injury and Repair Research Programme, University of Toronto			
Rotstein, Coleman	Dr.	Hamilton Health Sciences	<a href="mailto:crotstei@mcmaster.ca">crotstei@mcmaster.ca</a>		Hamilton, Ontario
Saginur, Raphael	Dr.	Division of Infectious Disease, Ottawa Hospital	<a href="mailto:rsaginur@ottawahospital.on.ca">rsaginur@ottawahospital.on.ca</a>		Ottawa Ontario
Simor, Andy	Dr.	Director, Department of Microbiology Sunnybrook Medical Centre	<a href="mailto:Andrew.simor@wchsc.on.ca">Andrew.simor@wchsc.on.ca</a>		2075 Bayview Avenue, Room B121 Toronto, ON M4H 3M5
St. Arnaud, Marcelle	Mr.	Manager, Canadian Health Network, National Aboriginal Health Organization	<a href="mailto:mstarnaud@nah.o.ca">mstarnaud@nah.o.ca</a>	Ph: 613-237-9462, ext. 527 Fax: 613-237-1810	220 Laurier Avenue West, Suite 1200 Ottawa, ON K1P 5Z9
Sullivan, Linda	Ms.	Manager, Policy and Communications, National Aboriginal Health Organization	<a href="mailto:lsullivan@nah.o.ca">lsullivan@nah.o.ca</a>	Ph: 613-237-9462, ext. 232 Fax: 613-237-1810	220 Laurier Avenue West, Suite 1200 Ottawa, ON K1P 5Z9
Tardif, Daniel	Mr.	Director General, Communicable Disease Control Division, First Nations and Inuit Health Branch	<a href="mailto:daniel_tardif@hc-sc.gc.ca">daniel_tardif@hc-sc.gc.ca</a>	Ph: (613) 948-6405 Fax: (613) 948-9254	Tunney's Pasture Ottawa, Ontario Canada K1A 0K9
Toys, Baldwin	Dr.	Head, Division of Microbiology, Ottawa Hospital	<a href="mailto:btoye@ottawahospital.on.ca">btoye@ottawahospital.on.ca</a>		Ottawa, Ontario
Turpin, Pierre March	Mr.	Senior Policy Analyst, Communicable Disease Control Division, First Nations and Inuit Health Branch	<a href="mailto:pierre_marc_turpin@hc-sc.gc.ca">pierre_marc_turpin@hc-sc.gc.ca</a>	Ph: (613) 954-2463 Fax: (613) 948-9254	Tunney's Pasture Ottawa, Ontario Canada K1A 0K9

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Upton, Allen	Dr.	Hospital for Sick Children	<a href="mailto:Upton.allen@sickkids.on.ca">Upton.allen@sickkids.on.ca</a>		Toronto, Ontario
Wigle, Ronald	Dr.	Division Chair, Department of Medicine, Division of Infectious Disease, Queens University			
Williams, David	Dr.	Medical Officer of Health for Thunder Bay District		Ph: (807) 625-5900 Fax: (807) 623-2369	999 Balmoral Street Thunder Bay, Ontario P7B 6E7
Wilson, Elinor	Dr.	Chief Executive Officer, Canadian Public Health Association	<a href="mailto:ceo@cpha.ca">ceo@cpha.ca</a>	Ph: 613-725-3769 Fax: 613-725-9826	400 – 1565 Carling Avenue Ottawa, Ontario K1Z 8R1
Wray, Richard	Mr.	President, Community and Hospital Infection Control Association, Infection Control Practitioner, Hospital for Sick Children	<a href="mailto:Rick.wray@sickkids.ca">Rick.wray@sickkids.ca</a>	416-813-8621 Fax: 416-813-4992	555 University Avenue, Room 7324 Toronto, ON M5G 1X8
Wright, Gerald	Dr.	Department Chair, Department of Biochemistry and Biomedical Sciences, McMaster university			
Yao, Zemin	Dr.	Chair, Faculty of Medicine, Department of Biochemistry, Microbiology and Immunity, Queens University			
Zoutman, Dick	Dr.	Medical Director, IC Service, Kingston General Hospital (Physician Director, CHICA)	<a href="mailto:zoutmand@kgh.kari.net">zoutmand@kgh.kari.net</a>	Ph: 613-549-6666 Ext.4015 Fax: 613-548-2513	Kingston General Hospital 76 Stuart Street Kingston, ON K7L 2V7
<b>Québec</b>					
Behr, Marcel	Dr.	Associate Professor, McGill Medicine	<a href="mailto:Marcel.behr@mcgill.ca">Marcel.behr@mcgill.ca</a>		Montreal, Quebec
Bergeron, Michel	Dr.	Director, Division of Microbiology and Infectious Diseases Research Center, Laval University	<a href="mailto:Michel.G.Bergeron@crchul.ulaval.ca">Michel.G.Bergeron@crchul.ulaval.ca</a>		Quebec City, Province de Quebec
Boivin, Guy	Dr.	Laval University	<a href="mailto:Guy.boivin@crchul.ulaval.ca">Guy.boivin@crchul.ulaval.ca</a>		
Desrochers, Michel	Dr.	Director General, NRC Biotechnology Research Institute: Health Sector		(514) 496-6101	6100 Royalmount Avenue Montréal, Quebec Canada H4P 2R2
Gourdeau, Marie	Dr.	Service de microbiologie-infectiologie, Hopital deL'Enfant-Jesus			1401 18e rue Quebec, PQ G1J 1Z4
Ishak, Magued	Dr.	Hotel-Dieu de St. Jerom			290, rue Montigny St. Jerome, Quebec J7Z 5T3
Laferrier, Celine	Dr.	Associate Professor, Microbiology and Immunology, University of Montreal	<a href="mailto:celine_laferriere@ssss.gouv.qc.ca">celine_laferriere@ssss.gouv.qc.ca</a>	Ph: (514) 345-4931 #4643 Fax: (514) 345-4860	Chef hospitalier Département de microbiologie et immunologie Hôpital Ste-Justine 3175, ch. Côte-Ste-Catherine Montréal (Québec) H3T 1C5
Lalonde, Richard	Dr.	Director Infectious Disease Division, CUSM-Royal	<a href="mailto:Richard.lalonde@mcgill.ca">Richard.lalonde@mcgill.ca</a>	Ph: 514-843-2090	Montreal, PQ

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Lamontagne, Francois	Dr.	Victoria Hospital, Associate Professor Medicine, McGill University Department de Microbiologie médicale et infectiologie, CHUM Hopital St-Luc	<a href="mailto:francois.lamothe.chum@ssss.gouv.qc.ca">francois.lamothe.chum@ssss.gouv.qc.ca</a>	Ph: (514) 890-8305 #36210 Fax: (514) 412-7311	Chef hospitalier Service de microbiologie médicale CHUM - Campus Saint-Luc 264, boul. René-Lévesque Est Montréal (Québec) H2X 1P3
Laverdière, Michel Meunier, Louise	Dr. Ms.	University of Montreal Conseillère en prévention des infections, Prévention des infections, Hopital Saint-Luc	<a href="mailto:laverdim@courrier.umontreal.ca">laverdim@courrier.umontreal.ca</a>	Tel: (514) 281-3255, ext 5902 Fax: (514) 281-3293	Conseillère en prévention des infections Prévention des infections Hôpital Saint-Luc 1058 rue St. Denis Montréal, Québec H2X 3J4
Miller, Mark	Dr.	Chief, Department of Microbiology and Infectious Diseases, Jewish General Hospital		514-340-8294	Jewish General Hospital G141-3755 Côte Ste-Catherine Montreal, Quebec H3T 1E2
Moore, Dorothy	Dr.	Division of Infectious Diseases, Montreal Children's Hospital	<a href="mailto:dmooinf@mch.mcgill.ca">dmooinf@mch.mcgill.ca</a>	Tel: (514) 934-4485 Fax: (514) 934-4494	2300 Tupper, Room C1242 Montreal, Quebec H3H 1P3
Orenstein, Pearl	Dr.	Infection Control Coordinator, SMBD Jewish General Hospital	<a href="mailto:porenste@lab.igh.mcgill.ca">porenste@lab.igh.mcgill.ca</a>	514-340-8222, ext. 5778 Fax: 514-340-7578	3755 Cote St. Catherine Montreal PQ H3T 1E2
Sekaly, Rafick-Pierre	Dr.	Scientific Director, Canadian Network for Vaccines and Immunotherapeutics, Montreal	<a href="mailto:rafick-pierre.sekaly@umontreal.ca">rafick-pierre.sekaly@umontreal.ca</a>	Ph: (514) 890-8000 #35288 Fax: (514) 412-7415	Laboratoire du Dr Rafick-P. Sékaly Centre de recherche Campus St-Luc Pavillon Edouard-Asselin 264, rue René Lévesque Est Montréal (Québec) H2X 1P1
Skamene, Emil	Dr.	Director, Centre for the Study of Host Resistance, McGill University	<a href="mailto:emil.skamene@muhc.mcgill.ca">emil.skamene@muhc.mcgill.ca</a>	Phone: 514-934-8038	Montréal, PQ
Villemur, Richard		Canadian Society of Microbiologists, INRS – Institut Armand-Frappier	<a href="mailto:richard.villemur@inrs-iaf.quebec.ca">richard.villemur@inrs-iaf.quebec.ca</a>	Ph: 450-687-5010 Fax: 204-474-7603	531, boul.des Prairies Laval, PQ H7V 1B7
Weber, Jean-Philippe	Dr.	Director, Institut national de sante publique du Quebec	<a href="mailto:jpweber@inspq.qc.ca">jpweber@inspq.qc.ca</a>	Ph: 418 650 5115 Fax: 418 654 2148	945, rue Wolfe Sainte-Foy (Québec) CANADA G1V 5B3
Wolfson, Christina	Dr.	Director Centre for Clinical Epidemiology and Community Studies Epidemiology, Biostatistics and Occupational Health	<a href="mailto:christina.wolfson@mcgill.ca">christina.wolfson@mcgill.ca</a>	Ph: 514-340-7563	Montréal, PQ

**Nova Scotia**

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Blades, Cathy	Ms.	Vice President Community Health, Southwest District Health Authority		Phone: 902-742-3541 Fax: 902-742-0369	60 Vancouver Street, Yarmouth, Nova Scotia Canada B5A 2P5
Duncan, Roy	Dr.	Executive Director, Dalhousie Infectious Disease Research Alliance	<a href="mailto:Roy.Duncan@Dal.ca">Roy.Duncan@Dal.ca</a>	Ph: 902 494 2630 Ph: 902 494 6770	
Elliott, Chris	Dr.	Chief of Staff, Pictou County Health Authority	<a href="mailto:chris.elliott@pcha.nshealth.ca">chris.elliott@pcha.nshealth.ca</a>	Ph: (902)752-7600 Fax: (902)752-6231	Pictou County Health Authority 835 East River Road New Glasgow, Nova Scotia B2H 3S6
Flinn, Patrick	Mr.	Chief Executive Officer, Pictou County Health Authority	<a href="mailto:patrick.flinn@pcha.nshealth.ca">patrick.flinn@pcha.nshealth.ca</a>	Ph: (902)752-7600 Fax: (902)752-6231	Pictou County Health Authority 835 East River Road New Glasgow, Nova Scotia B2H 3S6
Ford, Don	Mr.	President & CEO, Capital Health Authority		Jane Williams Executive Secretary (902) 473-2240	Suite 2142, 1796 Summer Street Halifax, Nova Scotia B3H 3A7 Halifax, Nova Scotia
Forward, Kevin	Dr.	Service Chief, Department of Microbiology, Queen Elizabeth II HSC, Professor, Departments of Pathology, Microbiology and Immunology, Dalhousie University	<a href="mailto:Kevin.forward@dha.nshealth.ca">Kevin.forward@dha.nshealth.ca</a>		
Johnston, Lynn	Dr.	Hospital Epidemiologist and Associate Professor of Medicine, Queen Elizabeth II Health Sciences Centre, Dalhousie University	<a href="mailto:ljohnsto@dal.ca">ljohnsto@dal.ca</a>		Queen Elizabeth II Health Sciences Centre, Room 5-014 ACC 1278 Tower Road Halifax, NS B3H 2Y9
Langley, Joanne	Dr.	I.W.K. Hospital for Sick Children, Dalhousie University	<a href="mailto:Joanne.langley@dal.ca">Joanne.langley@dal.ca</a>		8 <sup>th</sup> Floor Labs, 5850 University Avenue Halifax, NS B3J 3G9
Lessard, Peter	Dr.	Vice-President Medicine, Annapolis Valley District Health Authority			Annapolis Valley Health Corporate Office PO Box 490 121 Orchard Street Berwick, Nova Scotia Canada, B0P 1E0
MacCormick, Shaun	Dr.	Chief of Staff/Medical Director, Colchester East Hants Health Authority	<a href="mailto:shaun.maccormick@cehha.nshealth.ca">shaun.maccormick@cehha.nshealth.ca</a>	Phone: 902-893-5554 Fax: 902-893-0040	207 Willow Street Truro, Nova Scotia B2N 5A1
MacDonald, Kevin	Mr.	Chief Executive Officer, Guysborough Antigonish Strait Health Authority	<a href="mailto:kmacdonald@gasnshealth.ca">kmacdonald@gasnshealth.ca</a>	Tel: 902-867-4266 Fax: 902-863-1176	25 Bay Street, Antigonish, NS B2G 2G5
MacDonald, Madonna		Vice-President of Community Health, Guysborough Antigonish Strait Health Authority	<a href="mailto:mmacdonald@gasnshealth.ca">mmacdonald@gasnshealth.ca</a>	Tel: 902-867-4271 Fax: 902-863-1076	GASHA 25 Bay Street, Antigonish, NS B2G 2G5
MacDougall, Ms.	Ms.	Vice President of	<a href="mailto:eleanor.macdougall@cehha.nshealth.ca">eleanor.macdougall@cehha.nshealth.ca</a>	Phone: 902-893-5554	207 Willow Street

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
all, Eleanor		Community Health, Colchester East Hants Health Authority	<a href="mailto:all@cehha.nshealth.ca">all@cehha.nshealth.ca</a>	Fax: 902-893-0040	Truro, Nova Scotia B2N 5A1
MacKenzie, Michael	Dr.	District Chief of Staff, Guysborough Antigonish Strait Health Authority	<a href="mailto:mmkenzie@gash.nshealth.ca">mmkenzie@gash.nshealth.ca</a>	Tel: 902-867-4170 Fax: 902-863-1176	25 Bay Street, Antigonish, NS B2G 2G5
MacNeil, Blaise	Mr.	President & Chief Executive Officer, Southwest District Health Authority,		Phone: 902-742-3541 Fax: 902-742-0369	60 Vancouver Street, Yarmouth, Nova Scotia Canada B5A 2P5
Malcom, John	Mr.	CEO, Cape Breton District Health Authority	<a href="mailto:malcomj@cbdha.nshealth.ca">malcomj@cbdha.nshealth.ca</a>	Ph: 902-563-2711	
Marshall, Jean	Dr.	Head, Department of Microbiology and Immunology, Dalhousie University	<a href="mailto:Jean.Marshall@Dal.Ca">Jean.Marshall@Dal.Ca</a>	Ph: 902 494 1173 Ph: 902 494 5118	
McMillan, Fran	Ms.	Vice-President, Community Health, Cumberland Health Authority	<a href="mailto:fran.mcmillan@cha.nshealth.ca">fran.mcmillan@cha.nshealth.ca</a>	Ph: 902-661-1090 Fax: 902-667-1125	Cumberland Health Authority 34 Prince Arthur Street Amherst, Nova Scotia B4H 3B3
McNamar, Kevin	Mr.	Chief Executive Officer, South Shore District Health Authority	<a href="mailto:kmcnamara@ssdha.nshealth.ca">kmcnamara@ssdha.nshealth.ca</a>	(902) 527-5200 (902) 527-5269	90 Glen Allan Drive Bridgewater, NS B4V 3S6
Nestel, Mada	Dr.	Medical Director, South Shore District Health Authority	<a href="mailto:mnestel@ssdha.nshealth.ca">mnestel@ssdha.nshealth.ca</a>	(902) 543-4603 ext. 2245 (902) 527-5269	90 Glen Allan Drive Bridgewater, NS B4V 3S6
Peter MacKinnon	Mr.	Chief Executive Officer, Colchester East Hants Health Authority	<a href="mailto:peter.mackinnon@cehha.nshealth.ca">peter.mackinnon@cehha.nshealth.ca</a>	Phone: 902-893-5554 Fax: 902-893-0040	207 Willow Street Truro, Nova Scotia B2N 5A1
Quigley, H. Bruce	Mr.	Chief Executive Officer, Cumberland Health Authority	<a href="mailto:bruce.quigley@cha.nshealth.ca">bruce.quigley@cha.nshealth.ca</a>	Ph: 902-661-1090 Fax: 902-667-1125	Cumberland Health Authority 34 Prince Arthur Street Amherst, Nova Scotia B4H 3B3
Scott, Jeff	Dr.	Provincial Medical Officer of Health			
Smith, Mark	Dr.	Acting Director, Department of Community Health and Epidemiology, Population Health Research Unit, Dalhousie University	<a href="mailto:Mark.Smith@Dal.Ca">Mark.Smith@Dal.Ca</a>	902 494 6456	
Strang, Robert	Dr.	Medical Officer of Health, Capital Health Authority			Public Health Services Unite 4, 201 Brownlow Avenue Dartmouth, Nova Scotia B3B 1W2
Sutherland, Ian	Dr.	Chief of Staff, Cumberland Health Authority	<a href="mailto:ian.sutherland@cha.nshealth.ca">ian.sutherland@cha.nshealth.ca</a>	Ph: 902-661-1090 Fax: 902-667-1125	Cumberland Health Authority 34 Prince Arthur Street Amherst, Nova Scotia B4H 3B3

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Tarrant, Florence	Ms.	President, Public Health Association of Nova Scotia	<a href="mailto:phans@cpha.ca">phans@cpha.ca</a>		Public Health Association of Nova Scotia P.O. Box 33074, Halifax, NS B3L 4T6
<b>New Brunswick</b>					
Akwar Teneg, Holy	Dr.	Epidemiologist, Office of Chief Medical Officer of Health, Department of Health and Wellness	<a href="mailto:Holy.Akwar@gnb.ca">Holy.Akwar@gnb.ca</a>	Ph: (506) 453-2323 Fax: (506) 453-8702	Carleton Place 520 King Street Fredericton, New Brunswick E3B 6G3 Canada
Assaff, David	Dr.	Medical Officer of Health, Miramichi Public Health, Department of Health and Wellness	<a href="mailto:david.assaff@gnb.ca">david.assaff@gnb.ca</a>	Ph: (506) 778-6102 Fax: (506) 773-6611	Chatham Town Centre 1780 Water Street Miramichi, New Brunswick E1N 1B6 Canada
Balram, Christopher	Dr.	Director, Epidemiology Program, Department of Health and Wellness	<a href="mailto:christofer.balram@gnb.ca">christofer.balram@gnb.ca</a>	Ph: (506) 453-3092 Fax: (506) 453-2780	Carleton Place 520 King Street Fredericton, New Brunswick E3B 6G3 Canada
Benteau, Steve	Mr.	Director, New Brunswick Department of Health and Wellness, Division of Public Health Medical Services	<a href="mailto:steve.benteau@gnb.ca">steve.benteau@gnb.ca</a>	Ph: 453-2536 Fax: 444-4697	Carleton Place 520 King Street Fredericton, New Brunswick E3B 6G3 Canada
Berube, Medard	Dr.	Medical Officer of Health, Edmundston Public Health, Public Health, Department of Health and Wellness	<a href="mailto:medard.berube@gnb.ca">medard.berube@gnb.ca</a>	Ph: (506) 735-2065 Fax: (506) 735-3142	Carrefour Assomption 121 de l'Église Street Edmundston, New Brunswick E3V 1J9 Canada
Buck, Dawn Marie	Ms.	Director, St. Joseph's Community Health Centre, Atlantic Health Sciences Centre	<a href="mailto:bucda@reg2.health.nb.ca">bucda@reg2.health.nb.ca</a>	Ph: 506-632-5700	130 Bayard Drive, Saint John, New Brunswick, E2L 3K1
Bulleid, Barbara	Dr.	Chief of Staff, River Valley Health, Fredericton	<a href="mailto:Karen.Mason@rvh.nb.ca">Karen.Mason@rvh.nb.ca</a> (Admin??)	Ph: (506) 452-5678 Fax: (506) 452-5670	700 Priestman Street, PO Box 9000 Fredericton, NB E3B 5N5
Donovan, Jean-Marie	Ms.	Administrative Director (North), Extra-Mural Program, River Valley Health, Fredericton	<a href="mailto:JeanMarie.Donovan@rvh.nb.ca">JeanMarie.Donovan@rvh.nb.ca</a>	Ph: (506) 452-5678 Fax: (506) 452-5670	700 Priestman Street, PO Box 9000 Fredericton, NB E3B 5N5
Dube, Eileen	Ms.	Program Manager, Chief Medical Office of Health, Department of Health and Wellness	<a href="mailto:eileen.dube@gnb.ca">eileen.dube@gnb.ca</a>	Ph: (506) 658-2454 Fax: (506) 658-3067	Carleton Place 520 King Street Fredericton, New Brunswick E3B 6G3 Canada
Gammon, Deborah	Ms.	Chief Nursing Officer, Acadie-Bathurst Health Authority		Ph: (506) 544-2000 Fax: (506) 544-2329	1745 Vallée Lourdes Drive Bathurst, N.B. E2A 4P8
Giffin, Scott	Dr.	Medical Officer of Health, Saint John Public Health,	<a href="mailto:scott.giffin@gnb.ca">scott.giffin@gnb.ca</a>	Ph: (506) 658-3022 Fax: (506) 658-3067	Saint John Mercantile Centre

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
		Department of Health and Wellness			55 Union Street Saint John, New Brunswick E2L 5B7 Canada
Kazi, Fond		Vice President, Community Health, South East Regional Health Authority		Ph: 506-857-5111	135 MacBeth Ave Moncton, New Brunswick, E1C 6Z8
Kenmey, Peggy	Ms.	Director, Education Liaison, Atlantic Health Sciences Centre	<a href="mailto:kenpe@reg2.health.nb.ca">kenpe@reg2.health.nb.ca</a>		Atlantic Health Sciences Corporation P O Box 5200 400 University Avenue Saint John, NB E2L 4L4
Lawlor, Sharon	Ms.	President, New Brunswick/Prince Edward Island Branch, Canadian Public Health Association		Ph: 506-455-6938 Fax: 506-455-6938	Ann Harling, Secretary-Treasurer NB/PEI branch, CPHA 38 Manchester Court, Fredericton, NB. E3B 4P2
Losier, Aldéoda	Mr.	President and Chief Executive Officer, Acadie-Bathurst Health Authority		Ph: (506) 544-2000 Fax: (506) 544-2329	1745 Vallée Lourdes Drive Bathurst, N.B. E2A 4P8
MacDonald, Wayne	Dr.	Chief Medical Officer, Chief Medical Officer of Health, Department of Health and Wellness	<a href="mailto:wayne.macdonald@gnb.ca">wayne.macdonald@gnb.ca</a>	Ph: (506) 453-2323 Fax: (506) 453-8702	Carleton Place 520 King Street Fredericton, New Brunswick E3B 6G3 Canada
McKee, Maureen	Ms.	Administrative Director (South), Extra-Mural Program, River Valley Health, Fredericton	<a href="mailto:Maureen.McKee@rvh.nb.ca">Maureen.McKee@rvh.nb.ca</a>	Ph: (506) 452-5678 Fax: (506) 452-5670	700 Priestman Street, PO Box 9000 Fredericton, NB E3B 5N5
Nazair-Savoie, Carolle	Ms.	Nurse Practitioner, South East Regional Health Authority		Ph: 506-857-5111	135 MacBeth Ave Moncton, New Brunswick, E1C 6Z8
O'Brian, Anne	Dr.	Clinical Department Head, Department of Laboratory Medicine, Saint John Regional Hospital	<a href="mailto:obran@reg2.health.nb.ca">obran@reg2.health.nb.ca</a>	(506) 648-6000	PO BOX 0, Saint John, NB E2L4L4
Rau, Judith	Ms.	Infection Prevention and Control, Atlantic Health Sciences Centre	<a href="mailto:rauju@reg2.health.nb.ca">rauju@reg2.health.nb.ca</a>		Atlantic Health Sciences Corporation P O Box 5200 400 University Avenue Saint John, NB E2L 4L4
Reviczky, Kathryn	Ms.	Nurse Practitioner, South East Regional Health Authority		Ph: 506-857-5111	135 MacBeth Ave Moncton, New Brunswick, E1C 6Z8
Ross, David	Dr.	Medical Officer of Health, Moncton Public Health, Department of Health and Wellness	<a href="mailto:david.ross@gnb.ca">david.ross@gnb.ca</a>	Ph: (506) 856-2401 Fax: (506) 856-2623	81 Albert Street Moncton, New Brunswick E1C 1B3 Canada
Thériault, Bernadette	Ms.	Vice-President of Community Health Services, Acadie-Bathurst Health Authority		Ph: (506) 544-2000 Fax: (506) 544-2329	1745 Vallée Lourdes Drive Bathurst, N.B. E2A 4P8
Thompson, Bill	Dr.	Moncton Hospital			135 MacBeath Avenue Moncton, New Brunswick E1C 6Z8

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Vardy, Pamela	Dr.	Community Health, South East Regional Health Authority		506-854-2300	350 St. George Street, Moncton, NB E1C 1X1
Wojcik, Reine	Ms.	Manager, Department of Laboratory Medicine, Saint John Regional Hospital	<a href="mailto:wojri@reg2.health.nb.ca">wojri@reg2.health.nb.ca</a>	(506) 648-6000	PO BOX 0, Saint John, NB E2L4L4
<b>Newfoundland and Labrador</b>					
(no name)		Director of Public Health Nursing, Labrador Health Centre		(709) 897-2332 Fax: (709) 896-5415	P.O. Box 7000 Station C Happy Valley - Goose Bay, NF A0P 1C0
Alteen, L	Dr.	Vice President, Medical Affairs, Central West Health Corporation	<a href="mailto:alteen@cwhc.nl.ca">alteen@cwhc.nl.ca</a>	Ph: (709) 292-2339	50 Union Street, Grand Falls-Windsor, Newfoundland, A2A 2E1
Bowmer, Michael	Dr.				
Garceau, Richard	Dr.	Microbiologie Hopital Regional Dr GL Dumont	<a href="mailto:richardg@health.nb.ca">richardg@health.nb.ca</a>	Tel: 506-862-4820 Fax: 506-862-4195	Hopital Regional Dr GL Dumont 330 Rue Universite Moncton, NB E1C 2Z3
Hutchinson, Jim	Dr.	Health Sciences Centre, Department of Pathology, General Hospital Memorial University	<a href="mailto:hcc.hutj@hccsj.nf.ca">hcc.hutj@hccsj.nf.ca</a>	Ph: 777-7801	Memorial University of Newfoundland, St John's Newfoundland
Keats, D.		Chief Executive Officer, Central West Health Corporation	<a href="mailto:dkeats@cwhc.nl.ca">dkeats@cwhc.nl.ca</a>	(709) 292-2311	50 Union Street, Grand Falls-Windsor, Newfoundland, A2A 2E1
Lewis, Rita	Ms.	Program Coordinator, Division of Disease Control and Epidemiology, Department of Health and Community Services	<a href="mailto:RLewis@gov.nf.ca">RLewis@gov.nf.ca</a>	(709) 729-3427	Department of Health and Community Services PO Box 8700, St. John's, NL A1B 2P2
Minnie Wasmeier,	Dr.	Medical Officer of Health, Health Promotion, Health Protection, Western Regional Integrated Health Authority	<a href="mailto:minniewasmeier@hcswnf.ca">minniewasmeier@hcswnf.ca</a>	Ph: 709-637-5417 Fax: 709-637-5160	P.O. Box 156 Corner Brook, NF A2H 6C7
O'Keefe, Cathy	Ms.	Disease Control Officer, Department of Health and Community Services, Division of Disease Control and Epidemiology	<a href="mailto:COKeefe@gov.nf.ca">COKeefe@gov.nf.ca</a>	(709) 729-5019	Department of Health and Community Services PO Box 8700, St. John's, NL A1B 2P2
Ratnam, Sam	Dr.	Director, Newfoundland and Labrador Public Health Laboratory		Ph: 709-777-6565 Fax: 709-777-7070	100 Forrest Road P.O. Box 8800 St. John's NL A1B 3T2
Stratton, Faith	Dr.	Director, Ministry of Health and Community Services, Division of Disease Control and Epidemiology	<a href="mailto:fstratton@health.gov.nf.ca">fstratton@health.gov.nf.ca</a>	Ph: 709-729-3430	Department of Health and Community Services PO Box 8700, St. John's, NL A1B 2P2
Wasmeier, Minnie	Dr.	President, Newfoundland & Labrador Public Health Association,	<a href="mailto:minniewasmeier@hcswnf.ca">minniewasmeier@hcswnf.ca</a>	Ph: (709) 637-5000 Ext. 5628 Fax: (709) 637-5160	Newfoundland & Labrador Public Health Association P. O. Box 8172 St. John's, NL A1B 3M9
Williams, Bob	Dr.	Vice President, Medical Services, Health Care	<a href="mailto:robert.williams@">robert.williams@</a>	Ph: 709-777-1308	Waterford Bridge Road St. John's, Newfoundland,

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
		Corporation of Saint John's	<a href="mailto:hccsj.nl.ca">hccsj.nl.ca</a>	Fax: 709-778-6307	Canada A1E 4J8

### Northwest Territories

Aylward, Frances	Ms.	Community Health Nurse, Hay River Health and Social services Authority	<a href="mailto:FRANCES_AYLWARD@gov.nt.ca">FRANCES_AYLWARD@gov.nt.ca</a>	(867) 874-7207	#3 Gaetz Drive Hay River, NT X0E 0R8
Azizi-Zarandi, Nazila	Ms.	Community Health Nurse, Hay River Health and Social services Authority		(867) 874-7222	#3 Gaetz Drive Hay River, NT X0E 0R8
Beales, Anna	Ms.	Director of Health and Social Services, Tlicho Community Services Agency, NWT		(867) 392-3004	Bag 5 Rae-Edzo, NT X0E 0Y0
Cere, Liette	Ms.	Manager, Community Health Programs, Inuvik Regional Health and Social Services Authority	<a href="mailto:LIETTE_CERE@gov.nt.ca">LIETTE_CERE@gov.nt.ca</a>	(867) 777-8114	Bag 2 Inuvik, NT X0E 0T0
Christensen, Jill	Ms.	President, Northwest Territories/Nunavut Branch – Canadian Public Health Association			Box 1709 Yellowknife, NT X1A 2P3
Corriveau, Andre	Dr.	Chief Medical Health Officer, Northwest Territories Department of Health and Social Services		(867)-920-8646	
De Klerk, Braam	Dr.	Medical Director, Inuvik Regional Health and Social Services Authority	<a href="mailto:BRAAM_DE_KLERK@gov.nt.ca">BRAAM_DE_KLERK@gov.nt.ca</a>	(867) 777-8108	Bag 2 Inuvik, NT X0E 0T0
Greig, Robin		Laboratory Manager, Stanton Territorial Health Authority	<a href="mailto:ROBIN_GREIG@gov.nt.ca">ROBIN_GREIG@gov.nt.ca</a>	(867) 669-4165	Stanton Territorial Health Authority 550 Byrne Road, P.O. Box 10 Yellowknife, NT X1A 2N1
Hamilton, Laurette	Ms.	Community Health Nurse, Hay River Health and Social services Authority	<a href="mailto:LAURETTE_HAMILTON@gov.nt.ca">LAURETTE_HAMILTON@gov.nt.ca</a>	(867) 874-7205	#3 Gaetz Drive Hay River, NT X0E 0R8
Harrison, Rhian	Ms.	Environmental Health Officer, Hay River Health and Social Services Authority	<a href="mailto:RHIAN_HARRISON@gov.nt.ca">RHIAN_HARRISON@gov.nt.ca</a>	(867) 874-7135	#3 Gaetz Drive Hay River, NT X0E 0R8
Heimbach, Linda	Ms.	Coordinator, Occupational Health and Safety/Infection Control, Stanton territorial Health Authority	<a href="mailto:LINDA_HEIMBACH@gov.nt.ca">LINDA_HEIMBACH@gov.nt.ca</a>	(867) 669-4184	Stanton Territorial Health Authority 550 Byrne Road, P.O. Box 10 Yellowknife, NT X1A 2N1
Kandola, Kami	Dr.	Deputy Chief Medical Health Officer, NWT			
Lacerte, Martina	Dr.	Medical Director, Hay river Health and Social Services Authority		(867) 874-7184	#3 Gaetz Drive Hay River, NT X0E 0R8
Lafferty, Luch	Ms.	Director of Education, Tlicho Community Services Agency, NWT		(867) 392-3002	Bag 5 Rae-Edzo, NT X0E 0Y0
Lamothe,	Ms.	Manager, Community	<a href="mailto:ETHEL_LAMOT">ETHEL_LAMOT</a>	Ph: (867) 695-3815	Box 240

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Ethel		Wellness, DEH CHO HEALTH & SOCIAL SERVICES AUTHORITY	<a href="mailto:HE@gov.nt.ca">HE@gov.nt.ca</a>		Fort Simpson, NT X0E 0N0
Marshall, Keith	Mr.	Director, Community and Allied Health, Hay River Health and Social Services Authority	<a href="mailto:KEITH_MARSHALL@gov.nt.ca">KEITH_MARSHALL@gov.nt.ca</a>	(867) 874-7117	#3 Gaetz Drive Hay River, NT X0E 0R8
Martin, Jim	Mr.	Chief Executive Officer, Tlich Community Services Agency		(867) 392-3003	Bag 5 Rae-Edzo, NT X0E 0Y0
Morse, John	Dr.	Medical Director, Stanton Territorial Health Authority	<a href="mailto:JOHN_MORSE@gov.nt.ca">JOHN_MORSE@gov.nt.ca</a>	Ph: (867) 669-3116 Fax:	Stanton Territorial Health Authority 550 Byrne Road, P.O. Box 10 Yellowknife, NT X1A 2N1
Noseworthy, Olive	Ms.	Manager of Health, Sahtu Health & Social Services Authority		(867) 587-3665	Box 340 Norman Wells, NT X0E 0V0
Nowakowickie, Craig	Mr.	Senior Occupational Health Officer, Stanton Territorial Health Authority	<a href="mailto:CRAIG_NOWAKOWSKI@gov.nt.ca">CRAIG_NOWAKOWSKI@gov.nt.ca</a>	(867) 873-2183	Stanton Territorial Health Authority 550 Byrne Road, P.O. Box 10 Yellowknife, NT X1A 2N1
O'Donnell, Rose	Ms.	Chief Executive Officer, Sahtu Health & Social Services Authority		(867) 587-3654	Box 340 Norman Wells, NT X0E 0V0
Parker, Chuck	Mr.	Chief Executive Officer, Stanton Territorial Health Authority	<a href="mailto:CHUCK_PARKE@gov.nt.ca">CHUCK_PARKE@gov.nt.ca</a>	(867) 669-4224	Stanton Territorial Health Authority 550 Byrne Road, P.O. Box 10 Yellowknife, NT X1A 2N1
Rasiah, Dana	Ms.	Chief Executive Officer, Fort Smith Health and Social Services Authority	<a href="mailto:DANA_RASIAH@gov.nt.ca">DANA_RASIAH@gov.nt.ca</a>	(867) 872-6201	Box 1080 Fort Smith, NT X0E 0P0
Robert Genaille	Mr.	Community Wellness Worker, Fort Smith Health and Social Services Authority		(867) 872-2924	Box 1080 Fort Smith, NT X0E 0P0
Schaub, Patricia	Ms.	Community Health Nurse, Hay River Health and Social services Authority	<a href="mailto:PATRICIA_SCHAUB@gov.nt.ca">PATRICIA_SCHAUB@gov.nt.ca</a>	(867) 874-7206	#3 Gaetz Drive Hay River, NT X0E 0R8
Simon, Una	Ms.	Community Wellness Worker, Fort Smith Health and Social Services Authority	<a href="mailto:UNA_SIMON@gov.nt.ca">UNA_SIMON@gov.nt.ca</a>	(867) 872-2923	Box 1080 Fort Smith, NT X0E 0P0
Tsetso, Kathy	Ms.	Chief Executive Officer, DEH CHO HEALTH & SOCIAL SERVICES AUTHORITY	<a href="mailto:KATHY_TSETSOS@gov.nt.ca">KATHY_TSETSOS@gov.nt.ca</a>	Ph: (867) 695-3815	Box 240 Fort Simpson, NT X0E 0N0
Vieira, Paul	Mr.	Hay River, Health and Social Services Authority	<a href="mailto:PAUL_VIEIRA@gov.nt.ca">PAUL_VIEIRA@gov.nt.ca</a>	(867) 874-7110	#3 Gaetz Drive Hay River, NT X0E 0R8
Walton, Lorraine	Ms.	Health Promotion Officer, Inuvik Regional Health and Social Services Authority	<a href="mailto:LORRAINE_WALTON@gov.nt.ca">LORRAINE_WALTON@gov.nt.ca</a>	(867) 777-8177	Bag 2 Inuvik, NT X0E 0T0
White, Wanda	Ms.	Communicable Disease Control Consultant			

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
<b>Nunavut</b>					
		Environmental Health, Department of Health and Social services		Ph: 867-975-4800 Fax: 867-975-4833	Government of Nunavut, Box 1000, Station 1036 Iqaluit, Nunavut X0A 0H0
Aglukkaq, Leona Macdonald, W. Alexander (Sandy)	Hon. Dr.	Minister of Health and Social Services Director of Medical Affairs and Telehealth Department of Health and Social Services	<a href="mailto:wmacdonald2@gov.nu.ca">wmacdonald2@gov.nu.ca</a>	Ph: 867 979 7601 Fax 867 979 7346	Government of Nunavut, Box 1000, Station 1036 Iqaluit, Nunavut X0A 0H0
Talbot, Jim	Dr.	Chief Medical Health Office, Nunavut		Ph: 867-975-5761 Fax - 867-975-5705	
<b>Yukon</b>					
		Yukon Communicable Disease Control	<a href="mailto:hss@gov.yk.ca">hss@gov.yk.ca</a>	Ph: (867) 667-8323 Fax: (867) 667-8349	Yukon Communicable Disease #4 Hospital Road Whitehorse, Yukon Canada Y1A 2C6
Butler- Walker, Jody	Ms.	President, Yukon Public Health Association	<a href="mailto:walkerrj@internorth.com">walkerrj@internorth.com</a>	Ph: 867-393-3036 Also Phone: Ron Pearson at 867-668- 7289	Box 32054, Whitehorse, Yukon Y1A 5P9
Larke, Bryce	Dr.	Yukon Medical Officer of Health	<a href="mailto:bryce.larke@gov.yk.ca">bryce.larke@gov.yk.ca</a>	Ph: (867) 667-5716	Department of Health and Social Services Government of Yukon Box 2703 Whitehorse, Yukon Canada Y1A 2C6
Miltenberger, Michael	Mr.	Minister of Health and Social Services , Yukon Department of Health and Social Services,	<a href="mailto:Michael_miltenberger@gov.nt.ca">Michael_miltenberger@gov.nt.ca</a>	(867) 669-2355	PO Box 1320 Yellowknife, NT X1A 2L9
<b>Prince Edward Island</b>					
Bradley, Deborah	Ms.	Manager, Public Health Policy, Department of Health Care and Social Services, PEI	<a href="mailto:mdbradley@ihis.org">mdbradley@ihis.org</a>	Ph: (902) 368-6527 Fax: (902) 368-6136	16 Garfield Street Charlottetown, PE C1A 6A5
Dewar, David	Mr.	Chief Executive Officer, Provincial Health Services Authority	<a href="mailto:khdewar@ihis.org">khdewar@ihis.org</a>	Ph: (902) 894-0141 Fax: (902) 894-0138	Riverside Drive Charlottetown, PE C1A 7N5
Jost, Philip	Mr.	Chief Executive Officer, West Prince Health Region	<a href="mailto:pajost@ihis.org">pajost@ihis.org</a>	Ph: (902) 853-8663 Fax: (902) 853-8658	PO Box 10 Alberton PEI C0B 1B0 Canada
Kacsmarik, Sherry	Ms.	Chair, King's Health Region	<a href="mailto:semorrison@ihis.org">semorrison@ihis.org</a> (Admin??)	Ph: (902) 838-0945 Fax: (902) 838-0940	126 Douses Road Montague, PE C0A 1R0
Maclean, Alan	Dr.	Chair, East Prince Health Region, PEI		Ph: (902) 888-8029 Fax: (902) 888-8458	243 Harbour Drive Summerside PE C1N 5R1
McDonald, Doug	Mr.	Chair, Queen's Region Health Board, PEI		Ph: (902) 368-5973 Fax: (902) 368-6169	161 St. Peters Road Sherwood Shopping Centre PO Box 2000

Name	Title	Affiliation	E-mail Address	Phone	Contact Information
Neatby, Anne	Ms.	Communicable Disease and Immunization Programs Coordinator, Chief Health Office, Department of Health and Social Services, PEI	<a href="mailto:amneatby@ihis.org">amneatby@ihis.org</a>	Ph: (902) 368-6114 Fax: (902) 368-4969	Charlottetown PE C1A 7N8 11 Kent Street Charlottetown, PE C1A 7N8
Riley, David	Mr.	Deputy Minister, Health and Social Services, Department of Health and Social Services	<a href="mailto:driley@gov.pe.ca">driley@gov.pe.ca</a>	Ph: (902) 368-4935 Fax: (902) 368-4974	11 Kent Street Charlottetown, PE C1A 7N8
Sweet, Lamont	Dr.	Chief Health Officer, PEI	<a href="mailto:lesweet@gov.pe.ca">lesweet@gov.pe.ca</a>	Ph: (902) 368-4996 Fax: (902) 368-4969	11 Kent Street Charlottetown, PE C1A 7N8
Van Til, Linda	Dr.	Manager, Epidemiology and Evaluation, Health Policy Development, Department of Health and Social Services	<a href="mailto:lvtil@ihis.org">lvtil@ihis.org</a>	Ph: (902) 368-4964 Fax: (902) 368-6136	16 Garfield Street Charlottetown, PE C1A 6A5

