



Improving Public Health System Infrastructure in Canada

Report of the Strengthening Public
Health System Infrastructure Task Group
Federal/Provincial/Territorial
Advisory Committee on Population
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System Infrastructure Task Group

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Executive Summary

The F/P/T Strengthening Public Health System Infrastructure Task Group (Task Group) is a working group of the Advisory Committee on Population Health and Health Security (ACPHHS). Working closely with the F/P/T Special Task Force on Public Health (Special Task Force), the Task Group was created in the fall of 2003 with the following mandate:

To build on recommendations from the report of the National Advisory Committee on SARS and Public Health (Naylor Report), as well as other pertinent reports, to address infrastructure gaps where F/P/T collaboration would be of benefit.

Interest in public health infrastructure may have been heightened post-SARS, but is not new. Reports from the Krever Commission, the Walkerton Inquiry, the Advisory Committee on Population Health, CIHR-Institute of Population and Public Health, and federal and provincial Auditor Generals have expressed concern about the apparent lack of capacity in the public health system in this country. As stated in the Naylor Report: "...the evidence of actual and potential harm to the health of Canadians from weaknesses in public health system infrastructure has been mounting for years without a truly comprehensive and multi-level governmental response...The seriousness of the [SARS] outbreak and the challenges that arose in containing [it] are widely and rightly regarded as signposts for the need to strengthen Canada's public health systems."

In response to the SARS epidemic, the Naylor Report and others have provided a series of recommendations for improving Canada's public health system. The Task Group fully supports the intent of the Naylor Report's recommendations to improve the functioning and capacity of the nation's public health system. The Task Group also recognizes the preliminary progress towards fulfilling several key Naylor Report recommendations including the creation of a Public Health Agency of Canada (PHAC), the appointment of a Chief Public Health Officer, and the development of a series of Collaborating Centres for Public Health across the country.

In September 2003, the Conference of F/P/T Ministers of Health acknowledged the need to "make public health a top priority by improving public health infrastructure, and increasing institutional, provincial, territorial, and federal capacity that builds on current strengths and successes across the country." In support of this intent, this report describes in more detail what is meant by public health system infrastructure and to then describe and provide recommendations for priority areas for infrastructure development. Consistent with the Naylor Report and others, the focus of this report is on the formal governmental public health system.

Public health has been described as the science and art of promoting health, preventing disease, prolonging life and improving quality of life through the organized efforts of society. It combines sciences, skills, and beliefs directed to the maintenance and improvement of the health of all people through collective action. The programs, services, and institutions involved tend to emphasize two things: the prevention of disease, and the health needs of the population as a whole. This population focus is complementary to, but distinct from, the clinical focus of the personal health services system.

Improving the health of populations needs to consider the broad range of factors that influence health. These determinants of health interact in complex webs of causation that influence health-related behaviours and health status necessitate comprehensive approaches to improve health. Public health approaches will typically comprise combinations of education and skill building, social policy, inter-sectoral partnership and collaboration, regulation, community development, and the support of effective clinical preventive interventions. Whether focussed on tobacco control, addressing the growing obesity epidemic, preventing and responding to occurrences of communicable diseases, or tackling health inequalities, comprehensive public health approaches are focussed on improving the health of the population.

The extent to which health issues are adequately addressed by the public health system has implications not only for the health of the population, but also impacts the personal health services system. As demonstrated by SARS, an immediate public health threat can paralyse the delivery of personal health services. An influenza pandemic could result in even greater health

system and social disruption. Preventable non-communicable diseases and injuries are less dramatic, but through sheer numbers are a major burden on the personal health services system.

The communiqué of the 2004 First Ministers' Meeting on the Future of Health Care states that "all governments recognize that public health efforts on health promotion, disease and injury prevention are critical to achieving better health outcomes for Canadians and contributing to the long-term sustainability of medicare by reducing pressure on the health care system." Such a view has been substantiated by modelling commissioned by HM Treasury in the UK in which a greater emphasis on prevention and promotion in the first 10 years of the model was associated with lower rates of health care cost increases in the subsequent 10 years.

The core functions of the public health system include population health assessment, health surveillance, disease and injury prevention, health promotion and health protection. Public health applies these functions to a range of health issues including communicable diseases, non-communicable diseases and injuries, healthy child development, and environmental health. The formal public health system is organized in a series of inter-connected layers that includes local/regional, P/T, and federal levels.

The ability to fulfill public health functions is dependent on the strength and capacity of the supporting infrastructure. Any enterprise or system must be concerned with its people, its organization, and its resources. This is neither unique nor any less important for public health. There needs to be a sufficient, competent and appropriately distributed workforce; adequate capital investment; well-developed business processes; and an ability to manage information upon which decision-making is dependent. Without these, system outputs and outcomes will be less than optimal.

This report describes three main categories of public health system infrastructure: Sufficient and Competent Workforce; Organizational Capacity; and Information and Knowledge Systems. These had been highlighted in the Naylor Report and are fully described in the main body of the report and appendices. Based on guidance from the Conference of F/P/T Deputy Ministers of Health and the ACPHHS, the Task Group has given specific attention to the following infrastructure issues:

- Sufficient and Competent Workforce
- Organizational Capacity:
 - Public Health Network and Expert Groups
 - Public Health Strategies and Goals

- Agreements and Protocols
- Public Health Legislation
- Emergency Response and Surge Capacity;
- Public Communication and Citizen Engagement
- Information and Knowledge Systems:
 - Information, Surveillance, and Infostructure
 - Knowledge Development and Its Translation into Practice
- Cross-cutting issues:
 - Public Health Laboratories
 - Aboriginal Health
 - Collaborating Centres for Public Health
 - System Resources.

Each of these issues is described in the sections that follow. A list of recommendations is provided at the end of this summary.

Sufficient and Competent Workforce

The Naylor Report emphasizes that "no attempt to improve public health will succeed that does not recognize the fundamental importance of providing and maintaining in every local health agency across Canada an adequate staff of highly skilled and motivated public health professionals." Based on our analysis, there are a number of challenges. Vacant positions exist across the system and the public health professionals that do exist are unequally distributed. Considering the increasingly aging workforce, the number of training positions is insufficient. Maintenance of competencies in existing practitioners is challenged by the paucity of continuing education programs. While academic and public health practice fields should be inter-linked, they are not well connected. From a planning perspective, there are limited data to describe the current workforce and future trends, and no strategy to comprehensively address these challenges. While there has been an increasing profile for public health workforce issues, cuts to this workforce continue to occur in a number of jurisdictions. Stabilization and strengthening of the public health workforce are urgently required.

Several recent initiatives have begun to address some of the gaps in public health human resources. These have included an international environmental scan of public health workforce development strategies, a series of regional consultations with public health academics, practitioners and other system stakeholders, and the development of public health workforce competencies. The many facets of workforce development need to be pulled together with a comprehensive national strategy

to ensure a coordinated and efficient approach. Competency-based core and continuing education training capacity needs to be expanded. Personal and organizational financial incentives are required to address financial barriers to training. Comparable to teaching hospitals, training programs need to ensure an appropriate balance of academic and practice-based training through teaching public health units. The quality and consistency of training programs need to be supported through the use of standards and accreditation.

Public Health Network and Expert Groups

The Special Task Force has recommended the creation of a pan-Canadian Public Health Network (Network) to enhance public health collaboration across Canada. The Network would be comprised of a number of permanent Expert Groups, which would have one or more issue groups reporting to them. The main body of this report provides several suggestions to optimize the functioning of the Network and which are consistent with the Special Task Force's description of the Network. The Special Task Force highlights three immediate areas for the Network's attention and these are addressed in more detail in this report.

Public Health Strategies and Goals

Unlike many other countries, Canada does not have national health goals or related strategies. The communiqué of the 2004 First Ministers Meeting on the Future of Health Care states that governments are committed "to accelerate work on a pan-Canadian Public Health Strategy ... [that] will set goals and targets for improving the health status of Canadians through a collaborative process with experts." One of the first priorities will be to develop pan-Canadian public health goals through a broad based national collaborative approach.

Comprehensive public health strategies are expected to encompass all five core public health functions and address the full spectrum of public health issues (e.g. chronic diseases, injuries, childhood development, environmental health, communicable diseases, etc.). The level of detail of individual strategies will likely vary depending on the topic. For emergency preparedness and many health protection issues, quite detailed strategies are likely feasible, particularly considering the desirability of similar approaches and inter-connectedness of plans. Pan-Canadian strategies will also be beneficial for public health issues having a substantial social policy component recognizing that implementation will need to take into consideration the local policy context and that the most appropriate system level for this to occur is at

the individual P/T and local levels. Development of pan-Canadian strategies will be supported by the development of common indicators and measures of system performance.

Agreements and Protocols

The Special Task Force has identified that the Network is to prepare, implement, and maintain intergovernmental agreements on public health issues. Agreements are to be negotiated within 12 months of the creation of the Network for the following five priority areas: mutual aid during an emergency; public health information sharing; public health laboratory networks; international networks; and interchange and secondment of public health researchers and providers. Recognizing that agreements and protocols are an important infrastructure element, the Task Group strongly supports their timely development and implementation.

Public Health Legislation

Legislation is a critical infrastructure element that identifies the mandate, purpose and responsibilities of public health. Most public health related legislation exists at the P/T level and has been developed independently. Analysis of provincial public health legislation for the control of infectious diseases has identified many inconsistencies related to the reporting of infectious diseases, communication of personal information, and surveillance and powers in emergencies. The powers and responsibilities required to address the recognition and investigation of outbreaks and public health emergencies need not vary substantially between jurisdictions and the need for surge capacity, mutual support, and coordination of multi-jurisdictional outbreaks necessitates common and integrated responses and powers. Support needs to be given to facilitate the convergence of legislation among different jurisdictions.

At the federal level, the *Quarantine Act* was originally developed in the late 1800s and its updating needs to be completed. The ability to control the movement of isolated and quarantined individuals across P/T borders also needs to be addressed, as does controlling the transport of human pathogens into Canada and their movement and storage within the country. To increase the system's capacity to address public health legislative issues, a centre of expertise in public health law should be created as part of the PHAC. Inter-jurisdictional communication and collaboration would be facilitated by the support of a national issue group in public health law. There continues to be a need to pursue the achievement of an appropriate balance between the protection

of personal information and the public's need to be protected from health threats. Consistent with the Naylor Report's recommendation, the creation of a Public Health Ethics Committee is also recommended to guide decision-making on ethical issues raised by the application of public health legislation and interventions.

Emergency Response and Surge Capacity

The public health system has the responsibility to play a lead role in responding to public health emergencies (e.g. outbreaks, bioterrorism) and a contributory role for other types of emergencies (e.g. natural and technical disasters). The *Strategic Framework for Health Emergency Management* developed by the F/P/T Emergency Preparedness and Response Network provides a useful conceptual framework to link the various components involved in the management of health emergencies. The Centre for Emergency Preparedness and Response intends to lead a process to plan and establish a Health Emergency Management System that will address planning, training and exercising for health emergencies. From an infrastructure perspective, an underlying assumption to mutual aid and surge capacity is that others in the public health system, both within a P/T jurisdiction as well as other F/P/T jurisdictions, will have the spare capacity to provide aid during an emergency.

Emergency planning needs to be supported through guideline development, training and technical support, and the assessment of preparedness. A rational basis for stockpiling and maintaining public health supplies such as vaccines and anti-virals needs to be included in the strategic plan. There are a variety of risk-benefit trade-offs that are encountered with respect to the timely availability of these products. Professional and political decision-making on these issues would likely benefit from consulting Canadians through an informed dialogue on acceptable levels of risk for these products and their timely use in emergency situations.

Public Communication and Citizen Engagement

The ability to effectively communicate with the public is an important infrastructure element and involves informing the public about its health and the need for action. As illustrated during SARS, this communication may need to occur in the context of a crisis. On an ongoing basis, public health provides information to the public based on community health assessments and the identification of priorities for prevention. As part of comprehensive strategies to address population health issues, public health utilizes social marketing and other approaches to support healthier choices. Collaborative

partnerships are a key public health strategy and public health frequently works with intermediaries such as NGOs, health care providers, teachers, and others to expand the impact of its messages to the public. Expertise and capacity for public health communication needs to exist at all three levels of the public health system. The PHAC will enhance the capacity to provide public health information to Canadians, as well as work with and support P/T and local system levels to provide effective public health communication.

New technologies, such as the Internet, are providing a variety of options to facilitate greater public awareness of health issues. A variety of electronic communication approaches such as multi-media broadcast and response mechanisms have the potential to increase effective public health communication and to innovatively engage Canadians on public health issues.

Information, Surveillance, and Infostructure

Public health is an information-intense field. The core public health functions of assessment and surveillance rely on the collection of, or access to, several different types of data including morbidity and mortality data, health services, health determinants, and community values and preferences. Information is used to describe and assess trends, identify outbreaks, identify needs, set priorities, assess impact of interventions, and to demonstrate accountability. To be useful, data needs to be comprehensive, timely, and complete. Whether information is available to support decision-making depends on the existence of an information infrastructure or "infostructure".

Assessment of the current public health infostructure indicates the lack of a system architecture, poor collection systems, lack of harmonized standards, and a lack of mechanisms for effective collaboration and coordination. F/P/T collaboration will be critical to ensure the inter-operability of systems and optimal efficiency of system development. The federal Budget's provision of \$100 million to *Infoway* should assist the development and implementation of communicable disease surveillance systems like iPHIS across the country. Improvements in public health information systems need to include a variety of public health-related information sources (e.g. water quality, inspection services). There must also be the capacity to rapidly communicate information within the system, as well as with health care providers. Since *Infoway* focuses on system development, there will be a need for ongoing funding to maintain and continue to develop public health information systems. It will be critical to ensure that end-users are involved in every step of system planning and deploy-

ment. The creation of an Expert Group for Surveillance and Information is intended to improve the coordination of public health infrastructure development.

The application of modern technology and information management can do more than just improve the efficiency of current practices. More sophisticated approaches can improve the ability to detect hidden patterns of disease transmission. Syndromic surveillance may provide the opportunity to detect outbreaks earlier by using clinical features that are discernable before confirmed diagnoses are made. The need to improve surveillance systems also applies to non-communicable diseases, injuries, and population health determinants. This is a more complex area than infectious diseases due to the need to include multiple sources of data and the need for collaboration and coordination.

Surveillance-related information needs to be made more readily available to practitioners. A single electronic access point (e.g. a portal) would avoid the current challenges of searching multiple organizations' holdings for relevant information.

Knowledge Development and Its Translation into Practice

Public health knowledge provides the evidence upon which to base programs and services, the context to interpret surveillance and assessment information, and the basis for recommendations to the public and decision makers. The public health system is faced with two major issues in this area. First, there is a need for increased investment in developing knowledge through applied research. This is related to not only too few research dollars being available, but also to limited capacity to actually conduct research in this area. The second issue is that what is known about effective interventions is not being fully utilized and incorporated into practice. With a few small notable exceptions, there has been little effort to systematically synthesize existing knowledge and provide it in an appropriate format that is readily accessible to practitioners.

Greater capacity to conduct applied public health research will need to be developed in addition to increased funding for research. A more sophisticated and coordinated approach will also be required to synthesize existing knowledge and make it available to practitioners and decision makers in appropriate formats, and to pro-actively support the incorporation of evidence into practice.

Public Health Laboratories

Public health laboratories are an integral component of Canada's public health system. The laboratories provide early detection of health risks associated with infectious agents, play a vital role in outbreak investigations, and identify causes of disease to aid in treatment, prevention, and control. All of the infrastructure components apply to the laboratory setting including a sufficient and competent workforce, organizational capacity, and knowledge and information systems.

The Canadian Public Health Laboratory Network (CPHLN) links federal and provincial public health laboratories and has developed a multi-year strategy for infrastructure development. The plan includes enhancing the capacity and efficiency of the laboratories with improved surveillance and information systems and the expansion of the CPHLN by establishing provincial networks of microbiology laboratories (e.g. community and private laboratories, hospitals, universities, etc.). The plan also includes a gap analysis to identify areas for system improvement, continuous quality improvement initiative with ISO accreditation, standardization, and the development of a national laboratory system report card. Increased training and protocol development are also included.

Aboriginal Health

Aboriginal peoples in Canada experience substantial disparities in health determinants and health outcomes compared to the rest of Canadians. A new approach is needed that tackles the root causes of health disparities, cuts across administrative and jurisdictional barriers and focuses on improving the health of Aboriginal peoples. A key aspect is ensuring the input of Aboriginal peoples in the direction and design of health services and public health programs in their communities.

It is well recognized that there are significant gaps in public health system infrastructure in Aboriginal communities. These gaps include a lack of clarity regarding roles and responsibilities for public health, major gaps in public health data, as well as chronic difficulties in recruiting and retaining staff. Considering the continuing health disparities between Aboriginal peoples and other Canadians, a national public health perspective on the health of Aboriginal Canadians is required and must address all five core functions of public health. As a basic principle, all communities in Canada should have access to a comprehensive range of public health services. The development of a National Aboriginal Health Strategy needs to engage Aboriginal peoples to be actively involved in the assessment, problem solving,

and interventions to address public health issues through a determinants of health approach. The National Collaborating Centre for Aboriginal Health provides an opportunity to contribute to applied research and knowledge translation and dissemination to support effective interventions for Aboriginal public health issues.

Collaborating Centres for Public Health

The creation of the six national Collaborating Centres for Public Health was announced in May 2004. To be successful, these Centres must be focussed on the practice of public health and can contribute to it through a combination of knowledge translation, applied research, and training. The governance of these Centres needs to include representation from practitioners, researchers, and educators. While each of the Centres will have a particular focus, the inter-dependence of infrastructure issues will require the Centres to collaborate with each other and a variety of local/regional, national and international partners. Collective prioritization of projects and review of scientific workplans should encourage collaboration, integration, and a system-wide perspective to infrastructure development.

System Resources

A properly structured and functioning public health system will contribute to:

- Improved levels of health status of the population and decreased health disparities
- Decreased burden on the personal health services system and thereby contribute to its sustainability
- Improved preparedness and response capacity for health emergencies.

The 2004 First Ministers' Meeting on Health Care acknowledged the importance of public health to achieve better health outcomes and contribute to the sustainability of the personal health services system.

Investment in system infrastructure is necessary, but insufficient to achieve an effective public health system. Infrastructure provides the underlying foundation for effective programming, but not the programming itself. The Naylor Report recommends an additional \$700 million per annum in system funding from the federal government that would build up over a period of 5 years.¹ The Naylor Report emphasized the need for additional P/T investment since these jurisdictions have the primary responsibility for public health. Many of that report's recommendations focussed on communicable

diseases and emergency preparedness. Considering the many other important public health issues, this implies that a greater overall level of investment is required.

Some progress is being made. In the spring 2004 federal Budget, the government made multi-year commitments to *Infoway*, the new Public Health Agency of Canada, a national immunization strategy, and P/Ts to relieve stresses on their public health systems. These combine to an investment of \$250 million per year. The 2005 federal Budget provides an additional \$67 million per year for investments in chronic disease prevention and pandemic preparedness reflecting a remaining annual gap between the Naylor Report's recommendations and current commitments of \$383 million.

A number of groups within and outside Canada have attempted to estimate the needed level of public health system financing in order to achieve desired outcomes. There is a remarkable similarity in the conclusions of these various groups in recommending that the investment in public health needs to double and reach about 5-6% of governmental health system expenditures. The bulk of the new investment would be program-related costs including marketing, staff, inter-sectoral initiatives, etc. The Task Group views that an investment of this magnitude would need to be phased in over a 10-15 year period.

In contemplating the potential doubling of public health system funding, it is not intended that increased funding will simply achieve twice as much as what is currently done, but to address the well-known unmet needs that exist. Increased funds need to be strategically invested in programming and the underlying infrastructure to comprehensively address the public health needs of Canadians. For example, the U.S. Centers for Disease Control and Prevention (CDC) identified nine components of effective tobacco control programs. This list of program components highlights the comprehensive nature of public health interventions utilizing a variety of approaches (e.g. marketing, preventive interventions, building skills, enforcement, etc.) with a strong emphasis on partnership and collaboration. For example, the school program includes tobacco-free policies, evidence-based curricula, teacher training, parental involvement, and cessation services. The school based efforts are also linked with local community coalitions and statewide media and educational campaigns.

These different program components are implemented to varying degrees in Canadian communities. Applying the mid-range of CDC's estimates, if Canadian governments were to fully implement all of the recommended

program components, it would cost about \$450 million per year. Current tobacco control funding by Health Canada is estimated to be \$70 million, with additional spending by individual P/T jurisdictions. This compares with direct and indirect costs of smoking in Canada that were estimated to be **\$17 billion** in 1991. Considering the inflation in personal health services costs and the increase of tobacco-related illnesses in women, tobacco-related costs will have increased dramatically in the past decade.

Tobacco is but one risk factor. There are many areas of public health importance including physical activity, healthy eating, immunizations, injury prevention, emergency preparedness, healthy child development, and a reduction in health inequalities. Achieving progress on these priorities requires more than just the health sector. Inter-sectoral collaboration and community partnerships are an integral part of the public health approach. The capacity to bring partners together, to build a common vision and set of actions, and to provide the evidentiary and evaluative base for effective interventions requires leadership, expertise and resources. There are also capacity issues for other sectors to be able to actively participate with health in joint ventures.

In envisioning a stronger and more effective public health system for the future, it needs to be recognized that existing capacity is not uniform. There are several-fold differences in public health staffing levels among P/T jurisdictions with some having few individuals with formal training in public health. This inequality is compounded by some areas with higher than average population needs having less system capacity. In building system programming and infrastructure, specific attention will need to be paid to reducing these system inequalities.

Implementation

This is not the first F/P/T report that has made recommendations addressing the strengthening of the public health system's infrastructure. The lack of success in translating previous recommendations into sustained action is a serious concern for the Task Group. One of the most important limitations in the past was the absence of any individual or group that was clearly responsible and accountable for implementation.

To succeed, this report's recommendations need to make their way into the workplans of system leaders and have their implementation tracked in a systematic and transparent fashion. The Public Health Network and the Chief Public Health Officer/PHAC will have key leadership roles to ensure recommendations are implemented

and monitored. Most of the items are addressing gaps in system infrastructure that once filled, will need to be maintained on an ongoing basis.

Conclusion

Public health system infrastructure is the supporting foundation that allows the fulfillment of system functions. While each of the infrastructure elements require attention and development, the Task Group has focussed on identifying recommended actions for an initial group of priority elements. The recommendations listed at the end of this summary are intended to provide guidance for the initiation of infrastructure development in the immediate future. Building and maintaining system infrastructure will need to be an ongoing responsibility and the creation of new structures (e.g. PHAC, CPHO, Network) will provide opportunities to accomplish this. Improved system governance and transparency of decision-making, in addition to actual measurement of system performance, should make the fulfillment of this responsibility more likely in the future than it has been in the past.

Recommendations

The Task Group's recommendations listed below are consistent with, and build upon, those provided in the Naylor Report. Further details regarding the timing and costing of recommendations are provided in the main body and appendices of this report.

To increase our ability to strengthen the capacity and competency of the public health workforce, the Task Group recommends as a priority:

1. That provinces and territories commit to stabilizing and strengthening the public health workforce with particular emphasis on the front lines of the public health system.

The Task Group also recommends as longer term and necessary actions:

2. Developing and implementing a national public health workforce development strategy. This includes:
 - a. Creating an Office of Workforce Development within the Public Health Agency of Canada to lead and support public health workforce development.

- b. Identifying and applying public health workforce competencies for practice in the 21st century to assess training needs, to guide curriculum development, and to achieve consistency in training programs.
3. Increasing the training capacity to prepare new public health practitioners and to maintain and increase the skills of existing practitioners. This includes:
 - a. Creating additional capacity for core training such as certificate, diploma and MPH programs, as well as developing and implementing continuing education programming, which are accessible and relevant to public health practice. Funding also needs to be provided to develop specialized skill sets in key areas of practice including public health informatics, outbreak control, chronic disease prevention, and leadership/management.
 - b. Creating and supporting practicum settings such as teaching public health units to ensure practitioners receive an appropriate mix of academic and practical training.
 - c. Providing financial support for individuals and employers so that practitioners can engage in training.
 - d. Developing mechanisms for ensuring consistency and quality of training programs including the accreditation of schools offering public health training such as professional masters degree programs.

To increase our ability to develop pan-Canadian public health strategies, the Task Group recommends:

4. A national collaborative approach to the development of high level public health goals including:
 - a. Developing strategies based on evidence and best practices.
 - b. Developing indicators to comprehensively describe public health issues and public health system performance.
 - c. Developing common information management approaches to facilitate implementation, monitoring and evaluation.

To increase our ability to have a stronger legislative basis for the public health system, the Task Group recommends:

5. Developing and updating relevant public health legislation. This includes:
 - a. Updating the *Quarantine Act*.
 - b. Defining the duties and responsibilities of the Public Health Agency of Canada and Chief Public Health Officer of Canada.
 - c. Providing mechanisms to control inter-provincial movement of isolated or quarantined individuals.
 - d. Providing mechanisms to control the transportation and storage of pathogens within Canada.
6. Developing collaborative capacity in public health law and supporting the convergence of legislation. This includes:
 - a. Supporting the convergence of public health legislation at the provincial/territorial level through the development of model regulatory and legislative wording.
 - b. Developing a Centre of expertise in public health law as part of the Public Health Agency of Canada.
 - c. Supporting a national expert/issue group in public health law to work collaboratively to identify priorities, develop solutions to identified problems, and participate in the implementation of improvements.
7. Providing advice on ethics and protection of personal information. This includes:
 - a. Assessing, by all government levels, whether an appropriate balance between the protection of personal information and the public's need to be protected from health threats is being achieved.
 - b. Developing a National Public Health Ethics Committee, affiliated with or part of the Public Health Agency of Canada, to assess public health ethical issues and provide advice to the Network and Public Health Agency of Canada.

To increase the ability to plan for and respond to public health and other emergencies, the Task Group recommends:

8. Establishing a Health Emergency Management System that is based on the national strategic framework and that addresses the planning, training and exercising for health emergencies.

9. Developing a practical and acceptable basis for stockpiling and maintaining public health supplies such as vaccines and anti-virals.
10. Employing an informed dialogue to achieve greater citizen engagement regarding acceptable levels of risk in preparing plans for addressing pandemic influenza and other potential public health emergencies.

To increase our ability to communicate with and engage Canadians on public health issues, the Task Group recommends:

11. Developing national-level capacity to provide effective public health communications through the Public Health Agency of Canada.
12. Developing the capacity for effective public health communications at P/T and local public health levels across Canada through training, tool development, and other supportive means.
13. Developing strategic partnerships and capacity to enable the public health system to actively engage Canadians in the debate and discussion of public health issues.

To increase our ability to provide timely information to support public health decision-making and action, the Task Group recommends:

14. Developing information systems that support public health and other health system practitioners to fulfill the public health system's core functions. This includes:
 - a. Further developing infectious disease surveillance and information systems that:
 - Utilize pan-Canadian definitions and information standards;
 - Link with public health laboratory data;
 - Link with other relevant sources of public health data such as water quality and inspection services data;
 - Link with acute care system with particular emphasis on infection control data, laboratory data and emergency room services data;
 - Have rapid communication capacity within the public health system and between the public health system and health care providers.
 - b. Further developing and expanding non-communicable disease and injury surveillance systems.

- c. Increasing accessibility to public health information by public health and other health system practitioners.

15. Achieving improved information and surveillance systems through collaborative and coordinated approaches. This includes:

- a. Establishing an Expert Group for Surveillance and Information that reports to the Network's Council and oversees the development and implementation of public health surveillance and information systems across the country.
- b. *Infoway* working with provinces, territories, the Public Health Agency of Canada, and the Network to ensure public health information system development and implementation will meet user needs.
- c. Investing in the long-term maintenance and development of public health information and surveillance systems.
- d. Conducting pilot studies to assess the feasibility and effectiveness of syndromic surveillance for early detection of outbreaks.

To increase our ability to support evidence-based decision-making, the Task Group recommends:

16. Increasing the capacity for conducting applied public health research including Chairs of Applied Research and Public Health Practice; Public Health Clinician-Scientist positions/awards.
17. Increasing the funding available for applied public health research by providing increased targeted funding for identified research priorities.
18. Creating a Centre for Public Health Evidence sponsored by the Public Health Agency of Canada that would identify and address gaps in knowledge, prioritize topics for synthesis, coordinate and conduct synthesis projects, and be actively involved in knowledge translation and dissemination to support effective public health practices.
19. Developing a searchable database sponsored by the Public Health Agency of Canada to permit public health practitioners to identify and retrieve relevant public health evidence.
20. Developing strategic partnerships with organizations in the U.S. and UK that are engaged in public health-related knowledge synthesis and translation initiatives.

To increase our ability to provide effective public health laboratory services, the Task Group recommends:

21. Enhancing the capacity and efficiency of Public Health Laboratories through enhancement of laboratory based surveillance and information systems, expansion of the CPHLN by establishing provincial microbiology laboratory networks that include hospital and community laboratories, perform a gap analysis comparing current and required laboratory functioning, and the introduction of a continuous quality improvement initiative.
22. Enhancing training and the development of protocols to support testing for new and emerging pathogens, practical training of new graduates, support of ISO accreditation, and supporting testing services in Territories without public health laboratories.
23. Improving the surveillance of water quality through the development of national guidelines for water testing and real-time sharing of surveillance data between laboratories and public health disease control staff.
24. Enhancing standardization of laboratories' protocols and developing a national report card on laboratory performance.
25. Providing secretariat and program development support to enable the Public Health Laboratory Network to fulfill its mandate.
26. That Infoway includes the public health laboratories in the development of information systems for the broader set of health system laboratories.

To increase our ability to address public health issues affecting Aboriginal Canadians, the Task Group recommends:

27. A determinants of health approach as the primary mechanism to improve the health of Aboriginal peoples.
28. Engaging Aboriginal peoples to be actively involved in the development of a public health system for their communities. This is of critical importance in the interface between provincial/territorial and federal public health systems in First Nations and Inuit communities.

29. Collaborating in the development of a National Aboriginal Health Strategy that would incorporate the core functions of public health and address the gaps in public health system infrastructure for Aboriginal communities.
30. Moving forward simultaneously at the national and local levels to clarify roles and responsibilities for public health in Aboriginal communities.

To optimize the impact of the Collaborating Centres for Public Health on the practice of public health, the Task Group recommends:

31. Collaborating Centres focussing on a limited number of projects that will have impact on the practice of public health in the areas of applied research, knowledge translation, and training.
32. Collaborating Centres having a multi-stakeholder governance structure that includes practitioners, researchers and trainers.
33. Creating a single, high profile scientific advisory committee that would review and provide guidance on the scientific workplans of all of the Centres.

To optimize the benefits of the public health system to improve the health of Canadians, the Task Group recommends:

34. Identifying in a consistent manner F/P/T expenditures on the formal governmental public health system.
35. Investment by all F/P/T governments to ensure that the public health system has the capacity to effectively address the key public health issues facing Canadians.

Introduction

The F/P/T Strengthening Public Health System Infrastructure Task Group (Task Group) is a working group of the Advisory Committee on Population Health and Health Security (ACPHHS). Created in the fall of 2003, its mandate is as follows:

To build on recommendations from the report of the National Advisory Committee on SARS and Public Health (Naylor Report),¹ as well as other pertinent reports, to address infrastructure gaps where F/P/T collaboration would be of benefit.

Membership of the Task Group is comprised of federal and P/T senior public health officials, non-governmental expertise, academia and practitioners (see Appendix 1 for a list of members). In its work, the Task Group has liaised closely with the F/P/T Special Task Force on Public Health (Special Task Force), whose purpose is to task bodies with the appropriate expertise to undertake the work necessary to ensure the reviews mandated by the F/P/T Ministers of Health to improve public health infrastructure and capacity are carried out. The liaison has been facilitated by cross-appointment of members between the Task Group and Special Task Force. The Task Group provided an interim report to the Deputy Ministers of Health in May 2004.

Interest in public health infrastructure may have been heightened post-SARS, but is not new. The Krever Commission inquiry into the blood system had expressed its concern about the capacity of the public health system (see text box) and had recommended that provincial and territorial ministers of health provide sufficient resources for public health.²

A 2001 report prepared by the Advisory Committee on Population Health (ACPH), at the request of the Conference of F/P/T Deputy Ministers of Health, reflected widespread opinion that “a lack of investment in capacity-building has weakened the ability of governments and service providers to create the conditions that determine health, to promote and protect the health of Canadians, and to prevent unnecessary disease and injury. Lack of resources and a lack of will to adequately support the public health component of Canada’s health care system were the most often noted barriers, at all levels, to public health’s ability to fulfill its mandate and respond to ongoing, emerging and urgent issues.”³

Krever Commission and Public Health

“Public health departments in many parts of the country do not have sufficient resources to carry out their duties. They must have sufficient personnel and resources to conduct adequate surveillance of infectious diseases, to develop and implement measures to control the spread of infectious diseases, including those that are blood borne, and to communicate with other public health authorities both at the federal and the provincial-territorial levels. Continued chronic underfunding of public health departments is a disservice to the Canadian public.”

Source: Krever H. Commission of Inquiry on the Blood System in Canada. Final Report. Vol 3. 1997.

Widespread concern regarding the weakness of the public health system led an *ad hoc* group of Canadian experts to begin work in 2002 to identify the key elements of a national public health system.⁴ Their report and subsequent national think tank meeting⁵ assisted the creation of the Canadian Coalition for Public Health in the 21st Century.⁶

In its post-SARS analysis, the Naylor Report states: “...the evidence of actual and potential harm to the health of Canadians from weaknesses in public health system infrastructure has been mounting for years without a truly comprehensive and multi-level governmental response...The seriousness of the [SARS] outbreak and the challenges that arose in containing [it] are widely and rightly regarded as signposts for the need to strengthen Canada’s public health systems.”¹ The Report outlines that system deficiencies included, but were not limited to:

- Lack of surge capacity in the clinical and public health systems
- Difficulties with timely access to laboratory testing and results
- Absence of protocols for data or information sharing among levels of government

- Inadequate capacity for epidemiologic investigation of the outbreak
- Lack of coordinated business processes across institutions and jurisdictions for outbreak management and emergency response
- Inadequacies in institutional outbreak management protocols, infection control, and infectious disease surveillance
- Weak links between public health and the personal health services system.

The Standing Senate Committee on Social Affairs, Science and Technology endorsed the Naylor Report's recommendations and urged action to address them.⁷

In his review of Ontario's public health system, Justice Campbell stated that the system was broken and needed to be fixed:⁸

SARS showed Ontario's central public health system to be unprepared, fragmented, poorly led, uncoordinated, inadequately resourced, professionally impoverished, and generally incapable of discharging its mandate.

With this assessment, it is hardly reassuring that the Naylor Report informs us that Ontario is assuredly not the weakest link in the P/T public health chain.⁹

In response to the SARS epidemic, the Naylor Report¹ and others^{7,10} have provided a series of recommendations for improving Canada's public health system. The Task Group fully supports the intent of the Naylor Report's recommendations to improve the functioning and capacity of the nation's public health system. The

Task Group also recognizes the preliminary progress towards fulfilling several key Naylor Report recommendations in the federal spring 2004 Budget¹¹ including the creation of a Public Health Agency of Canada (PHAC), the position of a Chief Public Health Officer (CPHO), and a series of Collaborating Centres for Public Health across the country.

Recognizing the jurisdictional and organizational structures of the public health system in this country, F/P/T cooperation and collaboration are critically important to strengthen and manage the system. This is illustrated by the statement from the September 2003 Conference of F/P/T Ministers of Health, in which the Ministers acknowledged the need to:

"Make public health a top priority by improving public health infrastructure, and increasing institutional, provincial, territorial, and federal capacity that builds on current strengths and successes across the country."

In support of this intent, this report will describe in more detail what is meant by public health system infrastructure, and to then describe and provide recommendations for priority areas for infrastructure development. To provide context, the next section will briefly outline the role and functions of the public health system. Consistent with the Naylor Report and others, this report will focus on the formal governmental public health system.

The Role and Functions of Public Health

Public health has been described as the science and art of promoting health, preventing disease, prolonging life and improving quality of life through the organized efforts of society. It combines sciences, skills, and beliefs directed to the maintenance and improvement of the health of all people through collective action. The programs, services, and institutions involved tend to emphasize two things: the prevention of disease, and the health needs of the population as a whole.¹² This population focus is complementary to, but distinct from, the clinical focus of the personal health services system.

Improving the health of populations needs to consider the broad range of factors that influence health. Over the past decades, Canada has been an international leader in conceptually describing the many factors, particularly those beyond personal health service delivery, that influence health and wellbeing (see text box).^{13,14} The complex webs of causation that influence health-related behaviours and health status necessitate comprehensive approaches to improve health.

Public health approaches will typically comprise combinations of education and skill building, social policy, inter-sectoral partnership and collaboration, regulation, community development, and the support of effective clinical preventive interventions. For example, the massive reductions in tobacco use and exposure to second hand smoke that occurred over a period of decades were accomplished through concerted public health effort to achieve social change that combined all of these intervention components. Similarly, a comprehensive approach will be required against overweight and obesity, which have begun to challenge tobacco in relative importance.¹⁵

Figure 1 shows that over the past 15 years, obesity rates among adult Canadians have more than doubled. Rates of overweight and obesity have similarly increased in Canadian children and adolescents.¹⁶ The first report of high prevalences of overweight and obesity among Canadian *preschoolers* was published in August 2004.¹⁷ While epidemics of chronic diseases are less dramatic than their infectious disease counterparts, their net effects are substantial. Overweight and obesity contribute to a wide range of health conditions including diabetes, hypertension, cardiovascular diseases, and osteoarthritis.¹⁸ Annual deaths in the U.S. attributable to obesity have been estimated to be 300,000.¹⁹ With a

tenth of the population and a lower prevalence of obesity, Canadian deaths attributable to obesity are likely to be somewhat less than 30,000 a year. The health conditions caused by obesity tend to be chronic, resulting in disability and the need for ongoing personal health services. Direct health care costs due to obesity in Canada in 1997 were calculated as \$1.8 billion or 2.4% of total health care expenditures.²⁰ More recent estimates from B.C. and Nova Scotia suggest that with increasing prevalences of obesity, obesity related illnesses account for 4.5% and 6.8% respectively of total direct health care costs.^{15,21} In the US, obesity is estimated to account for 9.1% of medical expenditures amounting to \$92.6 billion in 2002 dollars.²²

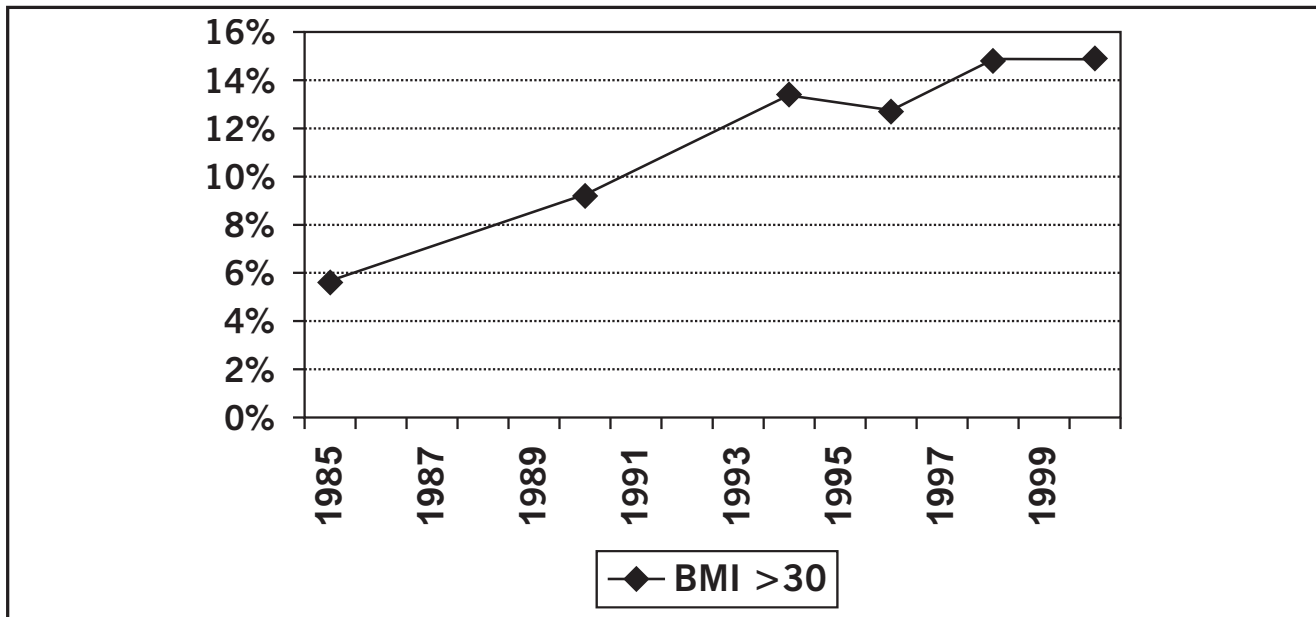
The issue of obesity is not one in which some individuals have put on excessive weight, but reflects a population that overall has become heavier. Risk factors for most diseases are typically distributed across a continuum. As described by the internationally renowned epidemiologist Sir Geoffrey Rose, a preventive strategy focusing on high-risk individuals deals only with the margin of the problem, and has only a trivial impact on the large proportion of disease occurring in the majority of people who are

Key Determinants of Health

- *Income and Social Status*
- *Social Support Networks*
- *Education and Literacy*
- *Employment/Working Conditions*
- *Social Environments*
- *Physical Environments*
- *Personal Health Practices and Coping Skills*
- *Healthy Child Development*
- *Biology and Genetic Endowment*
- *Health Services*
- *Gender*
- *Culture*

Source: F/P/T Advisory Committee on Population Health. *Toward a healthy future: second report on the health of Canadians*. 1999.

Figure 1: Prevalence of Obesity Among Canadian Adults



Sources: Katzmarzyk PT, 2002. Statistics Canada (<http://www.statcan.ca/english/freepub/82-221-XIE/00604/hlthstatus/conditions1.htm>)

at moderate risk.²³ For example, the number of cardiovascular events arising in people with slightly raised blood pressure or moderately abnormal blood lipids greatly exceeds those arising in the minority who meet clinical definitions for hypertension and hypercholesterolemia. Population-based strategies that seek to shift the whole distribution of risk factors have the potential to exert a much larger impact at a population level.

Changing health habits through individual intervention can be difficult and inefficient. Considering the prevalence of overweight and obesity, it would be logistically and financially impossible to provide intensive counseling and interventions to each affected person. Even if such resources could be found, these interventions would be fighting against the tremendous social influences contributing to the obesity epidemic. In other words, some individuals would be helped, but the circumstances that were producing overweight children and adults would remain unaddressed. The gradual adoption of new social norms (e.g., healthy eating and physical activity behaviours) becomes the logical way forward to improve the health of the population. At the same time, individualized clinical treatment needs to be provided to the small minority of persons at greatly elevated risk. In this way, the population approach of public health and the individualized approach of clinical medicine complement each other. Overweight and obesity represent a population-wide health issue requiring a comprehensive public health response that can address the fundamental roots of the epidemic.

While the focus of this report is on the formal, governmental public health system, public health practice relies heavily on inter-sectoral partnerships and collaboration. The formal public health system is necessary, but insufficient to improve the health of the population. The informal system is a key public health partner and includes non-governmental organizations, local associations, business groups, organized labour, and many others. These partnerships are of critical importance if public health is to influence upstream determinants of health such as social support and the conditions for healthy child development. Working together, the formal and informal public health systems contribute to improving the population's health and reducing health inequalities.

The extent to which population health issues are adequately addressed by the public health system has implications not only for the health of the population, but also impacts the personal health services system. As demonstrated by SARS, an immediate public health threat can paralyse the personal health services system. An influenza pandemic could result in even greater health system and social disruption. Preventable non-communicable diseases and injuries are less dramatic, but through sheer numbers are a major burden on the personal health services system. For example, the over-representation of obese individuals among Canadians with end-stage renal disease was recently reported by CIHI.²⁴ Since the obesity trend is only 15 years old, the impact on adverse health

outcomes that require long-term medical treatment (e.g. dialysis, renal transplants, coronary artery bypass) will likely increase.

The communiqué of the 2004 First Ministers' Meeting on the Future of Health Care states that "all governments recognize that public health efforts on health promotion, disease and injury prevention are critical to achieving better health outcomes for Canadians and contributing to the long-term sustainability of medicare by reducing pressure on the health care system." In fact, modelling in the UK by an independent financial executive for HM Treasury found that a greater emphasis on prevention and promotion in the first 10 years of the model was associated with lower rates of health care cost increases in the subsequent 10 years.²⁵

Functions and Structure of the Public Health System

Many countries and multi-national organizations (e.g. WHO, PAHO) have defined the essential functions of their public health systems. In 2001, the ACPH³ recommended five core functions of the public health system in Canada and their descriptions from the Naylor Report¹ are provided below. Additional descriptions and definitions have appeared in previous reports.^{3,4}

Health Protection

This is a long-standing core function for all public health systems. The assurance of safe food and water, the regulatory framework for control of infectious diseases, and protection from environmental threats are essential to the Public Health mandate and form much of the body of current public health legislation worldwide. Included in this function is the provision of expert advice to national regulators of food and drug safety.

Health Surveillance

Allows for early recognition of outbreaks, disease trends, health factors, and cases of illness which in turn allows for earlier intervention and lessened impact. Surveillance also assists in our understanding of the impacts of efforts to improve health and reduce the impact of disease. For example, a new strain of Salmonella occurring in many parts of the country over a short period of time may indicate contamination of a widely-distributed food product.

Disease and Injury Prevention

More than a decade ago, the Centers for Disease Control and Prevention in the U.S. identified that as much as two-thirds of premature mortality was preventable through the application of available knowledge. Many illnesses can either be prevented or delayed and injuries can be avoided (e.g., bicycle helmet use). This category of activity also includes investigation, contact tracing and preventive measures targeted at reducing risks of outbreaks of infectious disease. It overlaps with health promotion, especially as regards educational programs targeting safer and healthier lifestyles.

Population Health Assessment

Entails the ability to understand the health of populations, the factors which underlie good health and those which create health risks. These assessments lead to better services and policies.

Health Promotion

Public health practitioners work with individuals, agencies, and communities to understand and improve health through healthy public policy, community-based interventions, and public participation. Health promotion contributes to and shades into disease prevention by catalyzing healthier and safer behaviours. Comprehensive approaches to health promotion may involve community development or policy advocacy and action regarding the environmental and socio-economic determinants of health and illness.

The Task Group supports the consistent use of this list to describe the core high-level functions of the public health system in Canada. Public health applies these functions to a range of health issues including communicable diseases, non-communicable diseases, injuries, healthy child development, and environmental health. At times, the term "functions" can be used quite broadly and this issue is discussed further in Appendix 2.

The Naylor Report provides an excellent summary of the governance and organization of the public health system in Canada.¹ Responsibilities for public health are shared across three levels: federal; provincial/territorial; and local/regional. Federal legislative provisions exist for the regulation of food, drugs, and pesticides. In addition, there are the *Quarantine Act* and the *Importation of Human Pathogens Regulations* of the *Department of Health Act*. Health Canada has also contributed in a

variety of non-statutory ways including the provision of technical support and assistance, laboratory functions, and the provision of grants and contributions.

While the *Canada Health Act* sets out the conditions for receipt of funding for physician and hospital services, it does not cover public health. The uncertainty about federal powers in public health is underscored by the state of disease surveillance. While the *Statistics Act* and the *Department of Health Act* provide the Government of Canada with a mandate to collect information on public health risks of a pan-Canadian nature, Health Canada does not currently have a clear legal mandate to require provinces/territories to share health surveillance data with each other and the federal government. Difficulties with this voluntary process were evident during the SARS outbreak.

Public health activities in each province and territory are governed by a public health act (or equivalent) and its regulations, as well as by other specific legislation. The planning and delivery of services is mostly devolved to regional/local structures, with responsibility usually assumed by elected and/or appointed boards. The population and geographic size covered by local public health agencies vary considerably within and among P/T jurisdictions. As documented in the ACPH capacity report,³ the ability to deliver a full range of public health services varies considerably among local agencies. Smaller and more remotely located agencies have chronic difficulties in recruiting sufficient numbers of appropriately trained staff.

Each province and territory also has public health staff within the provincial government. These staff typically engage in planning, administering budgets, advising on programs, and providing assistance to local staff for serious incidents. The capacity of the P/T level of public

health varies considerably among jurisdictions. Some provinces such as B.C. and Quebec have developed agency structures outside of the provincial health department to provide expertise and support to the public health system. Post-SARS, Ontario has announced that it will also be creating a provincial public health agency.

Environmental health illustrates potential jurisdictional ambiguities. The federal and P/T governments all have legislation bearing on environmental health issues. P/T environment ministries may operate water purification facilities and test water. Municipal governments may pass by-laws, provide many environmental services, and be involved in enforcement. Local public health agencies and/or P/T health ministries are responsible for advising on human health impacts of environmental problems, for undertaking inspections and enforcement, and for investigations of environmental health hazards and health events thought to be environmentally caused. Public health laboratories undertake some testing, as do various federal, provincial, university or contract laboratories. Other departments of governments such as natural resources, transportation and recreation are inevitably involved. Lastly, emergency preparedness and response authorities, including P/T ministries of public security, will be involved in responding to environmental disasters.

The next section of this report will describe the infrastructure of the public health system upon which the fulfillment of public health functions depends.

System Infrastructure – Supporting the Core Functions

The ability to fulfill the system's core public health functions is dependent on the existence of a supporting infrastructure: sufficient and competent workforce; organizational capacity; and information and knowledge systems (Figure 2). These major infrastructure components comprise a number of inter-related elements that can be thought of as system support functions. For example, applied research and evaluation, workforce training, and developing information systems are not ends in themselves, but exist to support fulfillment of the system's core functions.

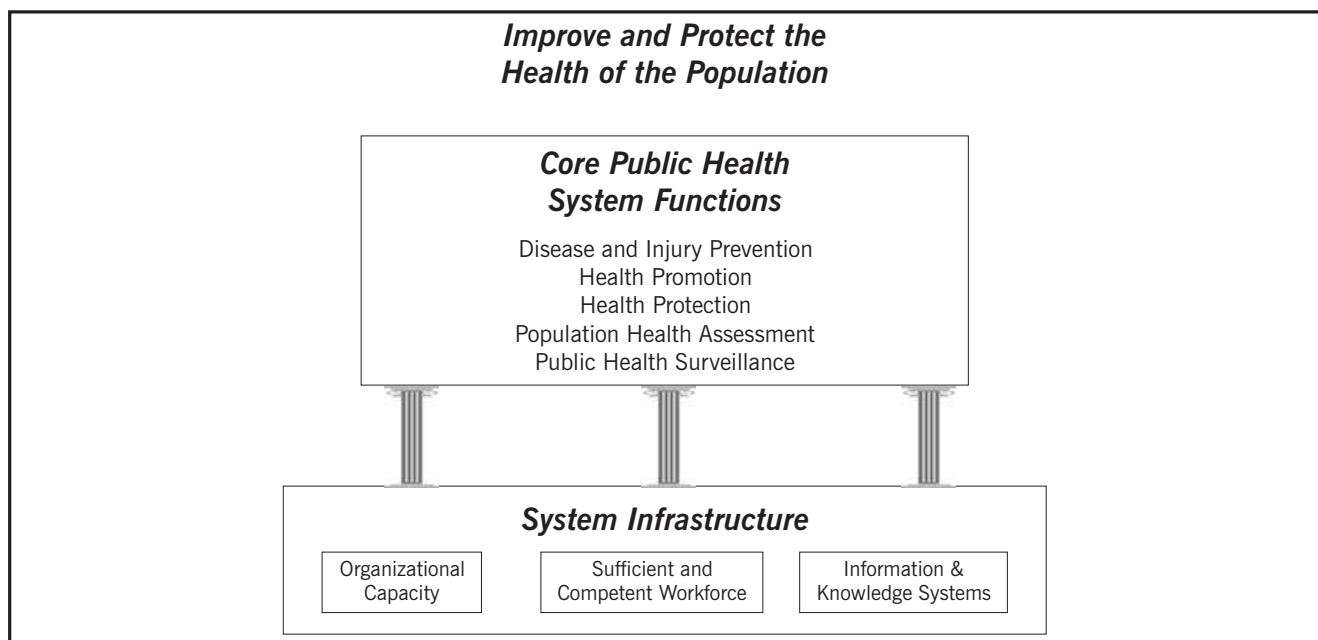
Any enterprise or system must be concerned with its people, its organization, and its resources. This is neither unique nor any less important for public health. The diagram provides a simplified overview of the public health system. Inputs into the system include labour and capital. These inputs, when utilized with the appropriate organizational business rules and processes, and the management of information and knowledge, will produce outputs of public health strategies, programs and services. Those outputs then contribute to improve-

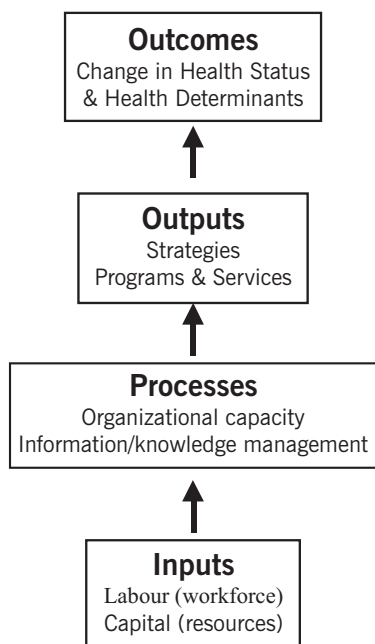
ments in health determinants and health status (i.e. outcomes). Infrastructure is essentially the inputs and processes of the system.

There needs to be a sufficient, competent and appropriately distributed workforce; adequate capital investment; well-developed business processes; and an ability to manage information upon which decision-making is dependent. Without these, system outputs and outcomes will be less than optimal. To appropriately manage the system, one needs to systematically describe and measure each of the steps and then take action where there are gaps.

The infrastructure requirements of a public health agency are not conceptually different from those required for a hospital. Both require sufficient numbers of competent practitioners from a number of disciplines. Selected sites will be affiliated with academic institutions to foster training and applied research. Attention must be paid to governance structures and organizational leadership and management. Information management systems will need to be in place to track

Figure 2: Public Health System Core Functions and Supporting Infrastructure





and record data, and facilitate its analysis and communication. While there is not a conceptual difference between infrastructure issues between an acute care hospital and a public health agency, the main difference has been the extent of investment in that infrastructure.

Based on descriptions of public health infrastructure in the Naylor Report and by the U.S. CDC, three broad categories of infrastructure are shown in Table 1. Each of these categories contain several infrastructure elements, which are also listed in Table 1 and further described in Appendix 4.

To illustrate how these infrastructure elements contribute to the fulfillment of an organization's mandate, an example is provided in Table 2 applying the elements to a local communicable disease surveillance and control program.

One could similarly demonstrate how infrastructure elements contribute to other important public health content areas (e.g. chronic diseases, injuries, child development, etc.). Typically, a comprehensive program for any particular public health content area will blend aspects of each of the five core functions.

While listed as separate items, the infrastructure elements are highly inter-related and inter-dependent. It is not possible to simply develop one or two items and expect significant improvements in system functioning. For example, to conduct surveillance, the system needs not only an appropriate information infrastructure and business processes for sharing of data, but also supporting legislation, and trained staff to manage, collect, analyze and interpret the data in the context of current knowledge and best practices. The system then needs the skills and capacity to communicate the findings to those that need to know.

The ability to respond to a public health emergency is dependant on pre-event preparation and system surge capacity. This requires several infrastructure elements to be adequately developed including:

- Capacity for collaboration and strategic decision-making to establish mutual aid agreements, protocols and other business processes prior to the event
- Sufficient and competent workforce that can be re-deployed to address the event

Table 1: Categories and Elements of Public Health System Infrastructure

Sufficient and Competent Workforce	Organizational Capacity	Information and Knowledge Systems
<ul style="list-style-type: none"> • Human Resource Planning • Training and Career Development • Human Resource Capacity 	<ul style="list-style-type: none"> • Legislation • System Governance • Leadership • Communication • Defined Functions, Programs and Services • System Development and Structural Capacity • Collaboration and Strategic Decision-making • System Expenditures 	<ul style="list-style-type: none"> • Research and Evaluation • Knowledge Management and Translation • Information Infrastructure • Business Processes

**Table 2: Infrastructure Elements for a Local
Public Health Communicable Disease Surveillance and Control Program**

Infrastructure Element	Description
Sufficient and Competent Workforce	<ul style="list-style-type: none"> • Adequate numbers of staff that collectively possess depth and breadth of required competencies (case investigation, epidemiology, disease content knowledge, outbreak investigation, community collaboration, data management, etc.)
Legislation	<ul style="list-style-type: none"> • Require reporting cases and outbreaks to public health • Powers to investigate and collect information • Powers to prevent further transmission
System Governance	<ul style="list-style-type: none"> • Clarity of roles and responsibilities • Accountability mechanisms (board, Minister, public) • Ensure protection from interference by vested interests
Leadership	<ul style="list-style-type: none"> • Clear who is responsible and accountable for program
Communication	<ul style="list-style-type: none"> • Provide information/direction to health care providers and public (e.g. control of outbreak)
Defined Functions, Programs and Services	<ul style="list-style-type: none"> • Clear description of the tasks and activities for the program
System Development and Structural Capacity	<ul style="list-style-type: none"> • Priority setting for improving program (e.g. more sophisticated data analysis) • Critical mass of expertise and technical resources available • Established protocols to acquire additional staff to assist emergency situation; 1) from within agency; 2) from other local agencies and province; 3) from other provinces and federal level • Performance measures established, monitored, and reported
Collaboration	<ul style="list-style-type: none"> • Inter-sectoral collaboration to address health determinants leading to communicable diseases (e.g. better housing, personal health services, and nutrition for shelter inhabitants to reduce risk of tuberculosis) • Consulting with and supporting NGOs (e.g. working with AIDS organizations to look for innovative ways to prevent spread of HIV)
System Expenditures	<ul style="list-style-type: none"> • Sufficient funding to program to fulfill mandate • Plan exists for acquiring additional funds for emergencies (staff, vaccine, etc.)
Research and Evaluation	<ul style="list-style-type: none"> • Participate in research initiatives with university • Evaluation of program components • At system level, applied research program to develop new knowledge
Knowledge Management and Translation	<ul style="list-style-type: none"> • Utilize central/system resources to identify best practices and effective interventions • Central supports to assist incorporation of best practices in programming
Information Infrastructure	<ul style="list-style-type: none"> • Program utilizes centrally developed information system to efficiently support surveillance and disease control activities • Ensures integrity and security of data • Uses central resource to access comparative data with other jurisdictions
Business Processes	<ul style="list-style-type: none"> • Established protocols for transfer of data to provincial level in timely fashion • Established protocols for transfer of data to other local agencies as required (e.g. case has contacts in another jurisdiction) • Established protocols for transfer of information from hospital infection control to program.

- Leadership and coordination to respond to, and manage, the emergency
- Effective communications with the public
- Integrated information systems and laboratories to manage the sudden surge in testing, reporting and investigation
- Capacity to conduct urgent research (e.g. identify a new organism, develop a new test) needs to be available, as does the ability to evaluate the impact of interventions
- Synthesize existing information and knowledge and provide it to practitioners, decision makers and the public in formats appropriate to the intended audience.

Similarly, the public health system's ability to respond to the obesity epidemic requires an adequately developed infrastructure to be in place with a particular emphasis on the following:

- Sufficient and competent workforce including skill sets in policy development and implementation, partnership and collaboration, and social marketing
- Legislation that highlights the role and expectations for public health to address determinants of health and lead processes in inter-sectoral collaboration
- System leadership at all levels to mobilize resources and coordinate action
- Effective communication strategies to the public and decision makers
- Inter-sectoral collaboration to create a social environment that supports healthier behaviours
- Applied research to evaluate interventions and knowledge translation to disseminate and support application of effective interventions.

A true system is one in which there is a group of interacting, interrelated, and interdependent elements forming a complex whole. Regardless of the strength of any one public health infrastructure element, it is the weakest link that will determine the ultimate effectiveness and efficiency of the system. Regardless of whether one is at the local/regional, P/T, or national level, infrastructure status will determine the ability to optimally fulfill system functions. All organizations within the public health system need to be concerned with infrastructure development, although the needs of different agencies will reflect their relative roles and responsibilities within the overall system.

Each of the infrastructure elements shown in Table 1 requires attention to improve the strength and responsiveness of the public health system. However, as an initial step, it is necessary to prioritize actions for those elements that will have the greatest impact and where early progress can likely be made. This is the focus of the next section of this paper.

Priority Areas for Infrastructure Development

Based on guidance from the Conference of F/P/T Deputy Ministers of Health and the ACPHHS, the Task Group has given specific attention to the following infrastructure issues:

- Sufficient and Competent Workforce
- Organizational Capacity:
 - Public Health Network and Expert Groups
 - Public Health Strategies and Goals
 - Agreements and Protocols
 - Public Health Legislation
 - Emergency Response and Surge Capacity;
 - Public Communication and Citizen Engagement
- Information and Knowledge Systems:
 - Information, Surveillance, and Infostructure
 - Knowledge Development and Its Translation into Practice
- Cross-cutting issues:
 - Public Health Laboratories
 - Aboriginal Health
 - Collaborating Centres for Public Health
 - System Resources.

The remainder of this paper will address and provide recommendations for each of these issues.

Sufficient and Competent Workforce

The Naylor Report emphasizes that “no attempt to improve public health will succeed that does not recognize the fundamental importance of providing and maintaining in every local health agency across Canada an adequate staff of highly skilled and motivated public health professionals.”¹

As described in the interim report from the Campbell Commission: “There has been a clear recognition in the past few decades of a general decline in public health capacity across Canada...SARS demonstrated that our most valuable public health resources are human resources and that Ontario lacked a critical mass of expertise at the provincial level. It is crucial to the success of any public health reform initiatives in Ontario

that there be a high level of expertise at both the local and central levels of public health.”⁸ Compared with Ontario, many other parts of the country have substantially less capacity and expertise to respond.

As a number of reports have noted, Canada is faced with a substantive set of challenges in its public health workforce that is characterized by the following:^{1,3,10}

- Vacant positions
- Poor and inequitable distribution within and among provinces/territories – particular challenges in rural and First Nations’ settings
- Aging workforce
- Insufficient training positions
- Little continuing education;
- Academic and public health practice fields not well connected
- Limited data available to describe the public health workforce
- No strategy to comprehensively address these challenges.

Interest in assessing and developing the public health workforce is a relatively new phenomenon. A 2001 undistributed report prepared by the ACPH documented the disparities and widespread concerns regarding the capacity of the public health workforce.³ As discussed in the Naylor Report, the single most important contributor to mounting a response during an emergency is the adequacy of staffing to meet ongoing needs. There continues to be a need to stabilize and strengthen the existing public health workforce, particularly at the front-lines of the system. With the increased and widespread recognition of the human resources crisis facing public health, it is highly troubling to this Task Group that substantial cuts to the public health workforce continue to occur.^{26,27} The federal 2004 Budget announced \$100 million to relieve stresses on P/T systems and P/T jurisdictions are encouraged to consider enhancing front-line staffing through this and P/T funding streams.

In response to the need to lead and coordinate a response to the current crisis in the public health workforce, a Public Health Human Resources Joint Task Group* (Joint Task Group) was formed. Its mandate is to focus on long-term planning, forecasting, research, education, and training related to public health human resources. The Joint Task Group has been involved in a series of initiatives to inform their work. Building consensus among the many system stakeholders is extremely important and is being incorporated at the appropriate stages of projects.

Initial efforts have included an assessment of public health workforce development efforts undertaken in Australia, England and the U.S.,²⁸ and a series of regional, consultative workshops with public health academics, practitioners and other system stakeholders held in early 2004.²⁹ These assessments, coupled with the recommendations from the Naylor Report and other sources, identified the following priorities for system development:

- Develop national strategy for workforce development with joint planning by key stakeholders: academics, employers, professional associations
- Identified and supported career paths for public health practitioners
- Develop a range of training options and components:
 - Range of training levels – Short courses, Diploma, BSc, MPH/MSc, PhD
 - Distance, part-time, full-time
 - Continuing education
 - Inter-disciplinary
 - Competency-based that addresses spectrum of skills/topics including management, leadership and emerging issues
 - Combine practice and academic learning (e.g. teaching health units)
- Strengthen academic centres (chairs, clinician scientists, practitioner exchanges, consortia of academic institutions)
- Identify and apply public health competencies
- Supports for training (funding to students/employers, provision of time for training, support skills' incorporation into practice);
- Expansion of the Field Epidemiologist Program

- Respond to emerging areas of need (e.g. informatics, genomics, management, communications).

In response to the findings from the international environmental scan and the feedback from the regional consultations, the Joint Task Group is pursuing the development of public health competency sets. Core competencies, which reflect the knowledge, skills, and abilities required for the broad practice of public health, are being drafted and will be consulted upon with the public health community through the 2004/05 fiscal year. Discipline-specific competency sets for public health nurses and public health inspectors are also being developed and will be linked to the core competencies. These competency sets will be an important tool to achieve consistency in training programs, to assess training needs, and to develop curriculum.

The workforce development strategy should be a multi-year plan that will guide the actions necessary to build the public health workforce across the country (see text box). The strategy will need to consider and address the many barriers to the recruitment and retention of highly skilled public health practitioners. For example, career paths need to be developed that allow experienced practitioners to continue to contribute to the system, as well as attract individuals from other fields. At the moment, there are no established links between employers and training programs that facilitate them working together and ensuring that training programs

Workforce Development Strategy

Strategy will need to include:

- *Monitoring workforce composition and forecasting needs*
- *Identifying competencies and developing related content/curriculum*
- *Address training capacity*
- *Use of incentives to assure competency*
- *Evaluate strategy and its components*
- *Assure financial support.*

Source: Pan-Canadian public health education initiative: summary of three regional workshops. Health Canada, 2004.

* The Joint Task Group is comprised of members from the F/P/T Strengthening Public Health System Infrastructure Task Group (SPHSITG) and the F/P/T Advisory Committee on Health Delivery and Human Resources (ACHDHR).

are producing the right number of individuals with the needed package of competencies. There will need to be much greater collaboration among training centres, and between them and employers.

The preparation of public health practitioners requires a combination of academic and practice-based training. While provinces have invested in the development of teaching hospitals and family practice centres for the training of professionals in the personal health services system, comparable settings in public health are extremely limited. In the 1980s, Ontario launched a teaching health unit program although a lack of sustained and predictable funding has hampered its impact in recent years. The development and funding of teaching public health units was repeatedly raised during the regional consultations to provide practical training of public health professionals and to also strengthen and increase the relevance of academic centres to the public health system.

The training capacity of academic centres needs to be increased so that they can prepare greater numbers of public health practitioners through MPH, community medicine, and other training programs. This is needed to not only replace retiring practitioners, but to meet the increased demand for practitioners as a result of the renewed focus on public health. The creation of new provincial and federal public health agencies, as well as the strengthening of public health agencies at all three system levels will create a demand for individuals with formal public health training that cannot be met by current training programs. In response, some universities are actively developing or expanding existing training programs. Achieving a sufficient mix and capacity of training programs cannot be left to chance and needs to be built into the workforce development strategy. In many parts of the country, it will not make sense for relatively small academic institutions to develop stand-alone programs such that much greater planning and coordination will be needed. Stronger links will be required between university faculty and practitioners to bridge these two fields. The creation of public health clinician-scientist positions would be one approach to accomplish this.

Life-long learning is the basic principle of a career in any health profession. Well developed systems of continuing education have evolved for many professionals in the personal health services system, but not in public

health. One of the most important reasons for this difference is that for personal health services, the pharmaceutical and medical equipment industries invest heavily in the funding of continuing education initiatives. With vaccines as the only pharmaceutical used commonly in public health, few private sector funds are available to support continuing education. This leaves the public sector, which directly employs the public health workforce, as the leading stakeholder to fund continuing education initiatives. This has not been an important priority in most jurisdictions.

One exception is Health Canada's Skills Enhancement for Health Surveillance initiative, which is an on-line facilitated training program to increase the skills of front-line practitioners. Introductory modules on epidemiology, surveillance and outbreak investigations have either been produced or are in the process of being prepared, with several additional topics planned over the next two years. A needs assessment for identifying additional priority topics is anticipated as the initial set of modules becomes available. Overall, there is a tremendous need to develop a wide range of accessible continuing education training programs. To do so, will require expanding the capacity of training centres in order to provide continuing education and a central office, most likely located within the PHAC, to coordinate continuing education initiatives and priority setting.

Information is the lifeblood of the public health system and there is substantial need for system development in this area. Considering this need, it is disconcerting that there are no programs for public health informatics^{2**} in this country. In contrast, the U.S. not only has several graduate programs in this area, but the CDC funds 2-year fellowships to develop leaders skilled in the integration of public health information systems and development of data standards, policy and quality control measures to advance the practice of public health informatics. The CDC also funds a similar program in public health genomics to assist professionals to become proficient in the application of genetic discoveries to disease prevention and public health. Canada needs the capacity to develop expertise in strategic niches such as these to contribute to the development of a strong public health system.

With the current public health workforce stretched to provide even basic levels of ongoing service delivery, there has generally been reluctance to provide opportu-

** Public health informatics has been defined as the systematic application of information and computer science and technology to public health practice, research, and learning.³⁰

nities for continuing education and upgrade training for staff. From a systems perspective, this is obviously self-defeating. Assistance needs to be made available to practitioners and their employers to offset the impact of individuals seeking additional training. This could include training grants and bursaries, providing protected time for training, and funding for employers in order to backfill positions.

The development of additional core and continuing education training programs while highly needed, will present a challenge with respect to ensuring the quality and consistency of the programs. The response in other countries has been to establish competency³¹ or accreditation standards³² for training programs. Canada will similarly need to address this issue and ideally do so as new programs are being created.

While the list of priorities is substantial, the country is not without assets to build upon. As demonstrated during the regional consultations, there is active interest among stakeholders to address this key component of the system's infrastructure. The preliminary projects by the Joint Task Group are important initial steps and further outputs are expected from this group. While many of the recommended initiatives will take time to impact the system, the sooner they are initiated, the sooner they can improve the current situation.

To increase our ability to strengthen the capacity and competency of the public health workforce, the Task Group recommends as a priority:

1. That provinces and territories commit to stabilizing and strengthening the public health workforce with particular emphasis on the front lines of the public health system.

The Task Group also recommends as longer term and necessary actions:

2. Developing and implementing a national public health workforce development strategy. This includes:

- a. Creating an Office of Workforce Development within the Public Health Agency of Canada to lead and support public health workforce development.
 - b. Identifying and applying public health workforce competencies for practice in the 21st century to assess training needs, to guide curriculum development, and to achieve consistency in training programs.
3. Increasing the training capacity to prepare new public health practitioners and to maintain and increase the skills of existing practitioners. This includes:
 - a. Creating additional capacity for core training such as certificate, diploma and MPH programs, as well as developing and implementing continuing education programming, which are accessible and relevant to public health practice. Funding also needs to be provided to develop specialized skill sets in key areas of practice including public health informatics, outbreak control, chronic disease prevention, and leadership/management.
 - b. Creating and supporting practicum settings such as teaching public health units to ensure practitioners receive an appropriate mix of academic and practical training.
 - c. Providing financial support for individuals and employers so that practitioners can engage in training.
 - d. Developing mechanisms for ensuring consistency and quality of training programs including the accreditation of schools offering public health training such as professional masters degree programs.

Public Health Network and Expert Groups

Over the years, there have been a multitude of F/P/T committees and working groups that have been involved with various aspects of public health. It has not always been clear how the roles of these groups have been conceptualized or their work coordinated. Often committees have been structured to provide policy advice, but without any mandate to implement or follow-up on recommendations. The Special Task Force has recommended the creation of a pan-Canadian Public Health Network to enhance public health collaboration across Canada. The Network would be comprised of a number of permanent Expert Groups (see text box). The vision is that each of the Expert Groups could have one or more issue groups reporting to them. The Expert Groups would report to a F/P/T Council, which itself would be accountable to the Conference of F/P/T Deputy Ministers of Health.

The Task Group supports the creation of a Public Health Network and recommends that it should:

- Increase discussion and clarification of subjects of mutual interest, improve collaboration, and enhance the effectiveness of public health activities and the predictability of public health responses to emergencies and threats to health
- Function as means of implementing collaboration (not merely the provision of advice)
- Involve experts, decision-makers and government officials appropriately in the various components of the network, making decisions at the appropriate level and in a timely manner
- Be involved with all aspects of public health infrastructure and programs, including infectious disease, chronic/non-communicable disease, and injury
- Build upon existing F/P/T committees and other structures
- Be more simple and understandable and result in a rationalization of existing committees, reducing overlap and duplication and enhancing communication and coordination

Initial Expert Groups Public Health Network

- Communicable disease control
- Public health laboratory network
- Emergency preparedness and response network
- Public health surveillance and information
- Non-communicable disease and injury
- Health promotion

Source: Partners in public health: report of the F/P/T Special Task Force on Public Health. May 2004.

- Enhance the efficiency of F/P/T collaboration and reduce as much as possible the burden of participation on P/T governments
- Involve governments, academics, professional associations, health charities and others, but not diminish the authorities or accountability of governments.

The Special Task Force report outlines the mandate, principles, structure and functions of the Network, which appear to be consistent with the above suggestions. The report also highlights three areas where the Network needs to make an impact:

- Development of public health agreements
- Development of a framework for a common approach to legislation and regulation
- Development of collaborative public health strategies

Each of these issues is addressed in more detail in the following sections of this report.

Public Health Strategies and Goals

The Naylor Report identifies that Canada, unlike a number of other countries, does not have national health goals or related strategies. The Report further states that there is “overwhelming merit in a collaborative process to integrate existing strategies and forge an F/P/T consensus on goals. Canadian citizens deserve a national health strategy that includes specific health

targets, benchmarks for progress towards them, and collaborative mechanisms to maximize the pace of progress.”¹ As an example, Sweden recently published national public health objectives that focus on health determinants (see text box).³³ One of the reasons for focussing on health determinants is that “they are accessible for political decisions and can be influenced by societal measures” and acknowledges that the “vast majority of public health work must take place outside the medical care service.”³³

The Report of the Special Task Force identifies that developing public health strategies and best practices should be a priority of the Network. The Report also states that the strategies would outline how F/P/T governments could collaborate in a coherent and consistent manner on public health issues recognizing differences in approaches and priorities between jurisdictions. The communiqué of the 2004 First Ministers’ Meeting on the Future of Health Care states that governments are committed to “accelerate work on a pan-Canadian Public Health Strategy...[that] will set goals and targets for improving the health status of Canadians through a collaborative process with experts.” One of the first priorities will be to develop pan-Canadian public health goals through a broad based national collaborative approach.

Public health strategies need to encompass all five core public health functions and address the full spectrum of public health issues (e.g. chronic diseases, injuries, childhood development, environmental health, communicable diseases, etc.). In envisioning the development of national public health strategies, the Task Group sees that the level of detail of strategies will likely vary depending on the topic. For emergency preparedness and many health protection issues, quite detailed strategies are likely feasible particularly considering the desirability of similar approaches and inter-connectedness of plans.

For health issues that have a substantial social policy component, the initial focus of strategy development should be on creating the necessary supports for effective programming. This would include the development of surveillance systems to identify trends and facilitate inter-jurisdictional comparisons, developing knowledge through applied research, synthesis of knowledge, and identification of best practices. The strategy could also include supports for implementation such as tool development, pilot projects, and the development of common indicators. The application of evidence in the development of specific interventions needs to take into consideration the local policy context and the most appropriate system level for this analysis is the P/T level.

Sweden’s National Public Health Objectives

- *Participation and influence in society*
- *Economic and social security*
- *Secure and favourable conditions during childhood and adolescence*
- *Healthier working life*
- *Healthy and safe environments and products*
- *Health and medical care that more actively promotes health*
- *Effective protection against communicable diseases*
- *Safe sexuality and good reproductive health*
- *Increased physical activity*
- *Good eating habits and safe food*
- *Reduced use of tobacco and alcohol, a society free from illicit drugs and doping and a reduction in the harmful effects of excessive gambling.*

Source: Agren G. Sweden’s new public health policy. Swedish National Institute of Public Health, 2003.

For example in the U.S., the evidence supporting early childhood development programs and family housing interventions were recently synthesized at the national level.³⁴ Determining how best to apply that evidence would require policy analysis that considers the provincial and local context to these issues. Nevertheless, even for topics with a strong social policy context, there are tremendous advantages to a collaborative approach to develop, synthesize, and translate public health evidence, develop surveillance systems and common indicators, and provide support for implementation.

An increasing number of provinces are embarking on identifying the programs and services that are to be delivered through their public health systems. A typical step in the development of these core sets of programs is a review of the evidence for the effectiveness of interventions. There is clearly mutual benefit to reviewing the evidence once and then making those findings available throughout the public health community instead of each jurisdiction duplicating the efforts of others. This issue is linked to knowledge translation and dissemination that is discussed later in this report.

To more clearly define expectations for the public health system, provinces are increasingly describing the specific programs and services that are to be delivered. These are the outputs of the system. Not yet developed are performance measures focussing on the state of the system's infrastructure (i.e. the inputs and processes). This has been an area of active work in the U.S. where they have developed performance standards for both the state and local system levels that assess infrastructure based on their list of essential services.³⁵

In an attempt to provide a comprehensive picture that brings together different dimensions of system performance, Ontario's Institute for Clinical Evaluative Sciences (ICES) has been developing a balanced scorecard for public health (see text box).³⁶

Conceptually linked to scorecards developed for the acute care sector, it includes dimensions for health status, community engagement, resources and services, and system integration and responsiveness. While still at an early conceptual stage of development, this type of tool could facilitate more explicit analysis of the links between infrastructure, outputs and outcomes, allowing more informed decision-making and accountability regarding the public health system and its functioning. Another practice that is being adapted from the acute care sector is accreditation. The Canadian Public Health Association and the Canadian Council on Health Services Accreditation (CCHSA) have recently launched a joint initiative to review current standards and determine the appropriate process and indicators for the accreditation of public health. This is particularly relevant since public health in most parts of the country is part of regional health authorities that are currently accredited by the CCHSA.

To increase our ability to develop pan-Canadian public health strategies, the Task Group recommends:

4. A national collaborative approach to the development of high level public health goals including:
 - a. Developing strategies based on evidence and best practices.
 - b. Developing indicators to comprehensively describe public health issues and public health system performance.
 - c. Developing common information management approaches to facilitate implementation, monitoring and evaluation.

Public Health Balanced Scorecard

Based on similar work for hospitals and other health care sectors, a balanced scorecard is being developed for public health as a means to assess system performance. The scorecard is envisioned to have four components:

- *Health determinants and status*
- *Community engagement*
- *Resources and services*
- *Integration and responsiveness.*

Applied to infectious diseases, a performance report could:

- *Include trends in the incidence and prevalence of infectious diseases*
- *Assess the levels of professional and public knowledge and support for infectious disease programs*
- *Examine the amount of resources that are allocated to programs in different jurisdictions*
- *Determine the extent that necessary activities, processes and networks are in place.*

Source: Woodward G, Manuel D, Goel V. Developing a balanced scorecard for public health: ICES investigative report. Toronto: ICES, 2004.

Agreements and Protocols

The Naylor Report identified the need for improved coordination among F/P/T jurisdictions through a series of agreements and protocols. The Task Group is aware that this has been a particular focus of the Special Task Force and has therefore not pursued this issue in any detail.

The Special Task Force has identified that the Network is to prepare, implement, and maintain intergovernmental agreements on public health issues between jurisdictions. It is envisioned that the Network will prepare and negotiate the agreement within Council, forward them to the Conference of F/P/T Deputy Ministers for review and comment, and ultimately submit to the Conference of F/P/T Ministers of Health for approval prior to implementation. While the agreements will respect the authority and limitations of individual jurisdictions and their right to manage public health functions and operations within their own domain, the intent is that all jurisdictions will be able to access additional

public health resources as needed and requested. Agreements will also need to address the importance of collaboration in system development and functioning such as the sharing of information.

The Special Task Force has identified five priority areas for agreements that are to be negotiated within 12 months of the creation of the Network:

- Mutual aid during an emergency
- Public health information sharing
- Public health laboratory networks
- International networks
- Interchange and secondment of public health researchers and providers.

Appendix A of the May 2004 Special Task Force report provides the core elements of a draft agreement on mutual aid during an emergency.

Recognizing that agreements and protocols are an important infrastructure element, the Task Group strongly supports their timely development and implementation.

Public Health Legislation

The formal public health system is one of the mechanisms by which governments act in the interest of the public good. Legislation is a critical infrastructure element that identifies the mandate, purpose and responsibilities of public health. For example, Quebec's *Public Health Act*, which is the most recent P/T public health legislation, explicitly identifies the system's core functions and responsibilities, and identifies additional powers during emergencies. It gives full balance to all the core functions recognizing the importance of health determinants and inter-sectoral collaboration (see text box).

Public health legislation at the P/T level has traditionally been developed independently of other jurisdictions. While the Task Group appreciates that P/T jurisdictions may wish to have flexibility on how they frame or emphasize certain aspects of public health such as health promotion and social determinants of health, such variation is much less desirable for health protection and data sharing issues. The powers and responsibilities required to address outbreaks and public health emergencies need not vary substantially between jurisdictions. The need for surge capacity, mutual support, and coordination of multi-jurisdictional outbreaks necessitates common and integrated responses and powers.

There is an immediate need for draft regulatory or legislative wording to allow the sharing of public health information between jurisdictions.

The Naylor Report describes the lack of consistency and inadequacy of public health legislation in this country. Analysis of provincial public health legislation for the control of infectious diseases (i.e. the Compendium³⁷) identified many inconsistencies related to the reporting of infectious diseases, communication of personal information, surveillance, and powers in emergencies. While the federal *Quarantine Act*, which was originally developed in the late 1800s, is being updated to address the movement of individuals and conveyances across the Canadian border, the ability to control the movement of isolated and quarantined individuals across P/T borders has not yet been addressed. There are additional concerns for controlling the transport of human pathogens into Canada and their movement and storage within the country. Current public health legislation focuses on the control of exposed or infected individuals. However, the SARS outbreaks created scenarios in which controlling groups of people based on their frequent interaction (e.g. socio-cultural/ethnic group, workgroups) needed to be considered.

There are two broad schools of thought to achieve legislative renewal in this country. One school views the need for the federal government to take a greater "command and control" approach, whereas the other views a cooperative solution. Considering the extent of F/P/T interest in strengthening the public health system, a cooperative approach appears to be the more appropriate choice.

Recognizing Health Determinants and Collaboration - Quebec's Public Health Act

"measures in this Act pertain to the prevention of disease, trauma and social problems having an impact on the health of the population and the means of exerting a positive influence on major health determinants, in particular through trans-sectoral coordination. These measures are intended to maintain and promote physical health and the mental and social capabilities of persons to remain active within their environment."

Source: Public Health Act, Bill 36. Chapter 1, para 3. Québec Official Publisher, 2001.

The importance of the many legislative gaps and issues however, requires that the process move forward immediately.

The recognition of the need for common legislative approaches is not unique to Canada. In the U.S., the development of model state public health legislation was identified as one of the priorities of the Turning Point initiative,³⁸ which is a privately funded series of projects to transform and strengthen the public health system in that country. Additional model legislation has been developed for state emergency health powers and state public health privacy legislation. All of these resources are available through CDC's Collaborating Center for Law and the Public's Health.³⁹

Canada does not have similar tools to support convergence in public health legislation, nor a centre of expertise in public health law. As shown in the accompanying text box, the U.S. Center's mission and aims are to strengthen the legislative component of public health system infrastructure in a comprehensive fashion. Considering the range of public health legal issues that require attention in this country, a comparable critical mass of expertise affiliated with the PHAC would be an obvious approach to strengthening this infrastructure element and supporting the convergence of public health legislation. As further support, and to ensure Canadian-wide participation, the current informal working group on public health law that has developed as part of the initiative in B.C. to draft new public health legislation, should be formally supported as an expert/issue group and linked with the PHAC and the Centre for Public Health Law. Doing so would support communication among key stakeholders and assist with prioritizing needs among jurisdictions regarding public health law issues.

The May 2004 Report of the Special Task Force identifies the need to address public health legislation and regulation. Core elements of the approach would include creating a framework for a common approach to modern and comprehensive public health legislation, provide guidance on legislative provisions, develop common solutions and approaches, and develop inter-locking legal provisions for the control of human pathogens, quarantine, and other disease control actions within Canada's borders. The Special Task Force also identified the need to establish mechanisms for sharing advice, information and expertise and to share best practices such as collaborative workshops, conferences and secure web sites. The Task Group agrees with these proposals and recommends that a Public Health Law Expert/Issue Group and a Centre for Public Health Law as key mechanisms for achieving the identified needs.

CDC Collaborating Center for Law and the Public's Health (Georgetown and Johns Hopkins Universities)

Mission includes:

- *Serving as a primary resource on public health law for public health practitioners, lawyers, legislators, policy-makers, advocates, and the public*
- *Improving understanding about how the law affects the prevention of disease and injury through research, education, training, collaboration, and dissemination of information*
- *Promoting the development and implementation of an effective public health law infrastructure.*

Specific aims include:

- *Identify existing training programs and their ability to effectively deliver necessary information about public health law*
- *Develop core legal competencies in public health law and corresponding curricula, as well as new training materials as needed*
- *Work with stakeholders and national partners to deliver training sessions and materials useful for public health practitioners, lawyers, legislators, and policy-makers*
- *Conduct legal research and analysis in targeted areas relevant to public health*
- *Examine the public health law infrastructure and make recommendations for needed improvements*
- *Promote communication and collaboration among interest groups through our web site and other communication mediums*
- *Enhance the visibility and effectiveness of law as a tool for the promotion of the public's health.*

Source: <http://www.publichealthlaw.net/About/Mission.htm>

In recent years, legislation at federal and P/T levels has been created to protect personal information. As discussed in the Naylor Report, there are widespread concerns that these legislative initiatives may impair public health functions. It is absolutely necessary to

achieve an appropriate balance between the protection of personal information and the need to protect the public's health. A working group of ACIET is currently identifying categories of acceptable secondary use of collected data that should be permitted without seeking additional consent. An ongoing need to address such issues can be anticipated and the Centre for Public Health Law would be expected to provide legal expertise for this issue.

The development and application of public health legislation can raise a number of ethical issues. In response, the Naylor Report recommended the creation of a Public Health Ethics Working Group to guide decision-making during emergencies and outbreaks. Quebec's *Public Health Act* creates a Public Health Ethics Committee to give the Minister its opinion on proposed surveillance plans and on proposed surveys on health and social issues. However, at the Minister's request, the Committee may give its opinion on any ethical question that may arise by the application of the *Act* with particular emphasis on the activities or actions included in the provincial public health program or local/regional public health action plans. In Quebec's *Act*, the Committee's membership is outlined to include an ethicist; a regional public health director; two professionals practising in the public health sector, one of whom is engaged in ongoing public health surveillance; and three interested members of the public having no professional ties to the health and social services system. Opinions of the Committee are public. The experience with the Quebec-based Committee should be pursued to gain insights into the development of a national level Ethics Committee. Attention will need to be given to how it will interact with the Network, PHAC, Chief Public Health Officer and the federal Health Minister.

To increase our ability to have a stronger legislative basis for the public health system, the Task Group recommends:

5. Developing and updating relevant public health legislation. This includes:
 - a. Updating the Quarantine Act.
 - b. Defining the duties and responsibilities of the Public Health Agency of Canada and Chief Public Health Officer of Canada.
 - c. Providing mechanisms to control inter-provincial movement of isolated or quarantined individuals.
 - d. Providing mechanisms to control the transportation and storage of pathogens within Canada.

6. Developing collaborative capacity in public health law and supporting the convergence of legislation. This includes:
 - a. Supporting the convergence of public health legislation at the provincial/territorial level through the development of model regulatory and legislative wording.
 - b. Developing a Centre of expertise in public health law as part of the Public Health Agency of Canada.
 - c. Supporting a national expert/issue group in public health law to work collaboratively to identify priorities, develop solutions to identified problems, and participate in the implementation of improvements.
7. Providing advice on ethics and protection of personal information. This includes:
 - a. Assessing, by all government levels, whether an appropriate balance between the protection of personal information and the public's need to be protected from health threats is being achieved.
 - b. Developing a National Public Health Ethics Committee, affiliated with or part of the Public Health Agency of Canada, to assess public health ethical issues and provide advice to the Network and Public Health Agency of Canada.

Emergency Response and Surge Capacity

The public health system has the responsibility to play a lead role in responding to public health emergencies (e.g. outbreaks, bioterrorism) and a contributory role for other types of emergencies (e.g. natural and technical disasters). The *Strategic Framework for Health Emergency Management* developed by the F/P/T Emergency Preparedness and Response Network provides a useful conceptual framework to link the various components involved in the management of health emergencies. National public health agencies have a key role in leading and coordinating public health emergency preparedness (see text box for examples from the U.S. CDC).

Emergency preparedness involves an iterative loop of planning, training and exercising. In late 2004, participants at a National Forum on Emergency Preparedness and Response agreed that the Centre for Emergency Preparedness and Response (CEPR) should lead a process to plan and establish a Health Emergency Management System that is consistent with the strategic

framework and compatible with the Public Safety and Emergency Preparedness Canada's (PSEPC) National Emergency Management System. The CEPR will be leading a planning group to define the components of the National Emergency Management System.

Once the National Emergency Management System is developed, there will be a need to develop, maintain and deliver training courses. There will also be a need to design, implement and evaluate exercises to assess preparedness and response capabilities at all system levels. Currently, there are no funds available for generalized health emergency training or exercising. In contrast, the UK Health Protection Agency has an Emergency Response Division Exercise Programme that has been running a series of exercises to test emergency preparedness in the health services community.

Plans between system levels and between jurisdictions need to be connected to facilitate the provision of mutual aid. There appear to be two ways of addressing the need for rapid deployment of highly skilled staff to affected areas. One is to have pre-established teams, and the other is to have an inventory of trained individuals that can then be used to create a team. Both approaches are described and their relative roles and advantages need to be given further consideration. National leadership and accountability will be required to ensure the development of an integrated and common system of response to public health emergencies.

As part of emergency preparedness planning, a rational basis for stockpiling and maintaining public health supplies such as vaccines and anti-virals need to be included. While there are unresolved issues regarding the funding of stockpiles, such difficulties should not be allowed to hold up putting in place the appropriate supplies.

The timely availability of vaccines and anti-virals raises issues of risk-benefit tradeoffs for the country. For example, due to unresolved issues over indemnity, Canada's pandemic influenza supplier estimates a 7-month clinical trial period before a vaccine could be made available. This time frame could be reduced if the regulator was more accepting of a higher level of side effects as a trade-off for timely vaccine access. A similar issue exists for anti-influenza medication. Professional and political decision-making on these issues would

U.S. CDC Emergency Preparedness

The CDC has a number of initiatives for the preparation and planning for public health emergencies that include:

- *Inventories for voluntary assessment of public health response capacity to respond to emergencies*
- *Notification procedures for public health officials*
- *Terrorism preparedness and response strategy*
- *Lessons from outbreak investigations*
- *Strategic national stockpile*
- *Epidemic information exchange (web-based communications network connecting CDC with public health agencies across the country)*
- *Strengthening national preparedness for smallpox*
- *Centers for public health preparedness*
- *Regulations to control communicable diseases*
- *Inter-state and foreign quarantine.*

Source: www.bt.cdc.gov/planning/index.asp

likely benefit from consulting Canadians through an informed dialogue on acceptable levels of risk for these products in the context of an influenza pandemic. To do so requires developing the capacity for greater citizen engagement on public health issues. This issue is further explored in a later section of this report.

Emergency planning and the development of relevant agreements and protocols for mutual aid address the issue of surge capacity so that resources can be shifted to where they are needed. An underlying assumption to mutual aid and surge capacity is that others in the public health system, both within a P/T jurisdiction as well as other F/P/T jurisdictions, will have the spare capacity to provide aid during an emergency. Assuming that there are resources available, activating their deployment needs to have been pre-planned so that the provision of mutual aid is smooth, seamless, organized, and

“ready-to-go” when required. It is expected that the Network’s Expert Group on Emergency Preparedness and Response will be responsible for achieving this coordination.

To increase the ability to plan for and respond to public health and other emergencies, the Task Group recommends:

8. Establishing a Health Emergency Management System that is based on the national strategic framework and that addresses the planning, training and exercising for health emergencies.
9. Developing a practical and acceptable basis for stockpiling and maintaining public health supplies such as vaccines and anti-virals.
10. Employing an informed dialogue to achieve greater citizen engagement regarding acceptable levels of risk in preparing plans for addressing pandemic influenza and other potential public health emergencies.

Public Communication and Citizen Engagement

The ability to effectively communicate with the public is an important element of the public health system infrastructure. It includes informing the public about its health and the need for action. It also includes the use of social marketing to support healthier choices. As illustrated during SARS, public health also needs the ability to effectively communicate during a crisis. The skill sets required to accomplish these various forms of communication differ from the politically-oriented communication expertise typically found in health ministries. As described in the Naylor Report, there is ample room for improvement of communication strategies used in Canada during public health emergencies.

Expertise and capacity for public health communication needs to exist at all three levels of the public health system. Recognizing the critical importance of public health communication, the U.S. CDC has developed a comprehensive set of training and program activities in this area (see text box). The PHAC should be actively involved in similar areas in this country. The provision of communications-related training and support by the national level will only be useful if there are dedicated resources to this activity at P/T and local public health levels.

New technologies are providing a variety of options to facilitate greater public awareness of health issues. The Internet provides an opportunity for dissemination of

Communication at the U.S. CDC

- *Health communication training program: built around CDCynergy, which is a multimedia CD-ROM used for planning, managing, and evaluating public health communication programs. There are basic, emergency-risk communication, and certificate level programs. Additional training available for working with creative teams such as advertising and public relations, as well as the process and benefits of testing concepts and materials with members of the intended audience.*
- *Intern and fellow program: program brings talented people from areas such as communication, journalism, health education, anthropology, marketing, and information technology/human computer interaction to help work on CDC communication projects.*
- *Areas of practice: CDC office of communication is actively involved in research and evaluation, social marketing, audience research, language and culture, on-line health and web evaluation. The latter includes evaluation of interactive health communication with the public.*
- *Entertainment education: provide expert consultation, education and resources for writers and producers who develop scripts with health storylines and information.*

Source: www.cdc.gov/communication/index.htm

health information (e.g. Canadian Health Network - www.canadian-health-network.ca) and the PHAC will presumably be a key source of public health related information through this channel. The Internet can also be used to counter erroneous information as illustrated by the U.S. CDC’s Health Related Hoaxes and Rumors webpage.⁴⁰

A preceding section of this report raised the importance of greater citizen engagement to discuss public health issues. New technologies and approaches are increasing the feasibility of this. For example, the Centre for Global eHealth Innovation is involved in a number of initiatives that could increase the effectiveness of public health interactive communication with the public (e.g. pre-test

messages; focus groups; multi-media broadcast and response mechanisms, etc.).⁴¹ Partnership between the PHAC, its Collaborating Centre in Ontario, the eHealth Innovation Centre, and other interested parties could develop innovative ways of engaging Canadians in public health issues.

To increase our ability to communicate with and engage Canadians on public health issues, the Task Group recommends:

11. Developing national-level capacity to provide effective public health communications through the Public Health Agency of Canada.
12. Developing the capacity for effective public health communications at P/T and local public health levels across Canada through training, tool development, and other supportive means.
13. Developing strategic partnerships and capacity to enable the public health system to actively engage Canadians in the debate and discussion of public health issues.

Information, Surveillance, and Infostructure

Public health is an information-intense field. Two of the five core functions (assessment and surveillance) are specifically focussed on the collection, analysis, interpretation, and dissemination of information. In the personal health services system, a patient provides the “data” upon which treatment decisions are made. However in public health, a variety of different types of data on the health of the population need to be collected or accessed including:

- Causes of death (mortality)
- Occurrences of illness, disability and hospitalization (morbidity)
- Utilization of health services
- Health determinants
- Community values and preferences.

To be useful, data should ideally be comprehensive, timely, and complete. Once compiled and analyzed, data becomes information and has multiple potential uses:

- Identify outbreaks and unusual circumstances (e.g. cancer cluster)
- To describe and assess trends (e.g. rising rates of obesity)
- Understand emerging diseases

End-to-End Surveillance Initiative - Principles

- **Comprehensive:** ensure E2E and health surveillance activities occur at all jurisdictional levels and for all subject areas. Openly recognize both jurisdictional variations in technology and requirements.
- **Standards-based:** establish a living architecture that provides a standard for health surveillance as requirements evolve.
- **Consensus-based:** acknowledge jurisdictional autonomy and seek to standardize data, processes, and technologies only where there are compelling requirements to do so.
- **Ease of integration:** develop modular and loosely coupled systems with a high degree of reusability.
- **Security, confidentiality, privacy, and protection of information:** protect personal health information, privacy, and confidentiality.
- **Proven technology:** use industry-accepted standards, such as messaging standards, proven technologies, and open architectures.

Source: www.hc-sc.gc.ca/pphb-dgspssp/csc-ccs/end_to_end_e.html

- Identify needs
- Set priorities
- Design and implement policies and programs
- Identify research gaps and needs
- Test hypotheses
- Assess impact and evaluate effectiveness of interventions
- Demonstrate accountability.

Whether information is available to support decision-making depends on the existence of an information infrastructure or “infostructure”. Health Canada’s Centre for Surveillance Coordination has been working with 8 provinces in the End-to-End (E2E) Surveillance initiative to further define specific business and IM/IT health surveillance requirements needed to support the health surveillance cycle from collection and integration of data through analysis and interpretation to dissemination of health surveillance information. A number of principles to guide subsequent development of systems and tech-

nology infrastructure in support of health surveillance systems were identified in the E2E surveillance architecture (see text box).

An assessment has been conducted to help jurisdictions identify the priority steps they need to take to build an integrated health surveillance infrastructure in their jurisdiction and to contribute to building the integrated pan-Canadian health surveillance network. A gap analysis of current health information systems indicates:

- Lack of an overall system-wide plan (i.e. architecture) for the management of the information that needs to flow and be available within the surveillance system within, and across, jurisdictions
- Poor collection systems that do not support high data quality or the timeliness of data
- Lack of harmonized standards for information, processes and technology to support public health surveillance
- Lack of sufficient mechanisms and processes for effective collaboration and coordination.

Awareness of the deficiencies in public health information systems is not new. Federal and provincial auditors have repeatedly identified their concerns in this area.^{42,43} For example, current public health information systems can take weeks to move information from laboratories to public health officials. This is extremely problematic if one of the key purposes of such reporting is to detect outbreaks as soon as possible. The transfer of information from clinical settings to public health is generally not efficient. This became particularly troublesome during the SARS outbreak to such an extent that the public health department needed to place professional staff in several hospitals to facilitate information transfer between facilities and the public health department. Most of the public health system's data on SARS cases and contacts were located in paper files and a number of incompatible databases that made opportunities for analysis extremely limited.

Improvements in public health information systems need to address the timely movement of information within the public health system across multiple disparate health sources such as public health laboratories, primary care physicians, community outreach clinics and other key sources of information (e.g. water quality, inspection services). Information also needs to move more rapidly between the personal health services system (e.g. hospital emergency rooms, infection control teams) and public health. This includes not only common reportable diseases, but nosocomial infections

as well. There must also be the capacity for the public health system to rapidly communicate with health care providers.

Modernizing existing public health practices is required, but there are opportunities to do much more. The application of modern technology and information management can provide higher quality information that can improve the ability to detect patterns of disease. For example, only a minority of cases of food poisoning are ever diagnosed and reported to public health. This can make detection of outbreaks and new risks difficult to identify. In the U.S., CDC and its partners have developed FoodNet to actively seek out information on foodborne infections from laboratories, physicians and the public.⁴⁴ The fingerprinting of organisms to be able to track sudden surges of particular strains amidst the background noise of routine reports (e.g. PulseNet) is another example of applying modern technology and information management. Expansion of PulseNet across Canada is currently limited by its resources and needs to be included in plans to improve and disseminate public health surveillance systems.

In some circumstances, it may be possible to use clinical features that are discernable before confirmed diagnoses are made to detect outbreaks. This concept, referred to as syndromic surveillance, could include monitoring pharmacy sales of anti-diarrhea products as an indicator of a community outbreak of gastroenteritis or of sets of symptoms suggesting a bioterrorism incident. While such approaches have theoretical potential, they need to be further assessed for their feasibility and effectiveness.

Sharing of information within the Canadian public health community has been improved, at least for enteric outbreaks, through the creation of the Canadian Enteric Outbreak Surveillance Centre (CEOSC). The website is intended to be used for "posting" alerts concerning outbreaks or suspected outbreaks currently under investigation. Evolution of this product has led to the development of the Canadian Intelligence and Outbreak Surveillance Centre (CIOSC) to strategically integrate laboratory and epidemiologic surveillance alerts and decision support tools in a common, secure, web-based environment. The Alert system allows investigators to identify those with similar outbreaks and to make contact either by e-mail, fax or phone in order to help each other. The sophistication of these endeavours continued to increase through the Canadian Network for Public Health Intelligence (CNPHI).

The need for the development of better information and surveillance systems is not limited to infectious diseases. The Naylor Report recommended developing a national system for non-communicable diseases and population health factors. This is a more complex area than infectious diseases due to the need to include multiple sources of data and the need for collaboration and coordination. An ACPHHS working group is actively developing a framework for the surveillance of chronic disease risk factors, but attention is also required for chronic disease data (e.g. morbidity, mortality), as well as injuries. Development of the actual surveillance systems will require substantial investment.

F/P/T collaboration will be critical to ensure the inter-operability of systems and optimal efficiency of system development. There is a background of such collaboration including the CIPHS Collaborative, which has been active in the dissemination of iPHIS, as well as collaborative efforts to address standards for communicable disease surveillance. The 2004 federal Budget's provision of \$100 million to *Infoway* will assist the development and implementation of communicable disease surveillance systems like iPHIS across the country. A basic principle of information system development is that end-users must be involved in every step of system planning and deployment, and this is of particular importance considering *Infoway's* lack of experience with the public health system. Cross representation in the Expert Group for Surveillance and Information that will be reporting to the Council and *Infoway's* Public Health Steering Committee may be one mechanism to link *Infoway* to public health system stakeholders.

The Naylor Report estimated that \$215 million would be required over a five-year period to develop a system for the surveillance of reportable infectious diseases, with the capability to link to front-line public health case management systems, laboratory system, and infection control systems. Since the funding of the public health system is currently estimated to be about \$2 billion per year, development of the surveillance system as outlined in the Naylor Report represents about 2.2% of the overall public health budget. The reason public health's information systems are in their current state has been the lack of sustainable funding in IM/IT development over a period of many years. While IT budgets vary depending upon the business sector, IT budget benchmarks in the sectors of health care and services/consulting are 4.8% and 4.5% respectively.⁴⁵ Applied to the business of public health, this would correspond to *ongoing* investment in IT of \$90 million per year. Clearly this has not occurred. That is why the public health department of this country's largest city

had to manage a SARS outbreak with hundreds of cases and thousands of contacts with "paper charts and colour-coded post-it notes".¹ The city's medical officer of health later commented that Toronto was using nineteenth century tools to fight a twenty-first century disease. A columnist for a national newspaper described the situation more dramatically (see text box).

"Thanks to near heroic efforts by public health officials, we managed to fight off a SARS fire spreading at lightning speed with an organization about as sophisticated as an improvised bucket brigade."

Source: Margaret Wente, *Globe and Mail*, May 5, 2003, p. A15.

Overall, there are two main uses of public health information: to inform decision-making; and accountability. Information can only be used however, if it can be located. One of the challenges for public health practitioners, particularly in the area of non-communicable disease surveillance, is the ability to find all of the different types of information that exist (mortality, morbidity, surveys, service utilization, etc.). Currently, public health related information may be found in existing health status reports or on the Internet through a variety of departments and agencies including Health Canada, Statistics Canada, and CIHI. It can be an extremely difficult and frustrating experience to attempt to search all of these sites looking for a particular piece of information. One of the solutions to this dilemma is to create a single portal through which one could access a wide range of public health related data and information. The CDC Wonder site is an example of such a portal that currently provides links to information on chronic diseases, communicable diseases, environmental health, health practice and prevention, injury prevention, occupational health, and reference data.⁴⁶ Tools to integrate and analyze data from different sources such as Geographic Information Systems (GIS) are also needed.

Analysis and comparison of data requires common definitions and standards. Through the work of CIHI, substantial progress has been made in identifying personal health services data standards. With respect to public health relevant indicators, most of the progress to date has been in areas used for measures of health status and some health determinants. These types of measures are commonly found in health status reports⁴⁷ and are examples of the health outcomes box of the

earlier input/output diagram of the system. However, there is no common agreement on definitions, models or standards for public health information, which is a requirement for populating a health surveillance system used for analysis and comparison purposes.

To increase our ability to provide timely information to support public health decision-making and action, the Task Group recommends:

14. Developing information systems that support public health and other health system practitioners to fulfill the public health system's core functions. This includes:
 - a. Further developing infectious disease surveillance and information systems that:
 - Utilize pan-Canadian definitions and information standards;
 - Link with public health laboratory data;
 - Link with other relevant sources of public health data such as water quality and inspection services data;
 - Link with acute care system with particular emphasis on infection control data, laboratory data and emergency room services data;
 - Have rapid communication capacity within the public health system and between the public health system and health care providers.
 - b. Further developing and expanding non-communicable disease and injury surveillance systems.
 - c. Increasing accessibility to public health information by public health and other health system practitioners.
15. Achieving improved information and surveillance systems through collaborative and coordinated approaches. This includes:
 - a. Establishing an Expert Group for Surveillance and Information that reports to the Network's Council and oversees the development and implementation of public health surveillance and information systems across the country.
 - b. *Infoway* working with provinces, territories, the Public Health Agency of Canada, and the Network to ensure public health information system development and implementation will meet user needs.

- c. Investing in the long-term maintenance and development of public health information and surveillance systems.
- d. Conducting pilot studies to assess the feasibility and effectiveness of syndromic surveillance for early detection of outbreaks.

Knowledge Development and Its Translation into Practice

Public health knowledge provides the evidence upon which to base programs and services, the context to interpret surveillance and assessment information, and the basis for recommendations to the public and decision makers. The public health system is faced with two major issues in this area. First, there has been insufficient investment in developing knowledge through applied research. This is related to not only too few research dollars being available, but also to limited capacity to actually conduct research in this area. Many of the faculty in university departments that are potentially related to public health, (e.g. epidemiology, community health, public health sciences), have no direct experience with the delivery of public health services and are not involved in research that is directly relevant to the practice of public health. As highlighted in a recent CIHR report, public health practitioners need to be involved in identifying evidence gaps and in conducting research to address those gaps.⁴⁸ Similar to clinical services, the public health equivalent of clinician-scientists would enable individuals with joint interests in public health practice and applied research to maintain linkages with both of these domains with beneficial results for public health training, education and service delivery. Creating university Chairs with a specific focus on public health applied research would be an additional mechanism to build capacity for research.

The second issue is that what is known about effective interventions is not being fully utilized and incorporated into practice. With a few small notable exceptions, there is little effort to systematically synthesize existing knowledge and provide it in an appropriate format that is readily accessible to practitioners. There is a tremendous need to systematically retrieve and review existing evidence, which can be scattered across a multitude of sources including difficult to access locations such as governments, universities, and consulting firms. In the absence of any coordinated approach to public health knowledge synthesis in this country, individual public health agencies at all levels embark on attempts at synthesizing topics to inform their decision-making. This

approach has a number of problems including unnecessary duplication of activities; inadequate dissemination of findings; inadequate resources to do a comprehensive search for evidence; and in some instances, insufficient skills to adequately synthesize the material.

The Canadian Task Force for Preventive Health Care has performed knowledge synthesis and the development of evidence-based recommendations for almost 30 years for clinical prevention. No comparable process exists in Canada for synthesizing evidence for prevention and promotion at the population level.^{***} In contrast, a U.S. Task Force for Community Preventive Services was created in 1996 to perform this work, although the range of topics outstrips the capacity of any one review group. A process such as that of the U.S. Task Force is one approach to address the need to prioritize synthesis efforts and conduct them in a consistent manner. This appears to be an obvious area for the PHAC to demonstrate leadership and there is a likely role for the Collaborating Centres to assist with synthesis work similar to the U.S.-funded Evidence-based Practice Centers.⁴⁹

Once evidence has been synthesized, it needs to be made available to practitioners in a timely, relevant, and comprehensive manner that ensures quality assurance. In the UK, the Health Development Agency (HDA) has been created to be the national authority on what works to improve people's health and to reduce health inequalities. The HDA works in partnership across sectors to support informed decision-making at all levels and the development of effective practice. It has a staff of approximately 120 and an annual budget of £12 million. One of the HDA's initiatives has been to create a Public Health Electronic Library to provide knowledge and know how to promote health, prevent disease and reduce health inequalities (see text box).⁵⁰

Part of the required strategy in Canada will be the creation of a single portal to allow practitioners to access evidence from a variety of sources from within and outside Canada. Some progress is already being made with the creation of the Health-Evidence.ca website, which is intending to create and maintain a searchable online registry of quality-rated effectiveness evidence for decision-making in public health and health promotion. The website currently includes only reviews published in

Public Health Electronic Library (UK)

Objectives of the Library include:

- To speed access to quality data; evidence; policies; networks and organisations; and learning from practice
- To help coordinate communication on the range of dedicated public health activity
- To highlight and promote opportunities for further involvement and engagement in the developing public health agenda
- To maximize the value of a wide range of resources and help to avoid duplication of effort
- To develop partnerships and promote collective ownership of PHEL at all levels
- To be quality driven with an ongoing programme of evaluation and user centred approach to development
- To improve skills and build the capacity for knowledge management

The Library currently categorizes its holdings into the broad headings of policies; evidence and data; knowledge into action; and networking.

Source: www.phel.gov.uk/about/aims.html

the scientific literature and this type of resource will eventually need to include unpublished reviews conducted in Canada and elsewhere.

Encouraging evidence-based practices needs to go beyond passive approaches such as portals, libraries and searchable websites. Pro-active interventions must also occur to support the incorporation of evidence into practice and needs to be a key responsibility of the Collaborating Centres and the PHAC.

To integrate research, synthesis and knowledge translation, the CIHR report had identified the need to create a national centre that would encompass these three areas and create feedback mechanisms between researchers

^{***} Clinical prevention versus population prevention. While complementary, there are key differences in the types of interventions. For example, providing 1:1 cessation counselling is an example of a clinical prevention intervention for tobacco. Community prevention would include social marketing campaigns, use of taxation, controlling sales to minors, controlling exposure to second hand smoke in public spaces, training clinicians to provide effective preventive interventions, etc.

and practitioners.⁴⁸ The PHAC would be a natural sponsor for such a centre and would be expected to work closely with the Collaborating Centres and CIHR.

To increase our ability to support evidence-based decision-making, the Task Group recommends:

16. Increasing the capacity for conducting applied public health research including Chairs of Applied Research and Public Health Practice; Public Health Clinician-Scientist positions/awards.
17. Increasing the funding available for applied public health research by providing increased targeted funding for identified research priorities.
18. Creating a Centre for Public Health Evidence sponsored by the Public Health Agency of Canada that would identify and address gaps in knowledge, prioritize topics for synthesis, coordinate and conduct synthesis projects, and be actively involved in knowledge translation and dissemination to support effective public health practices.
19. Developing a searchable database sponsored by the Public Health Agency of Canada to permit public health practitioners to identify and retrieve relevant public health evidence.
20. Developing strategic partnerships with organizations in the U.S. and UK that are engaged in public health-related knowledge synthesis and translation initiatives.

Public Health Laboratories

Public health laboratories are an integral component of Canada's public health system. The laboratories provide early detection of health risks associated with infectious agents, play a vital role in outbreak investigations, and identify causes of disease to aid in treatment and prevention. The ability of the public health system to respond to emerging public health challenges, such as the advent or outbreak of new diseases, depends in part on the capacity and effectiveness of public health laboratories.

In the context of system infrastructure, public health laboratories are a cross-cutting issue because their functioning depends on all of the infrastructure components applied to the laboratory setting (sufficient and competent workforce; organizational capacity; and knowledge and information systems). The Naylor Report provides several recommendations for addressing current challenges in the public health laboratory system including laboratory system capacity and protocols, information

system development, better integration with epidemiology and disease control efforts, and the development of a national report card of performance and gap assessment.

The Canadian Public Health Laboratory Network (CPHLN) was formed in 2001 and is a prototype for the development of Expert Groups in other content areas. One of the factors contributing to the collaborative nature of the CPHLN has been the long-standing relationship among the laboratory directors. This strength is also a potential weakness as many of the directors are nearing retirement age. The CPHLN links federal and provincial public health laboratories and its mandate includes strategies to:

- Coordinate pathogen detection, infectious disease prevention and control
- Conduct laboratory-based surveillance and provide an early warning system
- Ensure monitoring of food and water safety
- Develop and maintain advanced levels of training for public health laboratory workers
- Counter bioterrorism threats.

In response to SARS and the Naylor Report, the CPHLN has developed a multi-year strategy to improve the public health laboratories in this country. The plan includes enhancing the capacity and efficiency of the laboratories with improved information systems and to expand the CPHLN to include the many other laboratories that are involved in microbiological testing and research (e.g. community and private laboratories, hospitals, universities, etc.). The CPHLN plan also includes a gap analysis to identify areas for system improvement. Quality improvements will be targeted with the introduction of a continuous quality improvement initiative with ISO accreditation, increased standardization, and the development of a laboratory system report card. Training, protocol development, and testing reagents are included to address new pathogens and bioterrorism agents. The plan also addresses improved consistency in testing of drinking water across the country. Recognizing the need for increased coordination and system development, the plan also includes a stronger secretariat to support the CPHLN. Further details on the plan's contents are included in Appendix 3. Infoway is also involved in developing information system for health laboratories. The public health laboratories need to be involved in this process, as well as the development of public health information systems.

To increase our ability to provide effective public health laboratory services, the Task Group recommends:

21. Enhancing the capacity and efficiency of Public Health Laboratories through enhancement of laboratory based surveillance and information systems, expansion of the CPHLN by establishing provincial microbiology laboratory networks that include hospital and community laboratories, perform a gap analysis comparing current and required laboratory functioning, and the introduction of a continuous quality improvement initiative.
22. Enhancing training and the development of protocols to support testing for new and emerging pathogens, practical training of new graduates, support of ISO accreditation, and supporting testing services in Territories without public health laboratories.
23. Improving the surveillance of water quality through the development of national guidelines for water testing and real-time sharing of surveillance data between laboratories and public health disease control staff.
24. Enhancing standardization of laboratories' protocols and developing a national report card on laboratory performance.
25. Providing secretariat and program development support to enable the Public Health Laboratory Network to fulfill its mandate.
26. That Infoway includes the public health laboratories in the development of information systems for the broader set of health system laboratories.

Aboriginal Health

Aboriginal peoples in Canada experience substantial disparities in health determinants and health outcomes compared to the rest of Canadians. A new approach is needed that tackles the root causes of health disparities, cuts across administrative and jurisdictional barriers and focuses on improving the health of Aboriginal peoples. A key aspect is ensuring the input of Aboriginal peoples in the direction and design of health services in their communities.

It is well recognized that there are significant gaps in public health system infrastructure in Aboriginal communities. These gaps include a lack of clarity regarding roles and responsibilities for public health, major gaps in public health data, as well as chronic difficulties in recruiting and retaining staff. When it comes to the surveillance and control of communicable diseases, there should be no confusion over who is responsible for

which components. Health Canada's First Nations and Inuit Health Branch (FNIHB) provides public health surveillance and control of communicable diseases in First Nations communities to varying degrees across the country, but the official federal government perspective is that its involvement is voluntary and that no constitutional obligation or treaty requires them to provide health services or programs. Aboriginal peoples do not share the federal government's point of view. In general, provincial public health legislation applies to reserve communities, but provinces may be reluctant for a variety of reasons to take on the responsibility for public health services in these communities. Over the past decade, the federal government has been transferring greater responsibilities for health services, including public health, to reserve communities. Considering the population bases typically required to perform public health surveillance and disease control, the paucity of individuals with the required skill sets to do so, and the necessary linkages required to have a truly functioning system, the transfer process has contributed to the overall lack of clarity and limited the effectiveness of the transfer process in many settings. In addition to communicable diseases, Aboriginal Canadians are at increased risk of a number of additional adverse public health outcomes (e.g. diabetes, injuries). As a basic principle, all communities in Canada should have access to a comprehensive range of public health services.

Considering the long-standing lack of clarity in roles and responsibilities, and the historical, legal and political factors involved, the Task Group does not realistically foresee quick resolution of these issues at the macro level. While this path should still be pursued, it is at the front-lines of the system that clarity and mutual understanding should be sought. It is at the local level that stakeholders have the most to gain (and the most at risk) if there is not clarity in roles and responsibilities. Since the situation will vary from one province to another and in some provinces, from one region to another, a variety of local solutions may be identified, which is acceptable as long as the core functions of public health are fulfilled and comprehensive public health services are available to all communities. This process will require involvement of multiple stakeholders including the regional FNIHB office, local and provincial Medical Officers of Health, and First Nations representatives. From this bottom-up approach, models of collaboration can hopefully be developed, which can then be built upon over time.

Considering the continuing health disparities between Aboriginal peoples and other Canadians, a national public health perspective on the health of Aboriginal

Canadians is required and must address all five core functions of public health. This National Aboriginal Health Strategy would include information and trends on health determinants and health outcomes to inform decision-making. Research efforts on priority health issues will need to be coordinated, as will the identification and support of best practices. The recent announcement of the creation of a Collaborating Centre for Aboriginal Health appears to be an obvious coordinating and leadership mechanism to achieve these tasks. A key feature must be to engage Aboriginal peoples to be actively involved in the assessment, problem solving, and interventions to address public health issues and to ensure a determinants of health approach.

To increase our ability to address public health issues affecting Aboriginal Canadians, the Task Group recommends:

27. A determinants of health approach as the primary mechanism to improve the health of Aboriginal peoples.
28. Engaging Aboriginal peoples to be actively involved in the development of a public health system for their communities. This is of critical importance in the interface between provincial/territorial and federal public health systems in First Nations and Inuit communities.
29. Collaborating in the development of a National Aboriginal Health Strategy that would incorporate the core functions of public health and address the gaps in public health system infrastructure for Aboriginal communities.
30. Moving forward simultaneously at the national and local levels to clarify roles and responsibilities for public health in Aboriginal communities.

Collaborating Centres for Public Health

The Naylor Report outlined a vision for the national agency to be comprised of a series of regional hubs, which would be partnered with local academic centres, local/provincial public health systems (including the existing and proposed provincial public health agencies), and other stakeholders. Consistent with this view, the federal government has announced the creation of five Collaborating Centres across the country, each of which is focussed on a particular aspect of public health (see text box). (The Collaborating Centre for Aboriginal Health was discussed in the preceding section).

National Collaborating Centres for Public Health

- *Determinants of Health (Atlantic Canada)*
- *Public Policy and Risk Assessment (Quebec)*
- *Infrastructure, Infostructure, and New Tools Development (Ontario)*
- *Infectious Diseases (Prairies)*
- *Environmental Health (British Columbia)*
- *Aboriginal Health*

Source: http://www.hc-sc.gc.ca/english/pha/releases/2004_26bk2.html

To be successful, these Centres must be focussed on the practice of public health and can contribute to it through a combination of knowledge translation, applied research, and training. Consistent with this focus, the governance of these Centres needs to include representation from practitioners, researchers, and trainers. While the Centres have particular areas of focus, as outlined in this report, infrastructure components are inter-related. Therefore to optimize their impact, the Centres will need to collaborate with each other and a variety of local/regional, national and international partners. Considering their relatively modest budgets, the Centres need to ensure that they achieve optimal impact with the funds available. This necessitates focussing on doing a few things well versus dividing funds across multiple academic institutions or becoming a mini-granting agency, neither of which would likely generate much impact on public health practice.

Precise criteria for prioritization of projects will need to be established and there appears to be a national role through the PHAC for coordination and identification of priorities. To ensure high quality practices by the Centres, a single high profile scientific advisory committee is recommended to review the scientific workplans of the Centres to provide guidance and serve as a quality control mechanism. Considering the inter-relatedness of the infrastructure elements, the review of all of the Centres' scientific workplans together would encourage collaboration, integration, and a system-wide perspective to infrastructure development.

To optimize the impact of the Collaborating Centres for Public Health on the practice of public health, the Task Group recommends:

31. Collaborating Centres focussing on a limited number of projects that will have impact on the practice of public health in the areas of applied research, knowledge translation, and training.
32. Collaborating Centres having a multi-stakeholder governance structure that includes practitioners, researchers and trainers.
33. Creating a single, high profile scientific advisory committee that would review and provide guidance on the scientific workplans of all of the Centres.

System Resources

A properly structured and functioning public health system will contribute to:

- Improved levels of health status of the population and decreased health disparities
- Decreased burden on the personal health services system and thereby contribute to its sustainability
- Improved preparedness and response capacity for health emergencies.

The 2004 First Ministers' Meeting on Health Care acknowledged the importance of public health to achieve better health outcomes and contribute to the sustainability of the personal health services system. Preventing chronic diseases and injuries are obvious examples of the potential impact of public health in achieving these outcomes. The SARS outbreak demonstrated that a public health emergency could paralyse the personal health services system and impact a nation's economy. For example, the Conference Board of Canada estimated that SARS would lower the GDP by \$1.5 billion with almost three quarters of this being lost from the travel and tourism industry nationally.⁵¹ Such consequences are not limited to novel pathogens. For example, an influenza pandemic could have substantial impact on the personal health services system and cause widespread social disruption.

The preceding sections of this report have described the many needed areas for action and investment to build the system's infrastructure. System resources, however, comprise not only the costs associated with system infrastructure, but also the overall funding of the public health system. In preparing this report, the Task Group viewed that it was important to comment on both of these aspects.

Wanless Report Assumptions with Lowest Rates of Health Care Spending Increases

- Dramatic improvement in public engagement;
- Higher spending on health promotion;
- Sharp decline in key risk factors including smoking and obesity; better diets and exercise more;
- Reduction in socio-economic inequalities in health;
- Healthy life expectancy increases in line with life expectancy;
- Increased productivity of health care services

Source: Wanless D. Securing our future health: taking a long-term view. London: HM Treasury, 2002.

The costing of individual recommendations is challenging. System development has not been historically pursued for most components of the public health system. There is therefore an absence of detailed plans and costing analysis. For many infrastructure areas, the development of a strategy or plan will need to be an initial step and a prerequisite to developing more detailed costing estimates. Some areas though, are ready for immediate implementation. For example, the public health laboratories, with a pre-existing network, have already developed a 3-year plan for system development. As system investments are made and the infrastructure is strengthened, more detailed information will become available such as system performance measures and better estimates of actual system expenditures to more precisely inform decision-making.

Investment in system infrastructure is necessary, but insufficient to achieve an effective public health system. Infrastructure provides the underlying foundation for effective programming, but not the programming itself. A number of groups have attempted to estimate the needed level of public health system financing in order to achieve desired outcomes.

In the UK, a long-standing financial executive named Derek Wanless was asked by HM Treasury to assess the potential impact of varying levels of public health investment and other factors on future health care spending (see text box). His report estimated that doubling the investment in prevention and promotion (£250 million) was associated with achieving the maximal benefit for the public's health and the most impact on the sustainability of the personal health services system.²⁵

In Quebec, a 10-year plan has been adopted to orient public health actions against province-wide and regional public health priorities based on the evidence for effective interventions. Implementation of this program will require an almost doubling of Quebec's annual public health budget from \$265 million to \$506 million.⁵²

In a 2004 report from British Columbia, a legislative Select Standing Committee on Health analyzed current direct and indirect health-related costs and estimated health savings from modest improvements in key risk factors.⁵³ The Committee recommended that funding for public health initiatives should gradually increase from 3% to at least 6%. The British Columbia Cancer Society has also recently recommended increasing disease prevention funding to at least 5% of the health care budget with a particular emphasis on chronic diseases.⁵⁴

In Ontario, provincial investment in the public health system has added 180 full-time equivalent positions to address the surveillance and control of infectious diseases. The government has also announced that it will be increasing system funding from \$231 million to \$469 million per year over the next 3 years, although part of that increase reflects substituting provincial funding for current municipal funding.

There is a remarkable similarity in the conclusions of these various groups in recommending that the investment in public health needs to double and reach about 5-6% of governmental health system expenditures. While the Naylor Report and a recent CIHI report indicate how difficult it is to track system costs, the Naylor Report estimated that public health system spending was about \$2 billion per year, representing 2.6% of overall health system expenditures by the public sector. As per the preceding discussion, infrastructure investments account for only a minority of the approximately \$2 billion that will be eventually required. The bulk of the new investment would be program-delivery costs including inter-sectoral initiatives, staff, social marketing, etc. The Task Group views that an investment of this magnitude would need to be phased in over a 10-15 year period.

The Naylor Report recommends an additional \$700 million per annum in system funding from the federal government that would build up over a period of 5 years.¹ The Naylor Report emphasized the need for additional P/T investment since these jurisdictions have the primary responsibility for public health. Many of the Naylor Report's recommendations focussed on communicable diseases and emergency preparedness. Consid-

ering the many other important public health issues, this implies that a greater overall level of investment is required.

Some progress is being made. In the spring 2004 federal Budget, the government made multi-year commitments to *Infoway*, the new Public Health Agency of Canada, a national immunization strategy, and P/Ts to relieve stresses on their public health systems.¹¹ These combine to an investment of \$250 million per year. The 2005 federal Budget provides an additional \$67 million per year for investments in chronic disease prevention and pandemic preparedness reflecting a remaining annual gap between the Naylor Report's recommendations and current commitments of \$383 million.

In contemplating the potential doubling of public health system funding, there are several points that need to be considered. The most critical message is that increased funding is not intended to simply double what is currently done, but to address the well-known unmet needs that exist. Increased funds need to be strategically invested in programming and the underlying infrastructure to comprehensively address the public health needs of Canadians.

The modelling conducted by Derek Wanless and others has been based to some extent on the evidence for effective tobacco control programs. The U.S. Centers for Disease Control and Prevention (CDC) identified nine components of effective tobacco control programs:⁵⁵

- Community programs to reduce tobacco use
- Chronic disease prevention programs to reduce burden of tobacco-related diseases
- School program
- Enforcement
- Statewide programs
- Counter-marketing
- Cessation programs
- Surveillance and evaluation
- Administration and management.

These program components highlight the comprehensive nature of public health interventions utilizing a variety of approaches (e.g. marketing, preventive interventions, building skills, enforcement, etc.) with a strong emphasis on partnership and collaboration. For example, the school program includes tobacco-free policies, evidence-based curricula, teacher training, parental involvement, and cessation services. The school based efforts are also linked with local community coalitions, local tobacco vendor enforcement, and statewide media and educational campaigns.

These different program components are implemented to varying degrees in Canadian communities. Based on experience with implementing comprehensive programs and the positive outcomes that have occurred, the CDC has estimated the necessary investment in tobacco control programming on a per-capita basis. Using the mid-range of their estimates, if Canadian governments were to fully implement the nine evidence-based program recommendations identified by the CDC, this country would need to spend about \$450 million each year on tobacco control. This compares with current tobacco control funding by Health Canada which is estimated to be \$70 million, with additional spending by individual P/T jurisdictions.⁵⁶

To put these numbers in context, the direct and indirect costs of smoking in Canada were estimated to be \$17 billion in 1991.⁵⁷ Considering the inflation in personal health services costs and the increase of tobacco-related illnesses in women, tobacco-related costs will have increased dramatically in the past decade.

There are a number of priority public health issues that require comprehensive and sustained approaches including physical activity, healthy eating, immunizations, injury prevention, emergency preparedness, healthy child development, and a reduction in health inequalities. As discussed in a recent white paper from the UK on making healthy choices easier, their National Health Service “is freeing itself from a decades-old crisis focussed on waiting for treatment, which is creating the time, space and resources needed for effective action on prevention.”⁵⁸ Recognizing the tremendous imbalance in the investments by the private sector to encourage less healthy choices as compared with action by government for the public’s good, the UK is taking coordinated action to market health, improve labelling and information for the public and media, tackling inequalities, and partnering with industry.

Achieving progress on public health priorities requires more than just the health sector. Inter-sectoral collaboration and community partnerships are an integral part of the public health approach. The capacity to bring partners together, to build a common vision and set of actions, and to provide the evidentiary and evaluative base for effective interventions requires leadership, expertise and resources. Capacity issues also exist for non-health sectors to facilitate their participation with health in joint ventures. For example, to address obesity and overweight, public health would ideally partner with other government sectors including agriculture and food, education, children’s services, social services, tourism and recreation. These potential partners need to have the resources to allow them to come to the table as active participants and thereby bring their unique perspectives and partners.

In envisioning a stronger and more effective public health system for the future, it needs to be recognized that existing capacity is not uniform. There are several-fold differences in public health staffing levels among P/T jurisdictions with some having few individuals with formal training in public health. This inequality is compounded by some areas with higher than average population needs having less system capacity. In building system programming and infrastructure, specific attention will need to be paid to reducing these system inequalities.

To optimize the benefits of the public health system to improve the health of Canadians, the Task Group recommends:

34. Identifying in a consistent manner F/P/T expenditures on the formal governmental public health system.
35. Investment by all F/P/T governments to ensure that the public health system has the capacity to effectively address the key public health issues facing Canadians.

Implementation



This is not the first F/P/T report that has made recommendations addressing the strengthening of the public health system's infrastructure. The lack of success in translating previous recommendations into sustained action is a serious concern for the Task Group. One of the most important limitations in the past was the absence of any individual or group that was clearly responsible and accountable for implementation of recommendations.

To succeed, this report's recommendations need to make their way into the workplans of system leaders and have their implementation tracked in a systematic and transparent fashion. For each of the recommendations, the Task Group feels that there are two main actors who will need to demonstrate leadership for their implementation: i) Public Health Network; and ii) Chief Public Health Officer/PHAC. It is not possible for the Task Group to clearly delineate their relative roles for implementation. How they will work together and divide up responsibilities are still unclear at the current stage of system development. However, there must be a mechanism by which it is clear who is committed to implementing which specific tasks and to assess whether this has occurred.

Conclusion



A properly structured and functioning public health system will contribute to:

- Improved levels of health status of the population and decreased health disparities
- Decreased burden on the personal health services system and thereby contribute to its sustainability
- Improved preparedness and response capacity for health emergencies.

Public health system infrastructure is the supporting foundation that allows the fulfillment of system functions. Three main categories of system infrastructure have been described in this report, although all of the individual infrastructure elements are inter-dependent. While each of the infrastructure elements require atten-

tion and development, the Task Group has focussed on identifying recommended actions for an initial group of priority elements. These recommendations are intended to provide guidance for the initiation of infrastructure development in the immediate future. Building and maintaining system infrastructure will need to be an ongoing responsibility and the creation of new structures (e.g. PHAC, CPHO, Network) will provide opportunities to accomplish this. Improved system governance and transparency of decision-making in addition to actual measurement of system performance should make the fulfillment of this responsibility more likely in the future than it has been in the past.

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Appendix I

Membership of the Strengthening Public Health System Infrastructure Task Group

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Appendix 2

The Multiple Dimensions of Public Health Functions

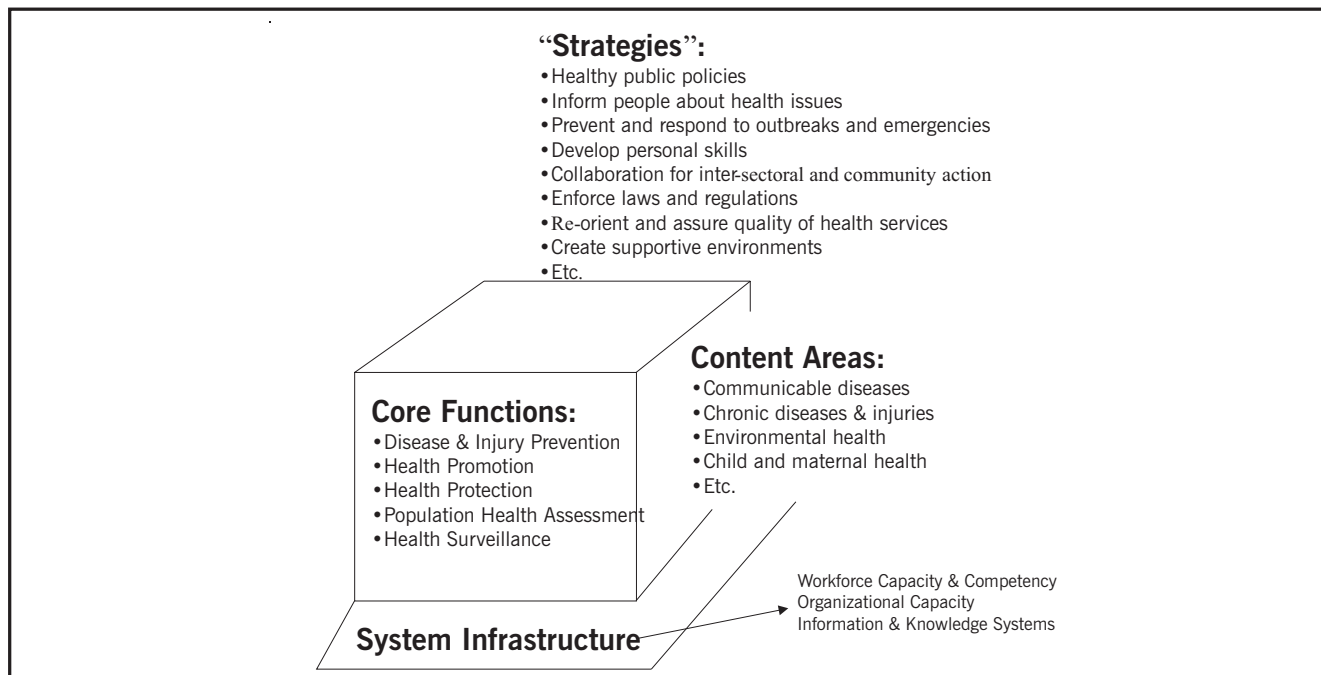
The ACPH recommended a list of five core system functions in their report on system capacity.³ There is a tendency that when organizations or even countries describe public health functions that quite different types of functions are included. Assessment of the lists of functions of a series of countries and trans-national health organizations^{4****} identified four separate dimensions of public health functions. These dimensions are illustrated in Figure 3.

The core functions are the most consistently captured across the various lists of functions. In addition to these, function lists often include some aspect of infrastructure development with workforce development being the most common. Individual content areas such as communicable diseases, injuries and workplace health are also often included. No attempt has been made to

present an exhaustive list of the content topics. Similarly, an exhaustive list of additional miscellaneous functions has not been captured under the “strategies” heading. While some of these represent strategies of the core functions (e.g. healthy public policy is a strategy of health promotion), other items such as assuring the quality of health services are concepts not captured elsewhere.

Recognition of these different dimensions of public health functions is of importance in order to avoid unnecessary confusion when discussing system or organizational functions. In other words, the functions cube shown above may be useful as a communications tool if discussions of system or organizational purposes is becoming befuddled by the unrecognized use of items from different dimensions.

Figure 1: The Dimensions of Public Health Functions



****Countries included: U.S.; England; Australia. Trans-national organizations included: WHO; PAHO; WHO-Western Pacific Region.

Appendix 3

Public Health Laboratory Network Recommendations for Laboratory Infrastructure Development

The Canadian Public Health Laboratory Network (CPHLN) has developed a 3-year plan in response to the Naylor Report's recommendations. Their workplan includes the following items:

- ▶ **Enhancing the capacity and efficiency of Public Health Laboratories:**
 - Enhance/expand PulseNet;
 - Enhance information systems;
 - Expand CPHLN by establishing provincial microbiology networks to include hospital and community laboratories;
 - Gap analysis;
 - Identify resources and process to maintain strong public health laboratory network across Canada;
 - CQI initiative with ISO accreditation;
- ▶ **Training and protocol development:**
 - Upgrade existing, and prepare new protocols to address new pathogens;
 - Support practical hands-on training/experience for new graduates;
 - Develop point of care test protocols and support their use in territories that do not have public health laboratories;
 - Preparation and training of staff for ISO accreditation;
- ▶ **Improved surveillance of water safety:**
 - Develop national guidelines for microbiological water quality testing;
 - Real-time sharing of surveillance data between laboratories and public health disease control staff.
- ▶ **Laboratory standardization and report card development:**
 - Secretariat staff to develop and disseminate standards, develop report card
 - Reagents for rapid detection of bioterrorism agents;
 - Standardized testing protocols;
- ▶ **Providing secretariat and program development staff to the CPHLN.** The staff required to support the four initiatives identified above.

Appendix 4

Infrastructure Elements

Table 3 provides a brief description of each of the infrastructure elements.

Table 3: Infrastructure Components and Elements

Infrastructure Component	Infrastructure Element	Brief Description
Sufficient and Competent Workforce	Human Resource Planning	<ul style="list-style-type: none"> • Strategy development • Workforce composition • Identified competencies • Needs assessment
	Training and Career Development	<ul style="list-style-type: none"> • Range of training options and formats • Accessible and effective training programs across the country • Lifelong learning • Recognition of career ladders and paths • Standards for qualifications and competencies
	Human Resource Capacity	<ul style="list-style-type: none"> • Appropriate number, qualifications, and geographic distribution of public health staff
Organizational Capacity	Legislation	<ul style="list-style-type: none"> • Modern legislation that provides for the exercise of public health authority and a supporting legislative framework for public health system functions across jurisdictions
	System Governance	<ul style="list-style-type: none"> • An effective governance structure to ensure clear decision-making authority and public accountability, that ensures a clarity of roles and responsibilities within a systems-wide perspective, and maximizes resources to achieve public health objectives
	Leadership	<ul style="list-style-type: none"> • Visibility for, and leadership of, the public health community
	Communication	<ul style="list-style-type: none"> • Capacity to utilize evidence-based strategies to communicate with multiple stakeholders (public health and personal health care practitioners, decision makers, public)

Table 3: Infrastructure Components and Elements (continued)

Infrastructure Component	Infrastructure Element	Brief Description
Organizational Capacity <i>(continued)</i>	Defined Functions, Programs and Services	<ul style="list-style-type: none"> • Clear expectations for what the public health system is responsible for
	System Development and Structural Capacity	<ul style="list-style-type: none"> • The capacity of the public health system to effect improvement in major health issues, to set priorities and make strategic investments • Organizational structures ensuring a critical mass of competencies at local/regional and provincial/territorial levels • Surge capacity planning to address sudden increases in system demands • Performance standards
	Collaboration and Strategic Decision-making	<ul style="list-style-type: none"> • Mechanisms to consult and undertake collaborative planning to develop strategies for important public health issues • Mechanisms to support non-governmental organizations and to consult with them
	System Expenditures	<ul style="list-style-type: none"> • Adequate and equitable distribution of resources throughout the public health system • Contingency planning for public health emergencies including surge capacity for additional staff, laboratory testing, information system expansion
Information and Knowledge Systems	Knowledge Development - Research and Evaluation	<ul style="list-style-type: none"> • Research related to population and public health • Evaluation of population and public health programs
	Knowledge Management and Translation into Practice	<ul style="list-style-type: none"> • A central resource for knowledge translation and evidence-based decision-making, including the identification of research needs • Development and dissemination of standards and best practices
	Information Infrastructure	<ul style="list-style-type: none"> • Includes information architecture, models and standards, technology transfer and assistance, privacy and information management, development of data sources, and system development
	Business Processes	<ul style="list-style-type: none"> • Defined, agreed to, and maintained agreements and protocols that identify roles and responsibilities, mutual aid and coordination for public health emergencies; and the collection, sharing and use of public health information