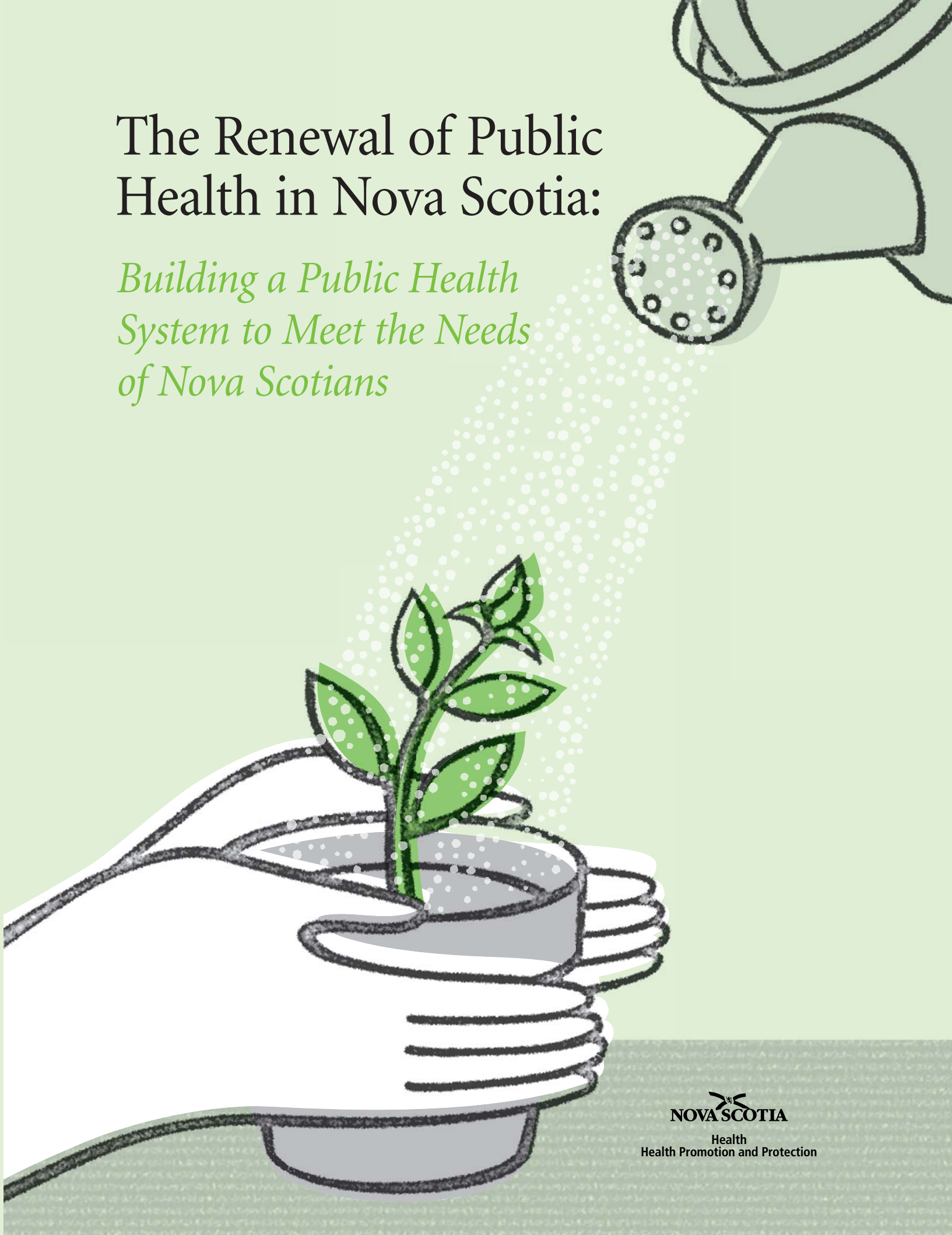


The Renewal of Public Health in Nova Scotia:

Building a Public Health System to Meet the Needs of Nova Scotians



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This report is dedicated to the memory of Dr. David M. Rippey.

As a highly respected member of the senior leadership team at the Nova Scotia Department of Health, he recognized and championed the need for a comprehensive review of the province's public health system.

While Dr. Rippey's illness prevented his active involvement during the review, his interest never wavered. His long-term vision and contribution to system renewal are strongly reflected in the report.



Message from the Minister

The SARS experience told Canada the bridge was out, the Naylor report said that it hadn't taken much to strain it. Think of this Public Health Review as a proactive response by expert engineers. A comprehensive review of the foundation of our public health system recommends a newly designed bridge.

As the first province to undertake an independent review such as this, we have wasted little time pointing ourselves in the right direction.

The Department of Health commissioned this report. We listened to system stakeholders, users and staff from across the province, to understand public health's enduring strengths and worst fears. Health's senior leadership and government endorsed this effort.

To members of the advisory committee, our staff, staff of the district health authorities, stakeholders and service users I say thank you on behalf of the government and all Nova Scotians for your insights, expertise, passion and commitment to the health and safety of all Nova Scotians. I would also like to recognize the late David Rippey's leadership role in moving this review from concept to reality.

I am proud that we have acted quickly by enacting one of the 21 recommendation through the creation of the Department of Health Promotion and Protection. This new department brings together Nova Scotia Health Promotion (NSHP), the public health staff who worked both for NSHP and Health, and staff of the Office of the Chief Medical Officer of Health.

We are committed to building on the success and positive response to the creation of Nova Scotia Health Promotion and all it has accomplished in three short years. We are equally committed to renewing the public health system. The new department sets the stage for the development and implementation of an integrated public health system that emphasizes both the promotion and protection of Nova Scotians' health and well being.

Maintaining our health promotion momentum alongside a growing public health system in a new department is the way to go. The guideposts in this report will point us to the place we all want to be: a healthier province now and into the future. I look forward to the journey that follows, developing creative and meaningful partnerships with the district health authorities, government departments, our stakeholders and ultimately, the people of Nova Scotia.

We welcome your engagement on this journey.



Barry Barnet
Minister of Health Promotion and Protection

Acknowledgements

The completion of the review of Nova Scotia's public health system would not have been possible without the contributions of many individuals and organizations. While it is impossible to name all who participated in this process over the past several months, some key contributors are named below. Apologies to any who have inadvertently been overlooked.

Senior leadership of the Department of Health (DOH) and Nova Scotia Health Promotion (NSHP) including Cheryl Doiron, Deputy Minister, DOH and CEO, NSHP; Dr. Jim Miller, Chief, Program Delivery, DOH; Scott Logan, Assistant Deputy Minister, NSHP; Dr. Jeff Scott, Chief Medical Officer of Health; and Janet Braunstein Moody, Senior Director, Public Health; provided an open and transparent environment for the conduct of this review.

Senior public health officials from three other provincial and territorial jurisdictions volunteered their time and wisdom to the benefit of this review: Dr. André Corriveau, Chief Medical Health Officer and Director, Population Health, Northwest Territories; Dr. Richard Massé, Président-directeur général, National Public Health Institute (Quebec); and Lynn Vivian-Book, Assistant Deputy Minister, Newfoundland and Labrador.

Meetings and discussions occurred with a number of groups and organizations including: Deputy Ministers of the Department of Environment and Labour (DEL) and the Department of Agriculture and Fisheries (DAF), Bill Lahey and Rosalind Penfound; District Health Authority (DHA) Chief Executive Officers and Vice-Presidents of Community Health; Public Health Working Group; Public Health Core Committee; NSHP Executive; DOH Program Directors; Atlantic Regional Office of the Public Health Agency of Canada; Atlantic Regional Office of First Nations and Inuit Health Branch of Health Canada; Health Charities; and the Public Health Association of Nova Scotia. Site visits were made to all of the Shared Service Areas providing an opportunity to interact with staff from across the province. In many locations, public health inspectors from DEL and DAF also participated.

The review's Provincial Advisory Committee actively contributed to the review discussing key themes and their implications, and providing recommendations for the conduct of the review. Members of the Committee included:

- Peter MacKinnon (Co-Chair); CEO, Colchester East Hants District Health Authority
- Dr. Jim Millar (Co-Chair); Chief, Program Delivery, DOH
- Dr. Maureen Baikie; Associate Provincial Medical Officer of Health
- Janet Braunstein Moody; Senior Director, Public Health, DOH
- Paula English; A/Director, Primary Health Care, DOH
- Dr. Steve Kisely; Head, Community Health & Epidemiology, Dalhousie University
- Doris Landry; Field Public Health staff
- Scott Logan; Assistant Deputy Minister, NSHP
- Madonna MacDonald; VP Community Health, Guysborough Antigonish Strait Health Authority
- Carol MacKinnon; Director, Public Health Services, South Shore DHA, South West Nova DHA, Annapolis Valley DHA
- Karen MacKinnon; Field Public Health staff
- Susan McBroom; Past-President, Public Health Association of Nova Scotia
- Jim McCorry; Public Health Inspector, Office of Chief Medical Officer of Health, DOH
- Joan Mikkelsen; Field Public Health staff
- Dr. Robert Strang; Medical Officer of Health, Capital District

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Executive Summary

SARS, WEST NILE, WALKERTON, OBESITY, PANDEMIC INFLUENZA, terrorism, climate change. Public health issues are, without doubt, reasserting themselves at the onset of the 21st century. At the same time, a series of reports have highlighted, sometimes in agonizing detail, the decline of public health capacity across this country and the need for comprehensive action. This recognition resulted in the country's First Ministers identifying that public health efforts "are critical to achieving better health outcomes for Canadians and contributing to the long-term sustainability of medicare." At the national level, the past year has witnessed the establishment of a Public Health Agency of Canada (PHAC) headed by the country's first Chief Public Health Officer (CPHO), as well as targeted federal investments to build provincial public health system infrastructure.

The Nova Scotia Department of Health (DOH) and Nova Scotia Health Promotionⁱ (NSHP) commissioned an external review to assess current capacity, strengths, limitations and opportunities, and to position Nova Scotia to build a stronger, viable public health system. The review is intended to achieve the following:

- Assess the current public health system in Nova Scotia in the context of nationally recognized reports and recommendations.
- Assess the system's strengths, limitations, and opportunities to ensure the system is responsive, integrated, coordinated, efficient, effective and prepared for new, existing, re-emerging public health threats – both acute and chronic in nature.
- Identify recommendations to ensure Nova Scotia is optimally positioned for both federal and provincial investments.

The findings and recommendations of recent provincial, national and international reports have been used as a guide to assess what needs to be done to renew Nova Scotia's formal governmental public health system. A wide range of system stakeholders including front line staff, District Health Authority executive management, non-governmental organizations, provincial departmental staff and elected officials have participated in the review. The process has also benefited from the wisdom of senior public health leaders from other provinces and territories who volunteered their time over the course of the review. This executive summary provides a high-level overview of the review's findings. The main report provides further details and discussion including the strategic actions required for system renewal.

Context for the Review

People's health are influenced by a wide variety of factors or determinants. These determinants include genetics, socio-economic factors, physical and biological environments, personal behaviours and the personal health services system. Both from a determinants of health and health status perspective, the health of Nova Scotians lag behind many other provinces' populations.

ⁱ The Office of Health Promotion was renamed as Nova Scotia Health Promotion in 2005. The current name is used in this report.

Recognizing the contribution of public health to improve the population's health, as well as preventing and mitigating public health emergencies, public health systems in this and other countries have been the focus of increasing scrutiny. While reports prior to SARS identified many areas of concerns, the SARS outbreak provided the confirmatory evidence demonstrating:

- Lack of clarity in leadership, governance, roles and responsibilities
- Uneven capacity and coordination
- Shortage of public health human resources, including surge capacity
- Gaps in laboratory capacity and emergency response
- Lack of research capacity
- Unclear risk communication.

Much of the attention to-date has been on the federal system level and Ontario's public health system. While the latter has been characterized as being broken and needing to be fixed, it has also been noted that it is "not the weakest link in the P/T public health chain." In response, the country's Ministers of Health identified the need to "make public health a top priority by improving public health infrastructure, and increasing institutional, provincial, territorial, and federal capacity" across the country.

The Public Health System

The public health system is less visible and tends to be less well understood than the personal health services system. Focussed on preventing disease, promoting and protecting health, prolonging life and improving quality of life through the organized efforts of society, it is complementary to, but different from, the personal health services system. The population-wide nature of public health issues requires comprehensive responses typically comprising combinations of education and skill building, social policy, inter-sectoral partnership and collaboration, regulation, community development, and the support of effective clinical preventive interventions. The formal public health system is necessary, but insufficient to improve the health of the population. In addition to the personal health services system, government policy, non-governmental organizations, local associations, business groups, organized labour, and many others are required to improve health.

The core functions of the public health system include: population health assessment, health surveillance, health promotion, disease and injury prevention, and health protection. Increasingly, dedicated public health agencies are being created that integrate all of these functions to address the broad range of public health issues. In Canada, examples include the federal Public Health Agency of Canada, Quebec's Public Health Institute, British Columbia's Centre for Disease Control, and the announced intent to create a Health Protection and Promotion Agency in Ontario. Whether structured as Agencies or within government health departments, public health organizations are typically comprised of a series of responsibility centres addressing core public health program areas (e.g. communicable diseases, chronic diseases, injuries, environmental health, child health, etc.) and responsibilities (e.g. public health emergency preparedness).

Provincial and national public health organizations require a critical mass of expertise to provide support, consultation and direction to local staff. Having programmatic responsibility centres facilitates the application of the core functions to each content area. The strategies of these individual responsibility centres are coordinated and integrated through the planning, priority setting, and management of the overall organization. The organization's director is expected to be a highly experienced public health professional that reports at a senior level of government – usually either to the Deputy Minister or Minister or their equivalent.

The organization of public health in Canada at sub-provincial levels typically reflects the organizational characteristics of the rest of the personal health services system. In most provinces, this is some form of regional health authority structure. Quebec has had the longest experience with regionalized structures and is widely acknowledged as having the most highly developed public health system with a defined public health division within each region. A provincial public health program links the system levels together to support coordinated planning and action vertically and horizontally in the system.

The ability to fulfill the public health system's core functions is dependent on the existence of a supporting infrastructure that is comprised of: a sufficient and competent workforce; organizational capacity; and information and knowledge systems. Each of these major infrastructure components comprise a number of inter-related elements that need to be in place for a system to function properly. The review of Nova Scotia's public health system is essentially assessing whether the system has been designed in order to optimally fulfill public health's mission and core functions.

Nova Scotia's Public Health System

The province's existing public health system is structurally complex. Between the Department of Health (DOH) and Nova Scotia Health Promotion (NSHP), there are three "divisions" of public health. To a large extent, these divisions are focussed on different core functions. NSHP focuses primarily on health promotion and chronic disease and injury prevention, while the DOH's Office of the Chief Medical Officer of Health focuses on health protection. Having transferred a substantial part of its staff to NSHP, the Population and Public Health division focuses primarily on healthy development and coordination of program areas. Separate Ministers of Health and Health Promotion exist, although the same Deputy Minister (DM) reports to both. The provincial public health laboratory (PHL) functions are handled by two tertiary level acute care hospital laboratories that are part of two separate health authorities.

The public health inspectors (PHI), who are involved in food safety, drinking water safety, and community inspection services, were transferred out of the DOH in the early 1990s to the Department of Environment (now Environment and Labour – DEL). A sub-group of the PHIs, focussed on food safety, were subsequently transferred to the Department of Agriculture and Marketing (now Agriculture and Fisheries – DAF). A complex set of Memoranda of Understanding attempt to clarify roles and responsibilities among the three Departments.

The local public health staff are employed in nine District Health Authorities (DHA). The two largest DHAs have population bases of 391,000 and 135,000. The remaining seven DHAs serve populations of 34,000-84,000. To address concerns regarding critical mass, all but the largest DHA are grouped into three shared service areas (SSA). A single director of public health exists for each SSA who manages the public health staff across the two or three DHAs that comprise the SSA. The director is employed by one DHA, but is accountable to each of the DHAs within the SSA.

The regional Medical Officers of Health are provincial employees that are geographically situated in the Capital DHA and three SSAs. They have legislated authority to direct staff within the DHAs, as well as within DEL and DAF for health protection purposes. Otherwise, they are expected to provide expert advice to these groups.

A new *Health Protection Act* has been passed and will be proclaimed once the regulations have been finalized. The remaining public health functions of assessment, surveillance, promotion and prevention beyond communicable diseases and environmental health are not defined in legislation. A set of high level public health program standards were developed in 1997, although their implementation are not monitored in any explicit fashion.

System capacity is limited. The combined public health staff of the 9 DHAs is 244 full-time equivalents. Few individuals have graduate level training in public health.

Province-wide, a limited number of information systems currently exist and these have limited functionality. For example, communicable disease reporting is paper-based and occurs on a monthly basis between DHA and provincial system levels. Surveillance systems and analysis capacity for other public health programs do not currently exist.

Public health system funding is approximately \$31 million/year, or 1.2% of overall health system funding. These figures do not include vaccine costs or the PHI component in the other two government departments (DAF or DEL).

Envisioning System Renewal

Building a stronger, more effective and efficient public health system requires a system perspective since “systems-based thinking and coordination of activity in a carefully-planned infrastructure are not just essential in a crisis, they are integral to core functions in public health because of its population-wide and preventive focus.” It requires strengthening structures and capacity at the provincial and DHA levels and improving their integration with each other, as well as with the broader health system at their respective levels.

The Provincial System Level

While system designs of leading provincial/state and national public health organizations support the integration and application of core functions across a range of public health issues, this is not the case in Nova Scotia. The current configuration of the three public health “divisions” based primarily on core functions creates artificial boundaries that impair the ability to apply all of the functions to public health issues. Spreading responsibilities across two or three separate organizations leads to unnecessary inefficiencies and barriers that impair comprehensive analysis and decision making.

The creation of NSHP provided an opportunity to focus on this important public health function and to strengthen it. With SARS and the resulting intense analysis of public health systems, it has become clear that all of the public health functions require attention and strengthening. There is a clear need for a more efficient and rational organization of public health in this province that maintains the government’s commitment to health promotion while addressing the entire spectrum of public health responsibilities in a comprehensive manner. Consistent with other leading public health organizations in this country and elsewhere, a single, strong provincial public health organization is required headed by a highly competent public health director to lead the renewal of the province’s public health system. Also similar to leading public health organizations in the world, the organization should be comprised of a series of responsibility centres focussing on key public health programmatic/content areas including public health emergency preparedness.

The responsibility centres should be comprised of a multi-disciplinary team of public health professionals that would be actively involved in surveillance, program standards, provision of expert support to the DHAs, and provincial level programming. One or more of the regional Medical Officers of Health (MOH) would be part of each team bringing their community medicine and epidemiologic expertise to the program area.

The teams will need to work together to ensure coordinated planning, priority setting, and system development. This collaboration will be facilitated by teams being part of the same organization with a common interest in prevention, promotion and protection. The single organization will also support the efficient development of the system’s infrastructure (e.g. common information systems, surveillance system development, workforce development, community needs assessment, and program standards and accountability).

A key design parameter requiring further analysis will be whether to place the consolidated public health organization within or outside the DOH. The main report includes discussion of some of the issues requiring consideration for this decision.

District Health Authority System Level

The shift from four Regional Health Boards to nine DHAs created a significant challenge for public health system design. A wide variety of options were considered with eventual implementation of the Shared Service Area (SSA) model. The intent was to maintain regional planning and coordination because of concerns that many of the DHAs would otherwise lack a sufficient critical mass of expertise to be able to deliver the full range of public health programs, services and responsibilities.

The SSA model is unique to Nova Scotia and attempts to create regional functionality out of local structures while the legislation, the funding, and the governance structures are all applied at the DHA level. The model's attempt to achieve a critical mass of expertise has been stymied by the relatively small populations of the areas, funding levels, and the ability to recruit specialized staff to smaller centres.

With just under a million people, Nova Scotia has the population of many Regional Health Authorities (RHA) located elsewhere in the country. The province has two levels to its overall health system, one of which, the DHAs, are expected to use a population health perspective in their planning and delivery of services and are to do so in an integrated fashion across the continuum of services that includes public health programs and services. Consequently, pulling local public health responsibilities out of the DHAs is undesirable. However, considering the population bases of the DHAs, expectations for their capacity cannot be those of much larger RHAs found elsewhere. From a public health perspective, Nova Scotia needs to be viewed as a single region comprised of a series of local authorities with devolved responsibilities to facilitate local assessment, priority setting, and service delivery. This has distinct implications for how the system needs to operate.

The needed inter-relationships between the provincial and DHA levels for public health are quite different than those for the clinical care of individual patients. In the personal health services system, primary care providers contact the secondary or tertiary system level to seek advice or transfer care of a patient. These actions occur daily and without involvement of the provincial government. While front line public health service providers also require advice and support, the next system levels are within government at the provincial and then federal levels. This means that the provincial level of the public health system needs to have the expertise and capacity to provide the necessary advice and support to the DHA level. Unlike individual patient care, one cannot transfer a community, but expect that the public health expertise will be available to assist with the unusual/large outbreak, provide evidence-based advice regarding how best to pursue a change in tobacco policies in a community, school policies to limit obesity, environmental contaminants, etc.

Unlike many other parts of the health system, the provincial public health level needs to be actively involved in supporting program delivery by the local authority and in some instances, is the more appropriate level to deliver certain aspects of selected programs (e.g. large social marketing campaigns, surveillance, etc.). Therefore it is more appropriate to envision a single set of public health programs and to acknowledge the relative roles and contributions of the system levels in their delivery. As applied in Quebec, their public health program is a common reference point for all system levels that ensures the use of evidence based programs and supports the tailoring of programs to local needs.

The integration of public health activities between the DHA and provincial levels is also complemented by the integration of their activities at each respective level. For example, at the DHA level, public health needs to collaborate with the institutional staff on infection control issues and contribute to DHA-wide emergency preparedness. Public health staff would also assist with the application of population health data for DHA planning and priority setting. At the provincial level, public health needs to collaborate with other program areas on a range of policy issues including primary health care initiatives, emergency planning, mental health, addictions, etc.

The intent is to have the public health system functioning as an integrated vertical system, while simultaneously being integrated at the DHA and provincial levels. Achieving this vision requires strategic action to put in place many supporting pieces and ongoing effort to ensure the system functions as intended. A province-wide public health program (i.e. standards) will need to be developed, supported and implemented and be a key component of an overall accountability framework for the public health system.

System renewal will formalize the dual roles of the regional MOHs who will combine their regional support role to DHAs with contribution to one of the provincial multi-disciplinary teams. This provides the opportunity for the MOHs to pursue a particular area of interest/expertise contributing their community medicine expertise to the provincial-level team, while also providing dedicated generalized community medicine support to the identified DHA(s).

Public Health Inspection

A variety of concerns were expressed during the consultative phase of the review regarding the existing distribution of responsibilities and resources for environmental health issues. While fully assessing and resolving the longstanding issues associated with the status quo are beyond the scope of this review, a multi-departmental process is required that identifies the key issues and concerns from the perspective of all three Departments that can then inform an analysis and discussion of options of how best to structure responsibilities, resources and required linkages.

Building System Infrastructure

Improvements in the structure of the public health system are necessary but insufficient to ensure overall system functioning. The supporting infrastructure is the underlying foundation that permits the system to fulfill its functions. The public health workforce is the single most important infrastructure component. Compared with other jurisdictions, on a per capita basis, Nova Scotia's public health system has only a fraction of their capacity both in terms of numbers and individuals with highly specialized skill sets. Overall, a comprehensive effort is required to strengthen the provincial and DHA components of the public health workforce. As the primary employer of public health professionals, the governmental public health system has an intrinsic interest in ensuring that sufficient public health training programs exist and meet their system's needs. The current lack of training programs for some public health professionals (e.g. professional Masters programs in public health, community medicine specialty programs) will need to be addressed in partnership with the academic sector, while exploring potential collaborative opportunities with other Atlantic provinces and the PHAC. As the system rebuilds, positions will need to be adapted and created that provide attractive mixes of challenges, responsibilities, and remuneration.

Public health is an information-intensive field. Just as personal health care providers take a history, perform an examination and do tests, public health relies on a wide range of information sources to assess the health of communities, prioritize issues, as well as plan, implement and evaluate interventions. While SARS demonstrated that information systems are critically important for outbreak management, the need for such systems are not limited to crisis situations. Analysis of public health information systems in Nova Scotia indicate that there has been little investment in information technology solutions over the past many years. Availability and use of computers vary widely from one part of the province to another. Existing applications are limited and focus mainly on communicable disease surveillance providing little support for the broader mandates of overall health promotion and disease and injury prevention. The ability to assess health, detect and respond to threats, both acute and chronic in nature, requires timely data and information to support effective decision making. Local Community Health Boards and DHAs require the supports and tools to enable comprehensive needs assessment and priority setting. Overall, a comprehensive strengthening of public health information systems is required.

The public health laboratory is a key element of the public health system and is of central importance in an outbreak. This involves not only provincial level capacity, but also the many laboratories across the province that conduct public health related testing. Laboratory information needs to be actively integrated with public health surveillance and control programs on an ongoing basis, as well as in emergencies. As demonstrated by SARS, attention to surge capacity needs to occur before the emergency.

The most important contributor to surge capacity in an emergency is the baseline capacity of the system. Strengthening that baseline capacity is the focus of this report, not only for emergencies, but in order to fulfill core functions in a more effective manner. Specific ongoing and sustained action is also required to plan, train, and exercise for emergency scenarios.

The province has recently updated its health protection legislation which is a key step to improving its readiness. Health protection is only one aspect of the public health mandate and as system renewal progresses over the upcoming years, there will be a need to establish a more comprehensive public health legislative framework.

System renewal is focused on making those changes necessary to improve the effectiveness and efficiency of the public health system. To achieve these desired improvements will require investment. Nova Scotia currently invests about 1.2% of the health budget on public health not including vaccine expenditures. This trails all other provinces for whom data is available. The intention though, is not to merely catch-up with other provinces, but to put in place the system that is required to effectively meet the needs of Nova Scotians. It is not precisely known what the optimal level of investment in public health should be. A number of recent reports though, suggest that the public health budget needs to reach, including federal contributions, 5-6% of total public sector health expenditures nationally. Considering the level of existing system funding and the magnitude of the required actions, a doubling of existing investment will need to be achieved through sustained and incremental system investment over a multi-year period (i.e. 5-10 years).

Conclusion

Public health systems around the world have not received sufficient attention in recent years. Nova Scotia is no different in this regard. This province has the opportunity to learn from the experiences of others in building a stronger and more effective public health system that will contribute to the health and wellbeing of all Nova Scotians.



The Renewal of Public Health in Nova Scotia: *Building a Public Health System to Meet the Needs of Nova Scotians*

1. Introduction

SARS, West Nile, Walkerton, obesity, pandemic influenza, terrorism, climate change. Public health issues are, without doubt, reasserting themselves at the turn of the 21st century. At the same time, a series of reports have highlighted, sometimes in agonizing detail, the decline of public health capacity across Canada¹⁻⁷ and other countries.^{8,9} Even the mainstream literature has bestsellers focussing on this decline.^{10,11}

In the post-SARS era, attention to the public health system has been unprecedented. Canada's First Ministers have recognized 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."¹²

Over the past year, the federal government established the Public Health Agency of Canada (PHAC) headed by the country's first Chief Public Health Officer (CPHO). For the first time, there are targeted federal investments in building provincial public health system infrastructure. Existing provincial public health agencies in British Columbia and Quebec are being joined by the announced creation of an Ontario Health Protection and Promotion Agency and in Alberta, the Markin Institute for Public Health.

It is in this dynamic context that the Nova Scotia Department of Health (DOH) and Nova Scotia Health Promotionⁱ (NSHP) commissioned an external review to assess current capacity, strengths, limitations and opportunities, and to position Nova Scotia to build a stronger, viable public health system. The review is intended to achieve the following:

- Assess the current public health system in Nova Scotia in the context of nationally recognized reports and recommendations.
- Assess the system's strengths, limitations, and opportunities to ensure the system is responsive, integrated, coordinated, efficient, effective and prepared for new, existing, re-emerging public health threats – both acute and chronic in nature.
- Identify recommendations to ensure Nova Scotia is optimally positioned for both federal and provincial investments.

ⁱ The Office of Health Promotion was renamed as Nova Scotia Health Promotion in 2005. The current name is used in this report.

The review has used recent reports as its guide to assess what needs to be done to renew Nova Scotia's formal governmental public health system. A wide range of system stakeholders ranging from front line staff, District Health Authority executive management, non-governmental organizations, provincial departmental staff and elected officials have been involved in the review. The process has benefited from the wisdom of senior public health leaders from other provinces and territories who volunteered their time over the course of this review.

The preliminary sections of this report provide greater background information on the context for the review (Section 2), the functions and infrastructure of a public health system (Section 3), and a description of Nova Scotia's public health system (Section 4). Subsequent sections provide the analysis and description of the actions needed for system renewal. The appendices contain a list of abbreviations used in this report in addition to supplementary material.



2. Context for the review

2.1. Public Health Issues in Nova Scotia

The health of the public is influenced by a broad range of factors or “determinants” of health (see text box). 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. For example, personal health practices and coping skills are but one set of health determinants and do not exist in isolation of the other determinants. Social and economic factors are highly influential. Interventions focussed solely on changing personal behaviours tend to be less successful with lower-income groups leading to even greater disparities in health.¹⁵ Public health approaches therefore need to consider the influence of multiple determinants when assessing and addressing the health of populations.

Key Determinants Of Health

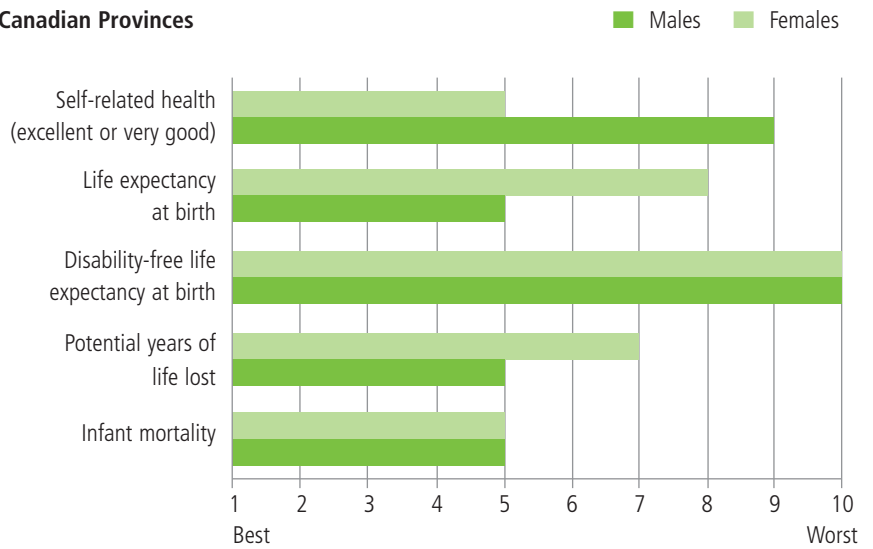
- Income and Social Status
- Social Support Networks
- Education and Literacy
- Employment/Working Conditions
- Social Environments
- Physical Environments
- Personal Health Practices and Coping Skills
- Healthy Child Development
- Biology and Genetic Endowment
- Health Services
- Gender
- Culture

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

In the absence of an existing comprehensive assessment of the health of Nova Scotians, Figures 1-3 provide a simple summary of the relative ranking of Nova Scotia among Canadian provinces for a selected series of health status measures and health determinants.

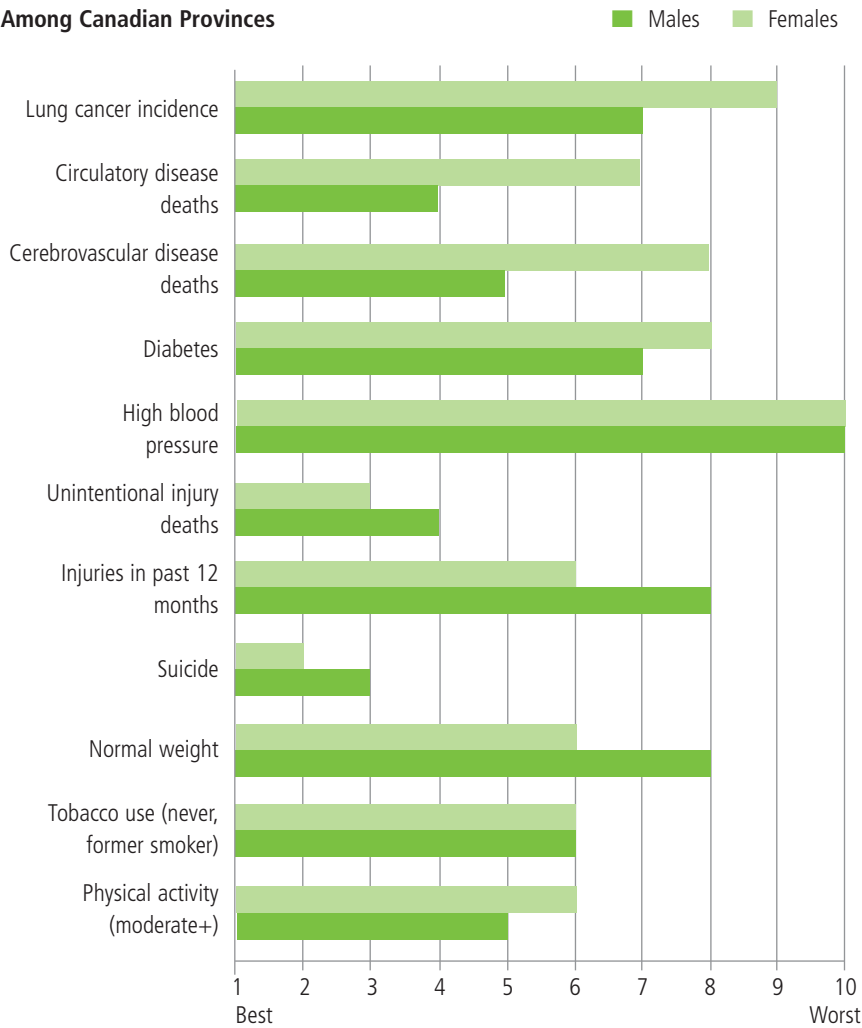
Figure 1 provides the ranking for a series of global health status measures. While many show Nova Scotia to be ranked fifth, particularly striking is that the life expectancy, free of disability, is the lowest in the country for both men and women.

Figure 1: Ranking of Selected Nova Scotia Global Health Status Measures Among Canadian Provinces



See Appendix A for details on data sources for this figure.

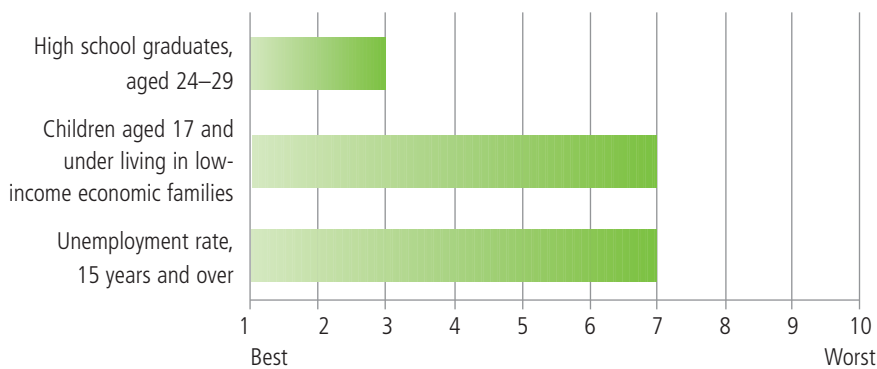
Figure 2: Ranking of Selected Nova Scotia Diseases, Injuries and Health Behaviours Among Canadian Provinces



See Appendix A for details on data sources for this figure.

Figure 2 provides a mixed picture of the ranking for several diseases, injuries and health behaviours. Many are in the lower half of the provinces with the prevalence of high blood pressure being the highest in the country. The prevalence of diabetes is also high. While there is a time lag between these two precursor conditions and vascular diseases, deaths from heart disease and stroke are already high, particularly in women. In contrast, rates of death from unintentional injuries and suicide are lower than most other provinces.

Figure 3: Ranking of Selected Nova Scotia Non-Behavioural Health Determinants Among Canadian Provinces



See Appendix A for details on data sources for this figure.

Figure 3 provides the relative ranking for selected non-behavioural health determinants. Rates of having achieved high school graduation among young adults is third in the country. However, the proportion of children being raised in low income families and the province’s unemployment rate both rank seventh. Lower income and higher unemployment influence health and health behaviours in a multitude of ways and impair the ability of affected populations to achieve better health.¹⁵

With most measures of health status ranked in the lower half of Canadian provinces, there is little doubt that Nova Scotians are faced with a diverse set of public health challenges. Since some of the less desirable measures are for precursor conditions and health determinants, this has implications for future health status if positive change is not achieved.

Attempting to address this situation primarily through personal health services is expensive and inefficient. It has been estimated that physical inactivity costs the Nova Scotia health care system \$66.5 million a year in hospital, physician and drug costs alone, equal to 4% of total government spending on these services.¹⁶ Tobacco costs the Nova Scotia health care system \$168 million a year in direct health care costs.¹⁷ These therefore do not include the indirect costs due to lost productivity or the personal costs of suffering and loss.

Over the past 10 years, the average annual increase in Nova Scotia's governmental health expenditures has been 6.5%.¹⁸ Ironically, as health care costs account for increasing proportions of the provincial budget, the ability of governments to make investments in other important determinants of health such as education, housing, and early child development becomes increasingly limited.

Routine statistics do not capture rare, but serious events. While Nova Scotia has been repeatedly hit in recent years with a series of natural and technological emergencies, the many public health emergencies that have occurred in Canada have, primarily by chance, struck elsewhere in the country. With an international airport, a major seaport, and a multitude of drinking water systems, Nova Scotia needs to be prepared to prevent and minimize the impact of public health emergencies.

2.2. Recent Focus on Public Health Systems in Canada and Internationally

Concerns regarding the state of public health systems in Canada predate SARS. As the Naylor Report observes, "there was much to learn from the outbreak of SARS in Canada – in large part because too many earlier lessons were ignored."³ The Krever Commission's investigation into contaminated blood products identified the lack of capacity in many parts of the country (see text box).¹⁹ A 2001 report prepared by the F/P/T 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."²¹

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.

Just prior to SARS, a CIHR sponsored report on the future of public health in Canada argued for clearly defined system functions, modern legislation, defined roles and responsibilities, accountability mechanisms, and appropriate delivery structures and staffing.² The SARS outbreak provided the confirmatory evidence demonstrating:

- Lack of clarity in leadership, governance, roles and responsibilities
- Uneven capacity and coordination
- Shortage of public health human resources, including surge capacity
- Gaps in laboratory capacity and emergency response
- Lack of research capacity
- Unclear risk communication.³

In his assessment of Ontario's public health system, Justice Campbell made the following blunt assessment:

SARS showed that Ontario's public health system is broken and needs to be fixed...[it] 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.⁶

Many of the challenges facing Ontario are not unique. The Naylor Report observed that Ontario is "assuredly not the weakest link in the P/T public health chain."²⁰ Other countries have also recognized the loss of focus on public health and the subsequent decline in system functioning over a period of many years.

In the U.S., the Institute of Medicine, which provides independent, objective advice on issues that affect people's lives, has produced major reports on the need to strengthen the public health system and its workforce.^{8,21,22} The U.S. Centers for Disease Control and Prevention (CDC) has similarly outlined the need to strengthen system infrastructure.²³ In England, that country's Chief Medical Officer has identified the need to strengthen the public health function within their health system and to adapt to the many structural changes that have been occurring.⁹ In Australia, the federal and state governments have come together to create a National Public Health Partnership to strengthen system infrastructure and better coordinate interventions.²⁴

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."²³ Consequently, the Conference of F/P/T Ministers of Health acknowledged in September 2003 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."²⁵

The next section will describe in more detail the core functions and necessary infrastructure required for the public health system.

3. Functions and Infrastructure of a Public Health System

Public health has been defined 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.²⁶

There are several important concepts contained within this definition. First, public health's focus is on health promotion and disease prevention, of which health protection is a natural extension. Second, that it pursues the goals of prolonging life and improving quality of life through organized and collective action. This therefore differs from, is complementary to, and requires strong linkages with the personal health care system with its particular strengths in diagnosis, treatment and rehabilitation. Organized societal efforts to improve health necessitate a strong governmental role that works collaboratively and in partnership with non-governmental sectors to achieve this mission.

While complementary to clinical services that operate at an individual level, the essence of public health is that it adopts a perspective based on groups of people or the population. The need to review and strengthen the public health system lies in its contribution to:

- Improving levels of health status of the population and decreased health disparities
- Decreasing the burden on the personal health services system and thereby contribute to its sustainability
- Improving preparedness and response capacity for health emergencies.²⁷

3.1. Core Functions of Public Health

Many countries and multi-national organizations (e.g. WHO, PAHO) have defined the essential functions of public health systems. While Canada does not have an official set of public health core functions, in 2001, ACPH recommended five core public health system functions.¹ These have been increasingly recognized in subsequent reports and in provincial public health legislation (e.g. Quebec's *Public Health Act*). The core functions include the following:

- Population health assessment
- Health surveillance
- Health promotion
- Disease and injury prevention
- Health protection.

Population health assessment and health surveillance are the query functions of public health. Population health assessment entails understanding the health of populations, the factors which underlie good health and those which create health risks. This is frequently manifested through community health profiles and health status reports that inform priority setting, program planning, delivery and evaluation. Health surveillance is an ongoing and systematic process of collecting, analyzing and interpreting data to inform decision making. It allows for early recognition of outbreaks, disease trends, health factors, and cases of illness, which in turn allows for earlier intervention and lessened impact.

Promotion, prevention and protection are the intervention functions of public health. Health promotion is characterized by collaborative ventures that lead to healthy public policy, skill building, and creating physical and social environments that support health. Comprehensive approaches to health promotion may involve community development, policy advocacy and action regarding the environmental and socioeconomic determinants of health and illness.

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. Many preventive actions are intended to protect the health of the population including the assurance of safe food and water, the regulatory framework for controlling infectious diseases, and protection from environmental threats.

The public health core functions are not mutually exclusive. In practice, they are highly interdependent and cannot stand alone. To comprehensively address public health issues requires analysis and action through several functions. For example, in tobacco control, all five functions need to be utilized in an integrated fashion. Population health assessment would be utilized to better understand who is smoking and the impact of upstream determinants of health that are contributing to smoking (e.g. stressors, supports, income, availability, etc.). Ongoing surveillance would track smoking rates, as well as long-term consequences of smoking (e.g. heart disease, lung cancer). These two query functions inform the design of strategies and interventions to improve the health of the population. Disease prevention interventions would be utilized to provide clinical preventive interventions to assist smokers to stop. Health promotion strategies of social marketing, community action, and healthy public policies would be implemented to shift societal norms. Health protection strategies to reduce exposure to second hand smoke would also be pursued.

This inter-dependence of core functions applies to essentially all public health issues whether they are communicable diseases, non-communicable diseases, injuries, healthy child development, seniors' health, or environmental health. The specific content changes with the topic, but the public health principles and functions remain the same.

3.2. Public Health Approaches

The population-wide nature of public health issues requires comprehensive responses. For example, the massive reductions in tobacco use achieved over the past three decades have been due to the use of several mutually supportive interventions.²⁸ The obesity epidemic will similarly require a comprehensive set of responses.^{29,30} Public health approaches typically comprise combinations of:

- Education and skill building
- Social policy
- Inter-sectoral partnership and collaboration
- Regulation
- Community development
- Support of effective clinical preventive interventions.

Experience has shown that isolated interventions are not effective. For example, mass communication campaigns have shown the most success when they are linked with a range of other interventions.³¹ The need for comprehensive approaches is reflected in the structure and content of public health program standards.^{32,33}

There is a strong inter-connectedness between population health and public health since public health uses a population health framework to analyze and act to improve health status. This is not to suggest that public health practitioners are the only ones to take a population health approach as it is the goal of the many stakeholders in a health system to have an overall population health approach. Nevertheless, within a regional health authority or a provincial department of health, the greatest concentration of expertise and experience in analyzing and applying population health concepts will typically exist within the public health group. One of the strongest arguments for including public health practitioners in regional health authorities is to bring that population health expertise within the health authority.

3.3. Collaboration, Partnership and Strategic Linkages

Public health is expected to assess and work collaboratively towards improving the population's health. For example, Sweden's national public health goals view that "since public health concerns are influenced by many different sectors of society, it is important to set objectives that can act as guiding principles for the work done within various sectors... [acknowledging] that the vast majority of public health work must take place outside the health care sector (e.g. schools, workplaces, communities, etc.)."³⁴ In Quebec, that province's Public Health Act states that its contents address 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 transsectoral 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."³⁵

The formal public health system is necessary, but insufficient to improve the health of the population. Other parts of the health system and other government departments are critically important. The informal public health system is a key public health partner and includes non-governmental organizations, local associations, business groups, organized labour, and many others. Partnerships are essential if public health is to influence upstream determinants of health such as social support and the conditions for healthy child development.

For example, public health has lead responsibility to investigate cases and contacts of communicable diseases. Public health needs to work with the personal health services system to ensure their clinical investigation and treatment. Social and physical environmental factors frequently influence the occurrence of ill health. In a tuberculosis outbreak, it may become apparent that the housing conditions and poor nutritional status of individuals is increasing the risk of exposure to, and the development of, active infections in a particular population group. Public health cannot address these contributing factors without the assistance and active involvement of other government and non-governmental sectors. Public health would be expected to actively engage these potential partners in mutual problem identification and solving. One could easily identify similar examples for other public health issues that require collaborative approaches (e.g. injuries, chronic diseases, etc.). From an infrastructure perspective, the public health system needs mechanisms to support NGOs and to consult with them, as well as mechanisms to consult and undertake collaborative planning to develop strategies for important public health issues.³

Within the broader health system, the public health system needs to have a number of strategic linkages:

- Senior health authority leadership and board: to contribute to population health analysis and decision-making
- Institutional infection control: to coordinate communication and actions to address the investigation and control of communicable diseases
- Assessment and surveillance: better use of service delivery information systems (e.g. emergency department visits) to assess burden and characteristics of health issues (e.g. injuries) and to inform needs-based program planning and implementation
- Cross-agency planning: coordinated planning and analysis of health issues across the continuum to identify gaps and address them; improve seamlessness of services (e.g. to families, to individuals with specific health conditions, etc.).

Of particular importance is the need to strengthen linkages between public health and primary health care. This has been recommended in all of the post-SARS reports,³⁻⁵ but goes far beyond outbreak situations. The developmental work to map out and systematically build these linkages in this country is just beginning to occur. A key feature is to support the fulfillment of public health functions in the primary care setting. For example, this might include mechanisms to support the performance of effective clinical preventive interventions and is currently included in the public health program standards in Ontario and Quebec. Appendix B provides further information on the complementary roles of public health and primary care for a variety of content areas.

3.4. Public Health Programs and Services

While Canada has not yet identified a set of program expectations for the public health system, the U.S. did so over a decade ago.³⁶ Their list of essential services serves as a framework for many aspects of public health system development in their country (see text box).

Across Canada, public health practitioners are typically responsible for providing programming and services for the prevention of non-communicable diseases and injuries; prevention and control of communicable diseases including preparation for and response to outbreaks and emergencies, healthy development across the age spectrum, and environmental health. For example, the public health program areas from Saskatchewan are shown in Table 1,³⁷ and are similar to the mandated program areas in other provinces.

U.S. Essential Public Health Services

- Diagnose and investigate health problems and health hazards in the community
- Inform, educate, and empower people about health issues
- Mobilize community partnerships to identify and solve health problems
- Develop policies and plans that support individual and community health efforts
- Enforce laws and regulations that protect health and ensure safety
- Link people to needed personal health services and assure the provision of health care when otherwise unavailable
- Assure a competent public health and personal health care workforce
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services
- Research for new insights and innovative solutions to health problems

Source: Public Health Functions Steering Committee. Public Health in America. 1994.

Table 1: Public Health Programs - Saskatchewan

Healthy families

Healthy birth outcomes
 Healthy child development
 Dental health
 Food security
 Abuse prevention
 Risk behaviour reduction in teens
 Teen pregnancy reduction
 Reduction in seniors' isolation

Chronic disease prevention

Physical activity promotion
 Tobacco reduction
 Good nutrition
 Substance abuse prevention
 Stress reduction

Healthy environment

Food and water
 Recreational water
 Public accommodation
 Safe housing
 Environmental hazards
 Sustainable communities and environments
 Hazardous wastes
 Emergency response

Injury prevention

Farm injuries
 Motor vehicle injuries
 Child and youth injuries
 Falls in seniors
 Community violence

Communicable disease control

Institutional infection control
 Vaccine preventable disease
 Antimicrobial resistant organisms
 Sexually transmitted infections and blood borne pathogens
 Travel related disease
 Specific communicable diseases
 Tuberculosis
 Zoonotics and vector borne disease
 Outbreak control

3.5. Public Health Structures

In order to fulfill the core functions of public health and be able to assess, plan, collaborate and implement programming in an effective manner, specific attention needs to be given to the structure of the formal governmental public health system. As previously defined, public health concerns itself with organized activities to improve health. As such, organizational structures need to support the achievement of this mission and facilitate the integration of the core functions. An increasing trend has been to develop dedicated public health agencies that address all five core functions across the range of public health issues. Typically, a series of responsibility centres are created that group multi-disciplinary teams by program areas. For example, the new Public Health Agency of Canada is currently comprised of the following Centres:

- Healthy Human Development
- Chronic Disease Prevention and Control
- Infectious Disease Prevention and Control
- Emergency Preparedness and Response
- Surveillance Coordination
- Laboratory for Foodborne Zoonoses and the National Microbiology Laboratory
- Strategic Policy; Management and Program Services; and Business Integration and Information Services.³⁸

Other public health organizations have a similar program-focussed structure and examples are provided in Appendix C.

Provincial and national public health organizations require a critical mass of expertise to institute the public health core functions in an integrated fashion for the range of public health issues facing the population. Having programmatic responsibility centres facilitates applying all of the core functions to **each** content area. The professional staff of these teams need to be experienced and highly specialized in order to be able to provide consultation and direction to local staff. The strategies of these individual responsibility centres are coordinated and integrated through the planning, priority setting, and management of the overall organization. The organization's director is expected to be a highly experienced public health professional that reports at a senior level of government – usually either to the Deputy Minister or Minister or their equivalent.

The organization of public health in Canada at sub-provincial levels typically reflects the organizational characteristics of the rest of the health care system. In most provinces, this is some form of regional health authority structure. Quebec has had the longest experience with regionalized structures and is widely acknowledged as having the most highly developed public health system. Each regional health authority has a defined public health division headed by a regional public health director who reports to the health authority's chief executive officer but is professionally accountable to the provincial public health director. Local public health service delivery occurs through CLSCsⁱ that facilitate integration of primary health care and public health services and additional health and social services at the community level. More complex public health tasks requiring more specialized expertise are performed at regional and/or provincial system levels. A provincial public health program links the different system levels together to support coordinated planning and action vertically and horizontally in the system.³³ The functions, approaches, structure, roles and responsibilities of the various actors in the public health system in Quebec are addressed in their *Public Health Act*.

In other provinces, public health structures within regional health authorities have not been as explicitly defined. In larger regional health authorities, identifiable public health divisions are the norm. In smaller health authorities, public health staff have tended to become dispersed. The impact of regionalization on public health capacity has not been formally evaluated,³⁹ although numerous key informant reports have raised significant concerns.^{1,40,41}

As outlined in the Phase 1 report, there appear to be two main reasons for strategically placing public health within regional health authorities i) to bring a strong orientation and the skill sets to support the population health perspective of the health authority; and ii) to foster integration of selected services. Phase I also highlighted a number of potential inter-related threats that need to be identified and managed if public health is to thrive within health authoritiesⁱⁱ.

ⁱ Centre Locale Service Communautaire – community health centres in Quebec.

ⁱⁱ These potential threats included: inclusion of public health in regional health authorities as an afterthought; fragmentation of public health staff/programs; loss of visibility and profile; diversion of funding and resources to clinical services; time requirements to actively participate in regional planning and management; lack of clear expectations and accountability for public health.

3.6. Public Health System Infrastructure

The ability to fulfill the public health system’s core functions is dependent on the existence of a supporting infrastructure that is comprised of:

- Sufficient and competent workforce
- Organizational capacity
- Information and knowledge systems.²⁷

These major infrastructure components comprise a number of inter-related elements that in many cases represent supportive roles for the core 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.

Table 2: 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

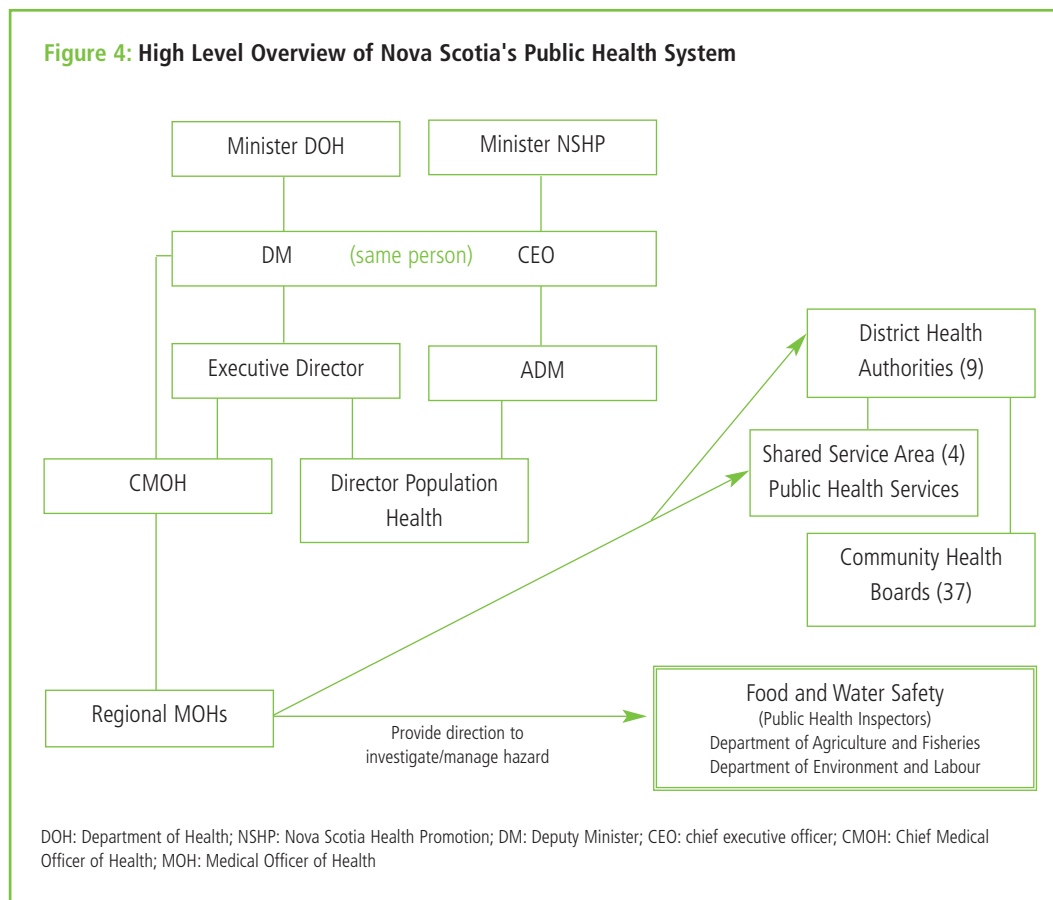
Source: Improving Public Health System Infrastructure in Canada, 2005.²⁷

These infrastructure elements are the supporting foundation for the public health system and their development pose relatively greater challenges for smaller jurisdictions. The review of Nova Scotia’s public health system is for the most part a review of system infrastructure. It is essentially assessing whether the system has been designed in order to optimally fulfill public health’s mission and core functions.

The next section of this report provides a brief description of Nova Scotia’s public health system.

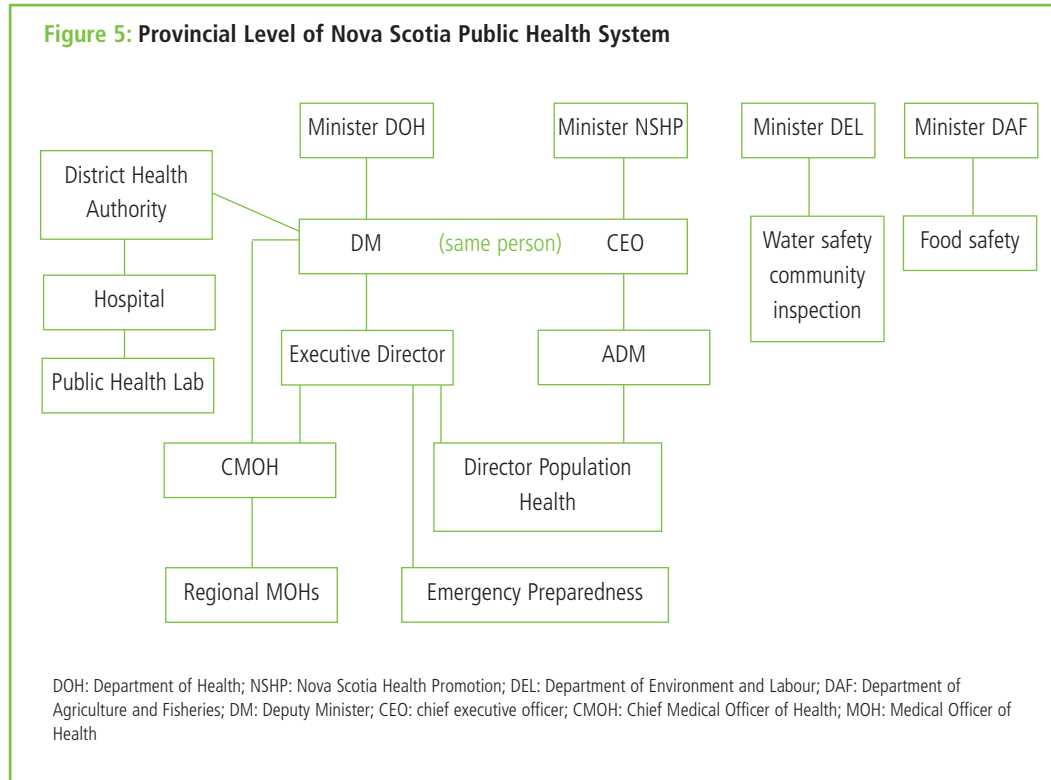
4. Nova Scotia's Public Health System

Figure 4 illustrates the province's public health system's main components and inter-relationships. Briefly, the DOH has an Office of the Chief Medical Officer of Health (OCMOH) and a Population and Public Health Division. The Nova Scotia Health Promotion (NSHP) has a separate Minister although its CEO is also the Deputy Minister (DM) of the DOH. The public health inspectors (PHI) are employed in two separate government departments. The local public health staff are employed in nine District Health Authorities (DHA), which are grouped into four shared service areas (SSA). These structures will be described in further detail in this section.



4.1. Provincial Level of the System

Figure 5 provides a more detailed view of the provincial level of the province’s public health system.



Between the DOH and NSHP, there are three “divisions” of public health:

- Office of Chief Medical Officer of Health (OCMOH)
- Nova Scotia Health Promotion
- Population and Public Health division.

To a large extent, these divisions are focussed on specific core functions. NSHP focuses primarily on health promotion and chronic disease and injury prevention, while OCMOH focuses on health protection. Having transferred a substantial part of its staff to NSHP, the Population and Public Health division focuses primarily on healthy development and coordination of program areas with the DHA staff. Separate Ministers of Health and Health Promotion exist, although the same Deputy Minister (DM) reports to both.

The regional MOHs are provincial employees that are geographically located in four different parts of the province to support the District Health Authorities (DHAs). They have legislated authority to direct staff within the DHAs, as well as within DEL and DAF for health protection purposes. Otherwise, they are expected to provide expert advice to these groups. The MOHs are accountable to the CMOH.

The public health inspectors (PHI), who are involved in food safety, drinking water safety, and community inspection services, were transferred out of the DOH in the early 1990s to the Department of Environment (now Environment and Labour – DEL). A sub-group of the PHIs were subsequently transferred to the Department of Agriculture and Marketing (now Agriculture and Fisheries – DAF) with responsibilities for food safety.

The provincial public health laboratory (PHL) functions are handled by two tertiary level acute care hospital laboratories. The laboratory director of one of these hospital laboratories also has the title of provincial PHL director.

Responsibilities for planning for public health emergencies has recently been transferred out of the OCMOH into the Emergency Health Services section of the DOH.

4.2. Local Level of the System

The sub-provincial level of the public health system has undergone several changes over the past decade. Initially organized as decentralized offices of the DOH, public health was then included in the creation of four Regional Health Boards (RHB) in 1997. In 2002, the RHBs were transformed into nine District Health Authorities (DHA) whose governance and programmatic responsibilities, including public health services, are defined in the Health Authorities Act.

Table 6 shows that the populations of the DHAs range from 34,000 to almost 400,000. Concerns for achieving a critical mass of public health staff prompted consideration of a number of options for organizing the local level of the public health system. It was eventually decided to create three “Shared Service Areas” (SSA) for the eight smaller DHAs that would plan and manage public health services across the grouping of two or three DHAs.

The main features of the SSA model include the following:

- Single Public Health Director for each SSA
- Director manages public health services across SSA’s 2 or 3 DHAs
- Director is accountable to CEO/VP of each of the DHAs
- Public health managers within DHAs report to the Director and combine local staff supervision, as well as cross-DHA programmatic supervision
- A provincially employed MOH provides support to each SSA.

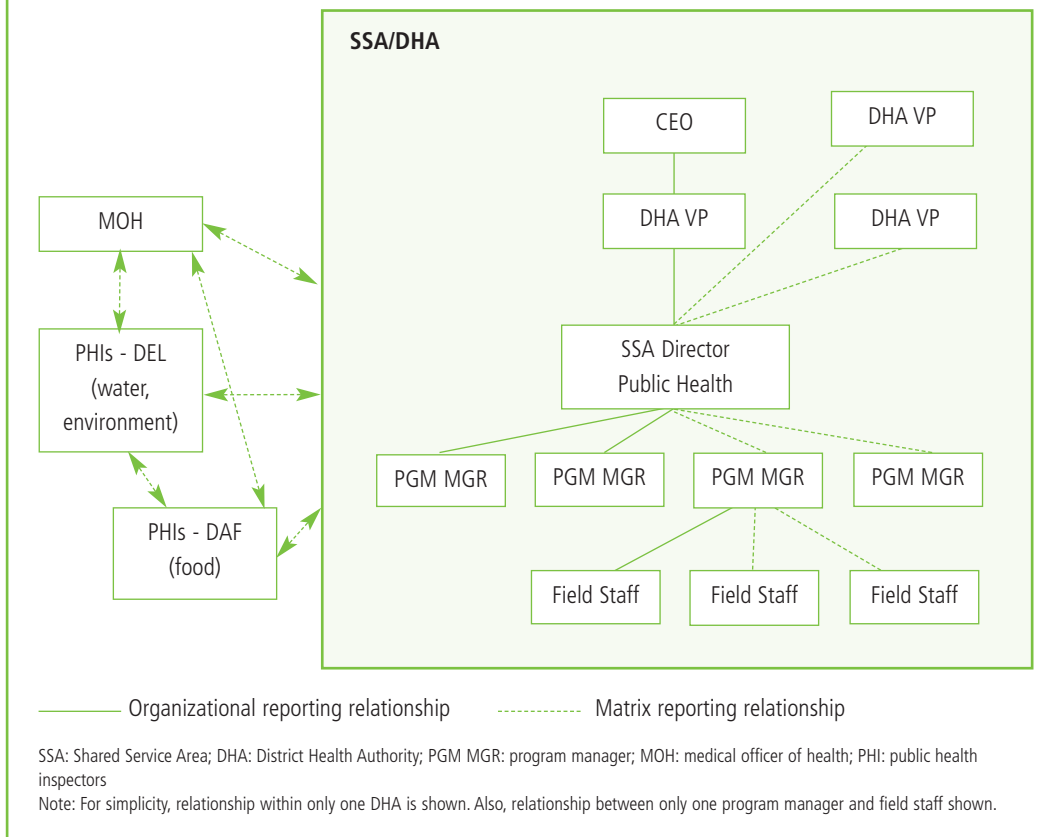
Illustrating these complex relationships is challenging although an attempt is made in Figure 7 below. The MOH and PHIs have also been included in the diagram, although they are organizationally separate from the DHA/SSA structures.

Table 6: Population Sizes of the District Health Authorities and Shared Service Areas

DHA	Population	Shared Service Area
1	62,000	211,000
2	65,000	
3	84,000	
4	73,000	156,000
5	34,000	
6	49,000	
7	49,000	184,000
8	135,000	
9	391,000	391,000

Source: 2001 Census. Numbers rounded to nearest 1,000.

Figure 7: High Level Representation of Sub-Provincial Level of Public Health System



The *Health Authorities Act* also makes provision for Community Health Boards (CHBs), of which there are currently 37, that are linked to the DHAs and are responsible for developing community health plans with primary health care and health promotion as their foundation.

4.3. Legislation, Functions, Roles and Responsibilities

A new *Health Protection Act* has been passed and will be proclaimed once the regulations have been finalized. The remaining public health functions of assessment, surveillance, promotion and prevention beyond communicable diseases and environmental health are not defined in legislation. An unendorsed provincial publication entitled *Public Health Services* describes the system's core public health functions.

A set of high level public health program standards were developed in 1997 at the time of the creation of the RHBs and describe the programmatic expectations for local public health services. The standards address the following program areas:

- Communicable disease prevention and control
 - Vaccine preventable
 - Non-vaccine preventable
 - Outbreak investigation and management
- Non-communicable disease prevention
 - Healthy beginnings
 - Early childhood
 - Modifiable risk factor reduction
- Public health enhancement
 - School aged children and youth
 - Community health promotion fund
 - Community social supports.

The program standards are not linked to legislation and monitoring of their fulfillment does not explicitly occur. Roles and responsibilities of the various actors within the overall public health system are currently unclear, which was one of the motivations for requesting this review.

4.4. The Public Health Workforce

Table 3 provides a high-level summary of the public health staff (FTEs) located within the SSAs. With a population of just under a million people, Nova Scotia has 244 public health staff at the DHA/SSA system level, of which few have graduate level training in public health. This is not to suggest that everyone requires post-graduate training, however there needs to be a sufficient cadre of highly skilled individuals to lead and facilitate the planning, delivery and evaluation of needs- and evidence-based programming.

Table 3: Summary of Public Health Human Resources at the DHA/SSA Level in Nova Scotia

DHA/SSA	PHN	Epi	Nutri	HealthEd	Dental	Other	Managers
1, 2, 3	34	0	3	3	6	2	4
4, 5, 6	27	0	1.5	4	3.2	0	4
7, 8	41	1	5	5	5	0	6
9	66	0	4	2	5	6.7	6
Total:	168	1	13.5	14	19.2	8.7	20

PHN: public health nurse; Epi: epidemiologist; Nutri: nutritionist; HealthEd: health educator; Dental: dental hygienist.

Vacancies in the DHA public health workforce are relatively rare. However, frequent concerns were expressed during the consultations regarding the ability to recruit the most qualified staff. For example, the selection process to fulfill a vacancy will favour a health care provider from the hospital sector with no public health experience versus a highly experienced public health practitioner not currently employed by the DHA. Some disciplines such as nurses have preparatory training for public health practice, but require significant on the job training. This training process is not formalized and is a challenge for small organizations who are simultaneously responsible for program delivery.

All of the province's MOH positions are currently filled, although historically, there have been chronic difficulties doing so. One of the regional MOH positions has been vacant for most of the past decade and been addressed by situating it in the provincial offices in Halifax and another was vacant for 12 years before being filled 2 years ago. A second MOH position has been recently added for the Capital District Health Authority in Halifax.

Eighteen PHI FTEs exist in DAF in their food safety program. The number of PHIs in DEL is between 25 and 30. This contrasts with the approximately 70 PHIs transferred out of the DOH a decade earlier. Since the transfer of PHIs, DEL has adopted a generalist inspector delivery model making it difficult to attribute specific disciplines with particular functional tasks.

At the provincial level, the OCMOH is comprised of the CMOH and a deputy CMOH in addition to analyst and administrative staff. An additional MOH and epidemiologist are being added to this group. The Director of Population and Public Health has coordinators for each of the three program standards. NSHP, headed by an ADM, was initially formed with staff from the public health group of DOH, as well as the Sport and Recreation Commission. With increased funding, NSHP has been actively recruiting and expanding its staff complement in recent years. In addition to funding specific programming, it provides staff within DHAs for tobacco and chronic disease prevention, and with recent announcements, will be funding positions within school boards to promote healthy lifestyle related policies and programming.

4.5. Information and Knowledge Systems

A limited number of information systems currently exist. Communicable disease reporting had been facilitated by a system provided to the province by the federal government, but is currently not operational. Manual tallies of cases of reportable diseases are provided by SSAs to the province on a monthly basis and summary statistics are generated from these and provided back to the SSAs. Some additional stand-alone systems exist for other communicable disease related programs.

Surveillance systems and analysis capacity for other public health programs do not exist. Dalhousie University's Population Health Research Unit houses many public health relevant databases and provides assistance to some individual DHAs on a contractual basis.

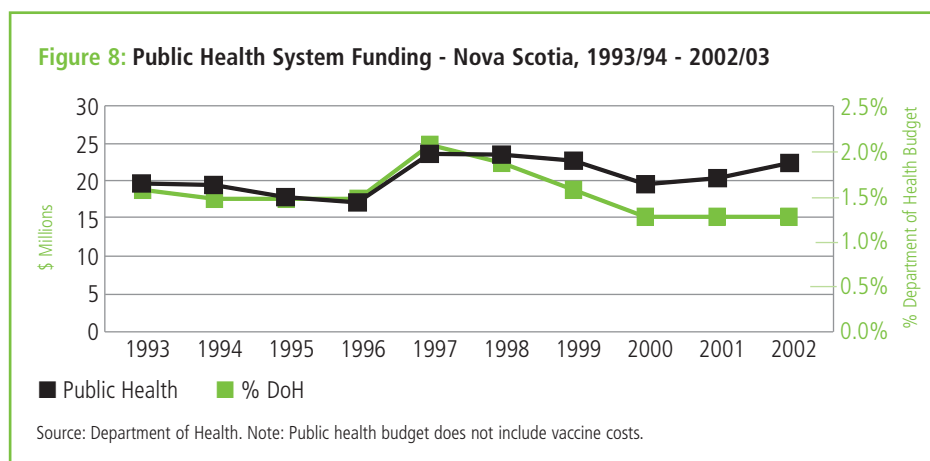
Information system development and access to relevant technology is highly variable across the SSAs. One SSA in particular has developed a series of Lotus Notes applications to support information and knowledge management. Assessing the potential dissemination of these applications province-wide, as well as implementing a number of other initiatives were identified in a Public Health Information Technology Strategy that was developed two years ago. However, this strategy has not been funded.

A public health applied research strategy or budget do not exist. Linkages with university researchers exist on an *ad hoc* basis.

4.6. System Funding

System funding is an important determinant of other infrastructure elements. Figure 8 shows the extent of DOH public health system funding from 1993/94 to 2002/03. Over this time period, funding (not counting vaccine costs) has tended to range from \$20 to 25 million/year. As a proportion of the overall DOH budget,

public health funding has accounted for 1.3-2.1% with the most recent years being at the lower end of the range. For 2004/05, combined DOH and relevant NSHP funding has increased to approximately \$31 million/year, or 1.2% of overall health system funding. None of these figures include the PHI component in DAF or DEL.



5. Envisioning a Renewed Public Health System

The preceding sections of this report have provided the background to inform the analysis and actions for system renewal. Section 2 provided an overview of some of the public health challenges facing Nova Scotia, many of which are greater than experienced in many other parts of the country. It also summarized the current context of widespread recognition regarding the decline of public health and the need to rebuild this country's public health systems. Section 3 provided a summary of the main desired characteristics of a public health system, which was then followed by a description of Nova Scotia's public health system.

Clearly there is much work to be done. The subsequent sections of this report provide an analysis of the status quo to the extent it informs the required actions for system renewal. The state of this and other provinces' public health systems did not occur overnight and concerted long-term effort will be required to rebuild them. A system perspective underlies the analysis. As the Naylor Report states:

“Systems-based thinking and coordination of activity in a carefully-planned infrastructure are not just essential in a crisis, they are integral to core functions in public health because of its population-wide and preventive focus... The case for a collaborative and coordinated approach to public health is arguably even more acute than in our still-fragmented personal health services systems.”²⁰

While the subsequent sections address individual system components, it is important to consider the pieces as they fit together. The actions for renewal that are included in the subsequent sections need to be viewed collectively. Action on only some will not lead to a substantially stronger system and in some cases, performed in isolation, may result in weakening it further.

Section 6 focuses on simplifying and strengthening system structures. Section 7 focuses on Public Health Inspectors, Section 8 on building system infrastructure, and Section 9 addresses the opportunities available to support system renewal. Section 10 discusses the importance of implementation.

5.1. Action #1 for System Renewal

- 1** Articulate and be guided by a collective vision for the public health system that integrates and supports the fulfillment of public health's core functions that effectively contribute to:
 - a. Improving levels of health status of the population and decreased health disparities
 - b. Decreasing the burden on the personal health services system and thereby contribute to its sustainability
 - c. Improving preparedness and response capacity for health emergencies.

6. Public Health System Structures – Provincial and DHA Levels

The structure of the current public health system is exceedingly complex. While organizations ideally exist to facilitate and support individuals and teams to be able to perform tasks they otherwise would not be able to do, the highly fragmented current structure does not achieve this, but rather creates unnecessary barriers and hindrances. The phase II consultations provided repeated examples of how staff have to work doubly hard just to get work done within and around the current structures.

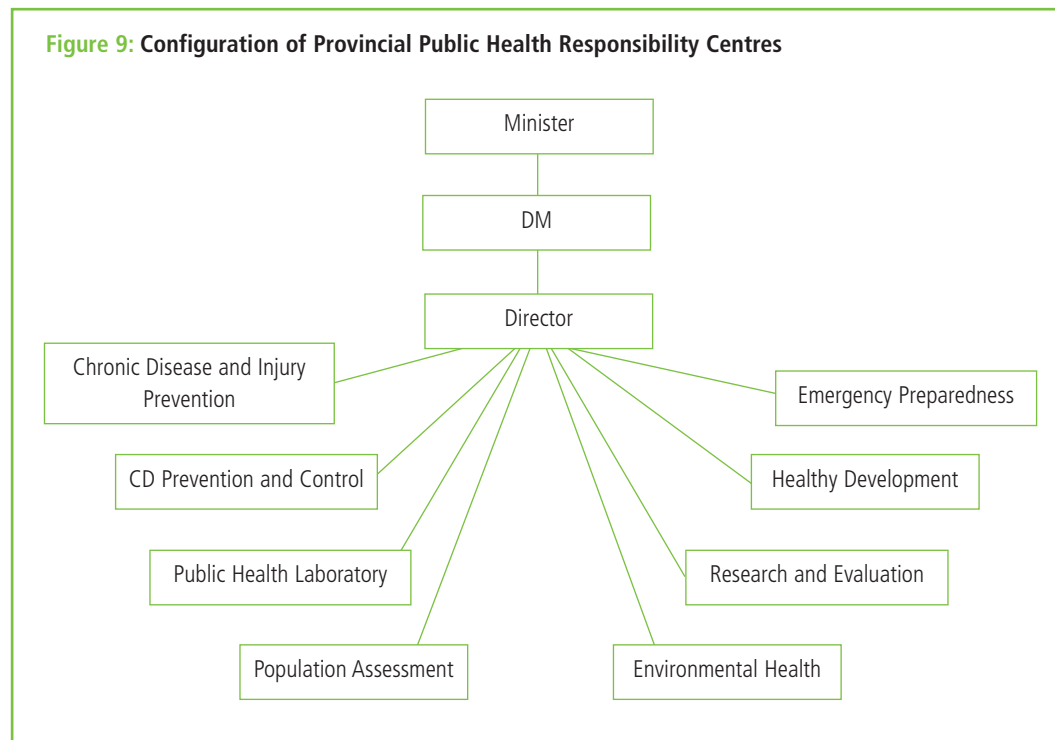
6.1. Provincial Level of System – Department of Health and Nova Scotia Health Promotion

The system designs of leading provincial/state and national public health organizations support the integration and application of core functions across a range of public health issues. The current configuration of the three public health “divisions” based primarily on core functions creates artificial boundaries that impair the ability to apply all of the functions to public health issues. For example, responsibility for healthy sexual behaviours are located within NSHP. However, responsibility for sexually transmitted diseases including their surveillance, treatment guidelines, immunizations (e.g. hepatitis B), investigation of cases, and contact follow-up are managed by another office (OCMOH). Additional related interventions such as youth health centres and educational tools (e.g. teen healthy sexuality resource) are located in yet another (Population and Public Health). Some of the key sexually transmitted diseases are also bloodborne (e.g. HIV, hepatitis B, hepatitis C) so that it is far from clear where harm reduction initiatives such as needle exchange programs fit. In the case of complex behaviour-based outbreaks such as syphilis, which is mounting a comeback internationally, one needs to combine targeted social marketing, collaboration and partnership with key population groups, complex case investigation and follow-up, in addition to screening and treatment.⁴²

It is not surprising that public health staff in DHAs describe confusion regarding which “division” of public health they should call. Spreading responsibilities across two or three separate organizations leads to unnecessary inefficiencies and barriers and impairs comprehensive analysis and decision making. As previously described, population health assessment and surveillance are the query functions of public health that should be used to drive needs based planning and priority setting, but are highly under-developed. Senior decision makers seeking public health input on policy issues can be confronted with multiple conflicting sources of advice.

The system currently lacks a single point of overall public health system leadership and accountability. Reports from Naylor, Kirby and others stress the importance of system leadership, which resulted in the creation of the Chief Public Health Officer position to head the PHAC, and the strengthening of the role of the Chief Medical Officer of Health in Ontario. Currently, the three divisions of public health only come together at the DM level versus there being a public health system leader that reports to the DM.

The creation of NSHP provided an opportunity to focus on this important public health function and to strengthen it. With SARS and the resulting intense analysis of public health systems, it has become clear that all of the public health functions require attention and strengthening. There is a clear need for a more efficient and rational organization of public health in this province that maintains the government’s commitment to health promotion while addressing the entire spectrum of public health responsibilities in a comprehensive manner. Consistent with other leading public health organizations in this country and elsewhere, a single, strong provincial public health organization is required headed by a highly competent public health director to lead the renewal of the province’s public health system. Also similar to leading public health organizations in the world, the organization would be comprised of a series of responsibility centres focussing on key public health programmatic/content areas (see Figure 9).



The Figure illustrates several key features:

- Single Directorⁱ position leading and accountable for the provincial public health system
- Director reporting to DM
- Organization addresses comprehensive range of programmatic areas
- Responsibility for public health laboratory functions and public health emergency preparedness are included, which is consistent with other public health organizations/agencies.
- Research and evaluation are intrinsic parts of the public health system.

ⁱ The term “Director” is being used generically to denote the member of a group of persons chosen to manage the affairs of an institution, versus a specific position level within the provincial civil service.

The responsibility centres would be comprised of a multi-disciplinary team of public health professionals that would be actively involved in surveillance, program standards, provision of expert program support to the DHAs, and provincial level programming. One or more of the regional MOHs would be part of each team bringing their community medicine and epidemiologic expertise to the program area. Depending on the staff complement and relative priorities, one might combine or split some of the responsibility centres that are shown in an actual organizational structure.

The teams will need to work together to ensure coordinated planning, priority setting, and system development. Even though the responsibility centres are clustered by program/content area, analysis and planning needs to be able to cross the centres (e.g. delivery of programs by population setting such as schools, workplaces, health care settings, etc.). This collaboration will be facilitated by teams being part of the same organization with a common interest in prevention, promotion and protection. The single organization will also support the development of common information systems, surveillance system development, workforce development, community needs assessment, and program standards and accountability.

The population assessment responsibility centre will have a key role in supporting needs assessment and prioritization activities of the DHAs. The extent to which staff with specialized skill sets are distributed between the provincial and DHA levels will require further consideration. The manner in which this has been addressed in other jurisdictions such as Ontario, Manitoba and England could be helpful in the further analysis of this issue.

A responsibility centre for public health emergency preparedness has been specifically identified because of its critical importance to the public health system. The Naylor Report even suggested that it should be considered as a sixth core function of the public health system. The creation of a separate responsibility centre is consistent with the structures of the PHAC, U.S. CDC, UK Health Protection Agency, and the proposed Ontario Health Protection and Promotion Agency. Dedicated effort is required to ensure preparedness for public health emergencies that is not distracted from ongoing daily responsibilities and concerns. It is expected that public health will lead the response to public health emergencies. Therefore, public health needs to lead the planning and preparedness for these types of emergencies. This planning will obviously need to interface with the broader emergency planning conducted in the DOH.

Whether all of the provincial responsibility centres should be based in Halifax will require further analysis. There are advantages and disadvantages of placing them all in one location versus a more distributed model. Key questions to consider in these future deliberations will be:

- Is there an over-representation of burden of condition/issue in one part of province?
- How will the proposed location influence the ability to recruit and retain expert staff?
- Are there affiliations with local academic institution(s) that have training, programming, and/or research interests in the program area?
- How will the proposed location influence the ability to interact with key partners within and outside government?

Similar to other public health organizations and agencies, the Director needs to have highly developed public health, leadership, and management competencies. This individual will need to lead a group of skilled public health professionals and lead the rebuilding of the province's public health system. S/he must also be able to effectively contribute to the executive management team of the DOH in the public health system manager role, as well as in the application of population health needs to departmental strategic decision making.

An important design consideration is whether the provincial public health Director position should also encompass the legislative responsibilities of the CMOH as outlined in the *Health Protection Act*. In many P/Ts, this is the case. For example, in provinces such as Ontario and Saskatchewan, the CMOH is also the director of the province's public health department. In Quebec, their public health Director has always been filled by a public health physician specialist, although the legislation does not specifically require it. In contrast, Manitoba and British Columbia have a CMOH or Chief Public Health Officer who are separate from an ADM for public health. In the Northwest Territories, there are separate job descriptions for the director and CMOH, but the positions can be combined if there is a suitable candidate that possesses the competencies required of both positions.

Considering the relative size of Nova Scotia and the need for clear leadership to rebuild its public health system, the most highly competent candidate for the director position needs to be sought. If s/he is also able to fulfill the CMOH role then that would further support the existence of a single leadership position. Consistent with other P/Ts, the director/CMOH position would:

- Have highly developed public health expertise
- Have protection for their independence
- Have the authority to notify the public and advise on measures necessary for public protection
- Provide an annual report to the legislature on the state of the public's health and the public health system
- Make reports to Nova Scotians whenever necessary
- Have a rigorous and transparent recruitment process that would see the Director/CMOH appointed to a five-year renewable term following recommendations by a panel of experts.

The Naylor and Kirby reports differed in their recommendations regarding the naming of the federal public health agency. Kirby had suggested the phrase "health protection and promotion" due to the confusion in some people's minds in this country regarding the meaning of "public health" versus "publicly funded health care". As can be seen in the text box, different public health organizations have somewhat different names although these are all public health organizations addressing the core public health functions for a comprehensive range of public health issues.

Names of Existing Public Health Agencies

- Public Health Agency of Canada
- National Public Health Institute (Quebec)
- Ontario Health Protection and Promotion Agency
- Centers for Disease Control and Prevention (U.S.)
- National Institute of Public Health (Sweden)

An area of active debate in this and other countries has been whether or not to locate public health organizations within government departments. A key driver of this debate has been the observation that public health has not thrived within governmental departments in recent years/decades. Arguing to place the new PHAC outside of Health Canada, the Naylor Report stated: “the current placement of public health functions within a department of government puts public health professionals inside a very large organization and a highly process-oriented culture with a particular orientation to the political issues of the day. One advantage highlighted by many commentators has been the transparency and enhanced credibility arising from a clearer distinction between scientific advice on the one hand, and policy-making by [the government] on the other.”³

P/T departments of health are much more operational than the federal government, which makes complete removal of public health from the department more complicated. The two existing provincial public health agencies in Quebec and British Columbia have expert staff within those agencies, but senior leadership and

management of the public health system (e.g. CMOH) remaining within their departments of health. It is still unclear how Ontario’s agency will be structured. Considering the relative scarcity of highly trained public health practitioners in Nova Scotia and the relative size of the province, a mixed model of this nature appears infeasible. The above Table lists some key characteristics of an Agency model versus a single consolidated public health division within the DOH.

In addition to identifying the organizational placement of the consolidated public health entity, there will also be the need to establish appropriate Ministerial oversight.

Table 4: Characteristics of Public Health Organizations Whether Located Within or Outside Department of Health

“Public Health” Agency External to DOH	“Public Health” Division Within DOH
<ul style="list-style-type: none"> • Better able to maintain a science-based culture and decision-making • Greater flexibility in developing cooperative arrangements with academic institutions and other non-governmental partners • Political and budgetary separation from larger personal health services system • Risk being perceived as “outsider” by Department with resulting isolation 	<ul style="list-style-type: none"> • Better able to influence strategic policy making of Department • Risk lack of transparency, independence, and accountability • Potential overshadowing by acute care system issues

6.1.1. Actions #2-4 for System Renewal

- 2 Establish a single leadership position for Nova Scotia’s public health system:**
 - a. Lead provincial public health organization and be responsible for overall system coordination and development
 - b. Reporting to DM
 - c. Highly developed competencies: public health, leadership, and management (may also fulfil legislated CMOH responsibilities if appropriate)
 - d. Clearly defined roles and responsibilities
 - e. Independence – reporting to public, legislature
 - f. Competitive, transparent selection process with renewable 5-year term

- 3 Establish an integrated public health organization at the provincial system level**
 - a. Created by consolidating current 3 public health “entities” (i.e. Office of Chief Medical Officer of Health; Population and Public Health Division; Nova Scotia Health Promotion)
 - b. Fulfills 5 public health core functions in integrated fashion: population health assessment, surveillance, health promotion, disease prevention and health protection
 - c. Structure similarly to other leading domestic and international public health agencies by programmatic area
 - d. Choose name for the public health organization that clearly identifies its responsibilities to staff, decision makers and the public.

- 4 Decide whether the consolidated provincial public health organization is best located within or outside the Department of Health and establish appropriate Ministerial oversight.**

6.2. Sub-Provincial Level of System – District Health Authorities and Shared Service Areas

In Nova Scotia, the shift from four RHBs to nine DHAs created a significant challenge for public health system design. A wide variety of options were considered with eventual implementation of the SSA model. The intent was to maintain regional planning and coordination because of concerns that many of the DHAs would otherwise lack a sufficient critical mass of expertise to be able to deliver the full range of public health programs, services and responsibilities. In retrospect, one of the difficulties with the consideration of local design options was that it was being done in the absence of an overall collective vision for the system or the ability to make other needed changes.

The SSA model is unique to Nova Scotia in that this model does not appear elsewhere in Canada nor in a number of other countries¹ whose systems have been reviewed.² The SSA model does share some similar features with other types of models such as the use of host districts to support non-host districts. This model was tried in Saskatchewan and was unsuccessful due to fragmentation of resources and their lack of equitable application among districts.

¹ Including U.S., England, Australia, New Zealand.

Experience with the SSA model has been unsatisfactory from the perspective of a number of key system actors. This is not surprising since the creation of the SSAs is attempting to create regional functionality out of local structures. The legislation, the funding, and the governance structures are all applied at the DHA level. Nova Scotia has a two level health system and the SSA model is trying to insert an additional layer. Some provinces such as Quebec have a three-layer public health system, but this is consistent with how the rest of that province's health system is designed.

In creating the SSAs, it appears that there has been a desire to achieve something close to a “traditional public health department”. The characteristics of such an entity are listed in the text box. These public health departments exist in many provinces as either stand-alone entities (e.g. Ontario) or within Regional Health Authorities - RHAs (e.g. Quebec, Alberta). One problem is that in Nova Scotia, the desired critical mass of expertise and capacity have not been achieved. This is partially a funding issue, but is also related to the ability to recruit specialized staff to smaller centres.

A substantial challenge is governance and accountability. A traditional public health department is accountable to either its own board or to the board of the regional health authority. DHAs are accountable under the *Health Authorities Act* for public health services, but the governance and accountability of a SSA has never been defined.

Some of the challenges facing local level system design in Nova Scotia can be informed by other jurisdictions' experiences. England's recent reforms of their National Health Service (NHS) were prompted by the desire to support greater decision making at the front lines of the system. This resulted in a shift from 90 health authorities, each having a traditional department of public health, to over 300 primary care trusts (PCTs) with much smaller population bases. An early decision was made to have each PCT have a public health team headed by a director of public health who sits at the executive table of the PCT. However, communicable disease control expertise that had been part of each public health department in the health authorities was placed outside of the PCTs forming regionally based teams that were linked to the newly established Health Protection Agency. This local fragmentation of public health staff within and outside the PCTs has been highly problematic and is to be rectified in the near future.

Concerns regarding the critical mass of PCT public health teams have led to the creation of regional public health networks to foster collaboration and mutual support. In addition, a series of public health observatories are also in place to strengthen the availability and use of health data in PCTs and strengthen public health input into the broad range of cross-government initiatives aimed at improving health and reducing health inequalities among PCT populations.

Traditional public health department

- \geq 250,000 population - either stand-alone or embedded within Regional Health Authority
- Critical mass of expertise and capacity [PHNs, PHIs, MOH(s), epidemiologist(s), nutritionists, health promoters, etc.]
- Relatively self-sufficient for day-to-day tasks including moderate sized outbreaks
- BUT, still needs support for surveillance, research, evaluation, best practices, infrastructure development, etc.
- Typically centralize more specialized functions and staff within each public health department

Recent reforms in Quebec also share some common themes with Nova Scotia. The creation of local networks to support integration of services among provider institutions will bring some additional challenges to public health, but will also provide an opportunity for public health to strengthen public health functions within clinical services, especially primary care.

In assessing the design options for the local level of Nova Scotia's public health system, there appear to be 3 key realities that need to be taken into consideration:

- Nova Scotia has less than a million people. It is therefore the size of many RHAs in other provinces
- Nova Scotia has a two level health system: DHAs and the provincial level
- Nova Scotia has 9 DHAs that are expected to use a population health perspective in their planning and delivery of services and are to do so in an integrated fashion across the continuum of services that includes public health programs and services.

The redesign of public health needs to be attuned to these realities. If any of these three points change in the future, then the system's design will need to be reconsidered and changes made accordingly. For example, the one consistency in the experience with regionalization in Canada over the past 15 years has been the periodic change in the number of health authorities within individual P/Ts. Changes in the number and therefore population bases of health authorities would likely have significant implications for system design characteristics.

6.2.1. Options Considered

There are a variety of potential structural options for the local level of the public health system. While the SSA model has not been a success, perhaps it could be modified to do so. The problem is that it is in conflict with two of the three realities because it attempts to create a third system layer and does not recognize that DHAs are responsible for the planning and delivery of local public health services. While one could attempt to make the SSA model "work" by coercing CEOs and VPs from adjacent DHAs to plan and deliver public health across DHAs, there is still the question of what the governance and accountability would be of the SSA since these are legislatively defined at the DHA level. One might consider a series of memoranda of understanding (MOU) and dispute resolution mechanisms, however, it is not clear that this would be successful and would be resource intensive. The accountability for public health functions, programs and services need to be improved, but creating additional superimposed complexity of a SSA is unattractive. This is however not to ignore and encourage opportunities for collaboration among DHAs in areas where it is mutually beneficial. This is different though from mandating DHAs to do so for all of their public health programs. Other SSA-type models such as the use of host DHAs does not appear to be a solution considering the experience with this model in Saskatchewan and it is not consistent with each of the DHAs being responsible for local public health services.

One option suggested during the consultative phase of the review is that public health should be withdrawn from the DHAs and be organized and delivered separately from them. Apparently this was widely considered to be the desired option within the public health community at the time of the creation of DHAs, but based on feedback during the review, this perspective appears to have become less prevalent over time as opportunities of working within DHAs become apparent. This is not to suggest that working within integrated health structures has not been extremely challenging for public health across the country, but discussions at the recent Regionalization and Public Healthⁱ conference were focussed primarily on how to best address those challenges and maximize the opportunities versus abandoning the model.

There are two main reasons for including public health within integrated health structures. The first is that it facilitates integration of planning and delivery of services. For example, being part of the same organizational structure can support closer working relationships between public health's community communicable disease surveillance and control function with institutional infection control.⁴³ It can also support integrated use of surveillance information to plan for health authority wide responses to influenza outbreaks and to facilitate emergency preparedness planning.⁴⁴

Health authorities that have been established for a sufficient period of time also report the value of being able to plan across the spectrum of primary prevention, screening, treatment, rehabilitation and palliation.⁴⁵ With planned reforms for primary health care, there are additional anticipated benefits of strengthening public health functions within this sector such as supporting greater uptake of clinical preventive activities. Integration of services can occur without being part of the same structure, it is just more difficult to do so working across organizational boundaries. While these examples of integration within the broader health system are important, it is critical to recognize that most of public health's partners exist outside the DHA structure and include a variety of community organizations such as schools, workplaces, and municipalities. These linkages are a fundamental requirement of public health practice and should not be influenced whether or not public health is within or outside a health authority.

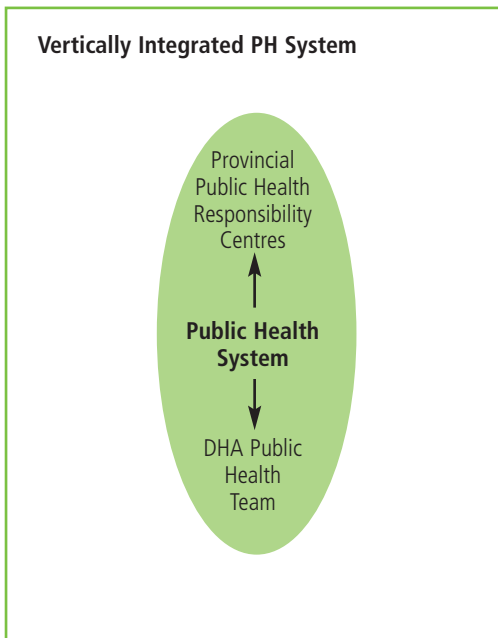
The second reason for including public health in integrated health structures is to bring the public health competencies of applying population health concepts to the systems-based analysis of health issues within DHAs. These are competencies that are related to, but are beyond managing and delivering public health programs and services. The intent is to support the integrated health structure to fulfill its intent in taking a population health approach to reorienting the planning and delivery of all health services. While this is accomplished at many levels of the organization, it requires that public health be an active participant at the executive table of the integrated health authority, which is reflected in England's PCTs, Quebec's regional authorities, and model health authorities in other P/Ts.

ⁱ Regionalization and the new public health. Fourth national conference on regionalization. The Canadian Centre for the Analysis of Regionalization and Health. Montreal. April 2005.

These two reasons provide a compelling argument for continuing to include public health within DHAs and strengthening its ability to fulfill its functions. Achieving this requires careful attention to several design features. Considering the population bases of the DHAs, they should not be mistaken for the RHAs found in many other jurisdictions. If the concept of the larger RHAs is applied anywhere, it should be applied to the entire province of Nova Scotia. In other words, from a public health perspective, Nova Scotia is a single region comprised of a series of local authorities with devolved responsibilities to facilitate local assessment, priority setting, and service delivery.

Thinking of Nova Scotia as a single region from a public health perspective has a number of implications. First, it requires thinking of public health as one integrated system instead of the false duality of a provincial system and a local system. In addition, there is substantial experience in organizing and delivering public health within RHA-type structures that can be informative. For example, highly specialized responsibilities and staff are typically consolidated into functional teams that support front-line public health staff. The organization of those specialized responsibilities and capacity were addressed in the earlier discussion of the provincial level responsibility centres. Viewing Nova Scotia as a single region with devolved local authorities requires thinking of public health as a single system that has two vertically integrated levels, but is also horizontally integrated with the rest of the health system at DHA and provincial levels. This perspective is further described below.

6.3. A Vertically Integrated Public Health System



Public health is focussed on population needs and population interventions making it different from individual-focussed services. While public health will deliver programs and services to individuals, even these are done with the broader intent of improving the population's health. For example, individual cases of communicable diseases are investigated and interventions made, but these are a component of the overall strategy of preventing further illness in others.

It needs to be recognized that the public health system has unique features compared to the rest of the broader health system. In clinical care, if a primary care physician requires assistance with a problem that exceeds their experience or expertise, s/he will consult a specialist that is typically based at the local secondary level hospital. If the specialist at that facility is in similar need of assistance, s/he will consult with the tertiary level teaching hospital. If a phone consultation cannot deal with the situation, then the patient can be physically sent to the appropriate setting.

Public health is similar in that practitioners at the front lines of the system need to request advice and assistance from the next level of the system. The critical difference is that the next level is within government at the provincial and then federal levels. This means that the public health role and types of expertise required at the provincial and federal levels are going to be extremely different from those required for other types of services. One does not expect a senior provincial bureaucrat to be able to provide advice on the clinical management of a severely ill patient, however, one does expect that the public health expertise will be available at the provincial level to assist with the unusual/large outbreak or provide evidence-based advice regarding how best to pursue a change in tobacco policies in a community.

The additional distinction is that while a patient requiring a higher level of care can be transferred out of the DHA to another part of the province to acquire that care, one cannot move communities with their associated outbreaks, obesity epidemics, or environmental contaminants. The system needs to be designed in such a way that the supports are available and come to the DHA in need of them.

There has been a tendency in this country to think of public health programs and services as being those solely delivered by local authorities. When one does that, there is tendency to view programming as the local authority's responsibility and the province's job is to set standards and monitor them. As per the previous paragraphs, the provincial level needs to be actively involved in supporting delivery by the local authority and in some instances, is the more appropriate level to deliver certain aspects of selected programs (e.g. large social marketing campaigns, surveillance, etc.). Therefore it is more appropriate to think of a single set of public health programs and to acknowledge the relative roles and contributions of the system levels in their delivery. This is the process chosen with Quebec's Public Health Program,³³ which is utilized as the basis of planning for all of their system levels.

The system levels need to work with each other similar to members of a team sport. There is an overall strategy that all team members are committed to and there needs to be frequent communication and passing of the puck/ball between the team members. However, there are also clear roles for the team members so that they do not end up tripping over each other and to assure that all of the assignments are covered. If a team sport is played by soloists, then a loss is the usual result. In public health, the lack of team play can mean needs that are not effectively or appropriately addressed, and the inability to effectively prevent and respond to emergencies. To be successful, there needs to be role clarity, communication mechanisms, sufficient capacity of both system levels, a defined public health program, performance measurement, and accountability mechanisms.

To help distinguish roles, one of the main differences between the two system levels is the client. As shown in Table 5, at the DHA level, the main clients of services are local individuals, families and communities, as well as local intermediaries who have contact with those clients. Examples of local intermediaries include primary health care providers, teachers, occupational health staff, and municipal staff (e.g. recreation). In contrast, the provincial level's main clients are the DHA public health staff, scales of population greater than a DHA, and provincial-level partners/intermediaries. In order to fulfill their support role, the provincial level staff need to be highly experienced and frequently have more specialized levels of expertise. The DHA public health staff are competent⁴ public health practitioners, but will tend not to be as specialized as their provincial counterparts.

⁴ The core competencies for public health practitioners have recently been explicitly identified and a series of regional consultations on their application are being planned by the Public Health Agency of Canada for the fall/winter of 2005.

Table 5: Differentiating Provincial and DHA System Levels – Skills and Primary Clients

	Provincial	DHA
Primary client	<ul style="list-style-type: none"> DHA public health staff, populations beyond single DHA, provincial-level partners 	<ul style="list-style-type: none"> Individuals, families, local community Intermediaries to reach above (e.g. schools, workplaces, municipalities, primary health care providers)
Skills	<ul style="list-style-type: none"> Highly experienced More specialized skills 	<ul style="list-style-type: none"> Mainly front-line public health competencies Highly developed skills in Director and selected staff

At a further level of detail, one might begin to further distinguish the two levels with respect to staff and programming as shown in Table 6.

Table 6: Differentiating Provincial and Local System Levels - Staff Type and Programming

	Provincial	Local
Staff	<ul style="list-style-type: none"> MOHs Epidemiologists Multi-disciplinary public health program specialists 	<ul style="list-style-type: none"> Public health director Front-line public health staff (PHN, health promoters, community development, nutrition, dental, etc.)
Programs and Services	<ul style="list-style-type: none"> Perform provincial population health needs assessment – support DHA-level analysis and interpretation Surveillance (CD, non-CD, injuries and associated upstream determinants) Establish program standards Establish accountability mechanisms Provide expert direction and support for evidence-based practices Province-wide interventions (policy, regulation, social marketing, etc.) Infrastructure development (information systems, legislation, workforce development, etc.) 	<ul style="list-style-type: none"> Delivery of individual services: <ul style="list-style-type: none"> Immunizations STI clinical services Individual counselling Home visiting Etc. Case reporting, follow-up and investigation Local community development, collaboration with community partners, health promotion and disease prevention (e.g. tobacco control coordinator, chronic disease prevention coordinator, etc.)

To further elaborate on the preceding conceptual outline of the system, the following examples provide a more concrete description of how this might work.

Example: Communicable Disease Control

Cases and clusters of reportable communicable diseases (CD) occur locally so that the DHA staff would be responsible for their investigation and management following established province-wide protocols (e.g. provincial CD Control Manual). Cases entered into the public health information system either manually or by electronic transfer from the laboratory and verified by the local staff, are available for local analysis and simultaneously to the provincial level CD control team for surveillance purposes. Epidemiologic analysis by the provincial CD team routinely generates surveillance products and analysis for the DHA in a timely fashion. More detailed analysis of time and spatial trends is performed by the provincial CD team staff seeking patterns in occurrences (e.g. GIS mapping of enteric cases to water supplies, patterns of cases occurring across multiple DHAs, etc.).

A CD coordinator has lead responsibility within the DHA to ensure the CD program is implemented appropriately. The designated MOH for that DHA would have an ongoing relationship with the CD coordinator and rest of the DHA staff and would have legislative responsibility for health protection issues in that DHA. The provincial CD team provides specific content expertise for different program components.

Supported by the provincial level staff, DHAs perform local assessment of CD-related needs and priorities (e.g. gaps in immunization coverage, STI rates/clusters, hepatitis rates due to injection drug use, etc.). These findings are incorporated into evidence-based strategies to address local needs in the overall local public health action plan. This local public health plan fits into the DHAs overall plan and also rolls up into the provincial public health plan.

Communication among the DHA CD coordinators and the provincial CD control team occurs on a regular basis to review trends in diseases, priorities for interventions and system development, and inter-DHA agreements (e.g. reporting, mutual aid agreements, call schedules, etc). While there are CD coordinators located in all of the DHAs, efficiencies could be achieved by having shared call among the DHAs. Even a large RHA of a million people would only likely have one person on call, although there needs to be mechanisms in unusual situations to be able to mobilize local staff. Regardless of the size of a public health department or team, there need to be pre-established arrangements for mutual aid. The smaller the public health team, the lower the threshold will be to require assistance from another authority.

Example: Prevention of Chronic Diseases

The prevention of chronic diseases has similarities to communicable disease prevention and control although the balance between proactive and reactive interventions is shifted almost entirely to a proactive perspective. Within the DHA public health team, a number of staff has their primary focus in this area including a chronic disease prevention coordinator, as well as single risk factor focussed staff (e.g. tobacco, physical activity, healthy eating). Provincial level staff, including the DHA's MOH, would assist the DHA to perform needs assessments and apply the information to the development of a local multi-year action plan tailored to local opportunities and circumstances. As key agents of knowledge transfer, the provincial staff would support the use of effective interventions within the local action plan.

Communication among DHA chronic disease prevention coordinators and the provincial chronic disease prevention team occurs periodically regarding trends in diseases and risk factors, priorities for interventions and system development, synergy of DHA and provincial level plans, best practices, etc.

Table 7 provides a more concrete example of how the provincial and local levels are mutually supportive for selected components of a hypothetical province-wide obesity strategy.

Table 7: Selected Components and Province and DHA Roles of Province-wide Obesity Strategy

	Province	Local (DHA)
Assessment of burden, trends	<ul style="list-style-type: none"> • Lead responsibility – data collection, analysis, dissemination 	<ul style="list-style-type: none"> • Assess extent to which local circumstances different from province-wide picture (data and particularly key informant & focus group information)
Collaboration	<ul style="list-style-type: none"> • Bring together key government departments and non-governmental sectors to set strategic direction • Example: work with department of education regarding policy direction for regular physical activity and school food policies • Example: work with the union of municipalities regarding the key role they play in creating environments that support healthy living (“active living by design”) 	<ul style="list-style-type: none"> • Work with local offices of other government departments to implement activities consistent with overall direction • Example: work with local school board and schools to facilitate implementation of daily physical activity and healthy food choices • Example: work with local municipalities to promote physical activity (e.g. park land and recreational areas; safe walking/cycling routes; recreational programs; elected officials as role models; physical activity events; etc.)
Media	<ul style="list-style-type: none"> • Plan and deliver province-wide media campaign • Plan how media campaign fits within overall comprehensive program 	<ul style="list-style-type: none"> • Arrange for delivery of key messages in local media and channels (e.g. schools, workplaces, businesses, charitable/faith organizations) • Link set of local interventions (awareness, skill building, local policy, etc.) to support campaign
Knowledge transfer	<ul style="list-style-type: none"> • Identify best practices • Support their uptake • Disseminate findings and lessons learned among DHAs 	<ul style="list-style-type: none"> • Apply best evidence to local practice

The activities at one system level support the actions of the other. This requires coordination and integration of efforts. The public health staff in the best position to determine how to best engage the local school or local mayor are located at the DHA level. Whether to initially tackle advocating for a new bike route or a community walking club (e.g. Volkssport) needs to be tailored to local circumstances. Good public health practice utilizes the best available evidence. For example, if one is attempting to work with the local school system, then the results of effective interventions^{46,47} in this setting need to be considered and applied where appropriate. The provincial (and federal) level of the system have lead responsibility on the knowledge transfer function to support the incorporation of effective interventions into local practice.

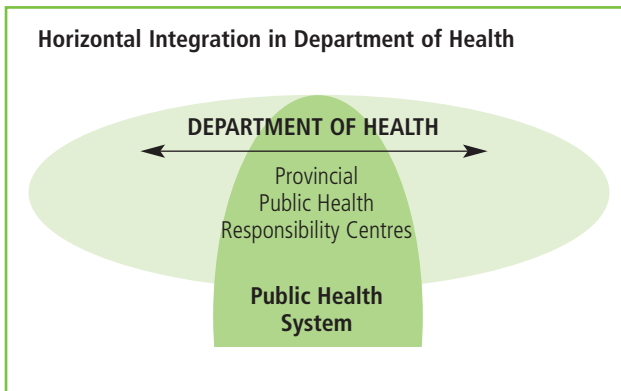
Embedded within these examples are some underlying assumptions that were included in the earlier list of prerequisites for successful implementation. One of these is the existence of an evidence-based public health program that is a common reference point for DHAs and the provincial teams. As utilized in Quebec, it is the toolbox of approved interventions that system levels can choose from to find the right balance of effective interventions for local priorities. While facilitating the tailoring of programs to local needs, it also ensures decision making within the boundaries of effective interventions. A more detailed discussion of program standards may be found in section 8.3.

A related prerequisite is the development of accountability mechanisms. The examples include reference to the development of a public health action plan based on assessed needs and priorities. This is envisioned to form a key component of the overall accountability framework for public health that is also described in more detail in section 8.3.

In order for both system levels to be able to fulfill their roles, there need to be a sufficient number of competent staff. However, even with an increase in staffing, individual DHAs will not be able to achieve a critical mass of expertise and capacity. This necessitates close linkages, ongoing support and coordination between the DHA and provincial levels. The post-SARS reports emphasize the importance of provincial capacity and its involvement and support to the local level.⁵⁻⁷ This is of even greater importance when considering the capacity of individual DHAs. As previously described, unlike other components of the health system, both the provincial and DHA levels are operational and need to work together as an integrated system.

A shift from 4 SSAs to 9 DHAs has an obvious implication for an increase in the number of public health directors. These individuals are of critical importance to the success of public health within DHAs and will require well-developed public health competencies including systems-based analysis. Program areas that shared staff and managers across DHAs will need to consider how best to re-organize themselves. For example, some SSAs shared CD coordinators/managers so that there will be a greater requirement for competent CD coordinators in each DHA. Simply addressing these positions however, will not substantially improve the capacity of the local system level. This will ultimately depend on a greater complement of public health practitioners. A subsequent section will address the issue of the public health workforce in more detail.

6.3.1. Horizontal Integration

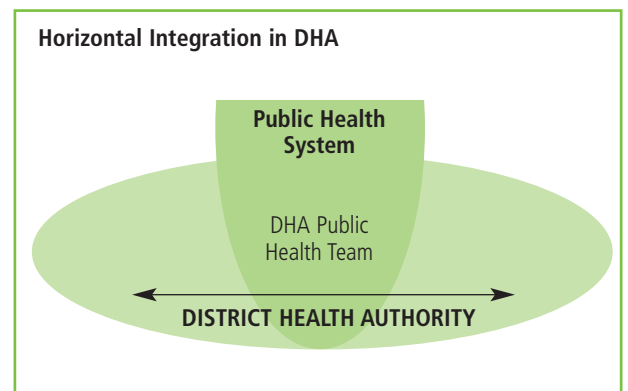


The preceding description, if viewed in isolation, may give the impression of a public health silo existing distinct from other aspects of the health system. Public health needs to exist as a system within a broader system, which requires horizontal integration at the provincial and DHA levels. A previous section on the design features of the provincial level of the system highlighted the need for public health's presence at the executive table of the DOH, as well as inter-sectoral collaboration with other government departments and non-governmental sectors. The provincial public health action plan needs to fit within the overall

provincial health plan and provincial public health staff will need to collaborate on a range of policy issues including primary health care initiatives, emergency planning, and inter-sectoral collaboration. These represent examples of the horizontal integration of public health at the provincial level.

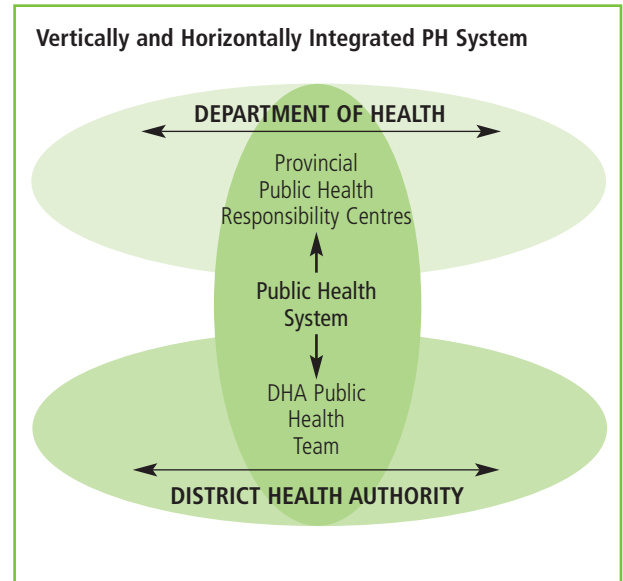
Within the DHA, the public health team headed by its Director will link and work with various parts of the DHA. A previous discussion of the opportunities for inclusion of public health within DHAs provided a number of examples as to how public health can strengthen its links with other parts of the health system, in addition to its traditional partnerships with community organizations. Some of these examples included:

- Public health CD control and institutional infection control
- DHA-wide emergency preparedness
- Chronic disease prevention and management across the continuum
- Application of population health data for DHA planning and priority setting.



One of the mechanisms described for vertical integration was the use of a local public health action plan. Part of the envisioned horizontal integration would be that those same public health action plans would fit within the DHA's overall plan. In this way, the local public health plans simultaneously facilitate vertical and horizontal integration.

Putting these components together, the system functions as an integrated vertical system, while being horizontally integrated at DHA and provincial levels. Achieving this vision requires strategic action to put in place the many supporting pieces and ongoing effort that the system functions as intended. Significant attention to implementation and its sequencing will be required and are addressed in further detail later in this report.



One of the difficulties with regionalization in provinces other than Quebec, has been the fragmentation of public health staff within Regional Health Authorities. Just as consolidation needs to occur at the provincial level, maintaining a single public health team at the DHA level is equally important.

6.4. Role of the Regional Medical Officers of Health

In recent years, Nova Scotia has had 4 regional MOH positions – one for each SSA. Half of these positions however, have had longstanding vacancies. The Cape Breton position was vacant for 12 years prior to being filled 2 years ago and the position based in Truro has been vacant for most of the past decade. There are likely many contributing factors to this situation including the difficulty recruiting specialists to small population centres, the overall state of the public health system, and the lack of training programs within Atlantic Canada for public health physician specialists. Even if resources were not an issue and there was an endless supply of MOHs, most of the DHAs are much too small to reasonably support/require their own MOH.

The suggested approach is to have the regional MOHs have dual roles. One of these roles would be to contribute to one of the provincial multi-disciplinary teams. This provides the opportunity for the MOH to pursue a particular area of interest/expertise and contribute their community medicine expertise to that team. The MOH would also provide dedicated generalized community medicine support to identified DHA(s).

There will likely need to be some flexibility and some experimentation with having MOHs located physically within larger DHAs, but still part of a provincial responsibility centre. For example, a MOH might be a member of the Chronic Disease and Injury Prevention responsibility centre and be the MOH supporting a particular DHA. In the latter role, the MOH would be the dedicated expert advisor to the DHA public health Director, the DHA CEO, and public health staff. S/he would retain their primary responsibility for health protection within the DHA as outlined in the *Health Protection Act* and provide expert assistance in developing, applying, and evaluating the local public health action plan.

6.5. Action #5 for System Renewal

- 5** Transition the sub-provincial public health system level in a controlled manner from the existing Shared Service Area model to one based within District Health Authorities. This will require:
- a. Being guided by the vision of a public health system that is vertically integrated between the provincial and DHA system levels, each of which are integrated horizontally with the rest of the health system
 - b. Clear roles, responsibilities and accountabilities of the two system levels
 - c. Directors of public health in each DHA to manage and be responsible for public health programming within the DHA and to provide population-level analysis and advice to senior executive and the board of the DHA
 - d. Maintaining an intact public health team headed by the Director of Public Health
 - e. Adequate capacity at both system levels in order to fulfill roles and responsibilities
 - f. Expectations and commitment for mutual aid among DHAs to address surges in demand (e.g. outbreaks, emergencies)
 - g. Medical Officers of Health to have dual roles:
 - i) Be MOH for one or more DHAs
 - ii) Be member of a provincial programmatic team.



7. Public Health Inspectors

A key component of the public health system rests outside the DOH and NSHP. Unlike most other P/Ts³, Nova Scotia's public health inspectors (PHIs), whose responsibilities include drinking water safety, food safety, and community inspections, are located within the Department of the Environment and Labour (DEL) and the Department of Agriculture and Fisheries (DAF). DEL and DAF view that their departments are key components of the public health system.

All of the PHIs and engineering staff that had been employed by the DOH were transferred to the Department of Environment in 1994. It appears that the primary motive for the shift was to address liability concerns and potential overlap in responsibilities between the two departments with respect to water and sewage. Despite the potential implications of shifting a major component of the public health system to another Department, neither an evaluation of its impact or a pre-transfer Memorandum of Understanding (MOU) were conditions of the transfer. A MOU between DOH and DEL was established 10 years later joining an existing MOU between DOH and the Department of Agriculture and Marketing that had been established shortly after the transfer of food safety responsibilities from the Department of Environment. An additional MOU also now exists between DEL and DAF.

Concerns from within the public health community heard during the review included the difficulty of managing local public health issues due to the fragmentation of responsibilities and resources, the decreased emphasis on community inspection services over the past decade, and concerns regarding the regulatory framework for drinking water. Of particular concern is that while MOHs have legislated health protection responsibilities, there are no PHI staff within DOH/NSHP/DHA to address these issues. MOHs are therefore totally reliant upon the staff of other government departments who in some cases are not certified PHIs to fulfill their legislated and professional responsibilities.

Fully assessing and resolving the longstanding issues associated with the current extent and configuration of responsibilities and resources are beyond the scope of this review. There needs to be a multi-departmental process that identifies the key issues and concerns from the perspective of all three departments that can then inform an analysis and discussion of options of how best to structure responsibilities, resources and required linkages. This process has the potential to further strengthen a multi-departmental systems approach to public health issues. While addressing the environmental health programs is a critically important step in the overall renewal of Nova Scotia's public health system, the other system changes described in this report can proceed while this piece is being resolved.

³ Among the 13 provinces and territories, only three other jurisdictions, Newfoundland and Labrador, Quebec, and Manitoba, have PHIs working outside of health organizations.

7.1. Action #6 for System Renewal

- 6** The Departments of Health, Environment and Labour, and Agriculture and Fisheries embark on a collaborative process to achieve the following:
 - a. Identify, from the perspective of the three departments, the key issues and concerns regarding the current distribution of public health responsibilities and resources.
 - b. Identify the range of public health issues and corresponding programming that needs to be provided.
 - c. Identify the optimal distribution of responsibilities and resources required to address the findings identified in “b” above.
 - d. Develop an implementation plan to achieve “c” above.



8. Building System Infrastructure

The preceding two sections have focussed primarily on structural improvements to the public health system. While coherent and rational structures are critically important, they are insufficient to ensure overall system functioning. This is why directed attention is required for the supporting foundation, or infrastructure, of the system. Sections 3 and 4 provided an overview of infrastructure components and their current state in Nova Scotia respectively. This Section provides further analysis and the required actions for system renewal.

8.1. Sufficient and Competent Public Health Workforce

The success of renewing the public health system will ultimately depend on the extent to which a sufficient and competent public health workforce is achieved. As stated in the Naylor Report:

“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.”³

The Campbell Commission echoed Naylor by stating:

“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...It is crucial to the success of any public health reform initiatives...that there be a high level of expertise at both the local and central levels of public health.”⁶

Section 6.1 described the responsibility centres envisioned for the provincial level of the system each of which would be comprised of an inter-disciplinary team of public health professionals. Once more detailed implementation planning occurs regarding the teams’ specific responsibilities, the team’s staffing requirements can be ascertained. A gap analysis can then be conducted comparing the teams’ needs and the existing complement of staff within the current three public health divisions.

Section 4.4 provided a disciplinary breakdown of the current DHA/SSA workforce noting the 244 current public health staff positions province-wide. These staff numbers are relatively low compared with other jurisdictions. For example, Table 8 provides a comparison of the staffing levels of

Table 8: Crude Public Health Field Staff (Health Authorities) Comparison Between Nova Scotia and Saskatchewan

Discipline/Position	Nova Scotia (Pop’n: 938,134)	Saskatchewan (Pop’n: 996,194)
Medical Officer of Health*	4	12.4
Public health nurses	164.9	274
Epidemiologists	1	5
Public health inspectors	45	74.5

MOHs: Saskatchewan has 2 additional unfilled positions. PHIs: total based on estimates at DEL and DAF. Note: no system-wide data available at provincial level for other public health professionals in Saskatchewan (e.g. health promoters). Does not include FNIHB staff.

selected public health professionals with Saskatchewan, which has a similarly sized provincial population. The data clearly illustrate much greater numbers of public health professionals in Saskatchewan than in Nova Scotia for all of the public health disciplines for which data is available.

Table 9: Crude Comparison of Capital City Public Health Workforces, Halifax and Regina

Discipline/Position	Halifax (Pop'n: 391,000)	Regina (Extrapolated to 391,000)	Regina (Actual Pop'n: 245,000)
Medical Officer of Health	2	3.7	2.3
Public health nurses	65.8	111.2	69.7
Epidemiologists	0	1.6	1
Public health inspectors	?	23.1	14.5
Dental Health	4	6.4	4
Health Promotion	2	10.3	6.43
Nutritionist	4	10.5	6.6
Outreach/Other Workers	6.66	10.0	6.25
Managers	6	14.4	9

Because health promotion related positions were not available province-wide in Saskatchewan, Table 9 provides a comparison for the provinces' capital cities. Since the Halifax health authority is 60% bigger than Regina's, the table also provides a column showing the Regina workforce extrapolated to Halifax's population size.

This comparison is not intended to portray Saskatchewan as a gold standard, but simply as a current comparator. Some limitations exist for this type of comparison because of differences in how services are structured. For example, in Saskatchewan, a greater proportion of PHNs are involved in the direct delivery of immunizations. Also, public health PHIs in that province are legislatively responsible for drinking water safety for settings with higher risk populations (e.g. daycares). Nevertheless, there are clearly large differences in the public health workforce in Nova Scotia compared with a similarly sized province in this country.

The size of the public health workforce is also considerably smaller than that of Ontario public health units. For example, on a per capita basis, the city of Toronto has about a 3-fold greater public health workforce than Nova Scotia and the Region of Peel, which has a population of about a million people, has double the public health workforce and is actively expanding it.

It may be arguable that Ontario is not an appropriate peer comparator for Nova Scotia because of its relative size and wealth. Considering that many measures of public health need are greater in Nova Scotia and the geographic dispersion of its population, one might conversely argue that Nova Scotia needs more public health staff on a per capita basis. What is clearly known is that Ontario's public health workforce was quickly overwhelmed with the consequences of one imported case of SARS and Nova Scotia only has a fraction of that capacity.

Workforce capacity is more than simply counting FTEs. The level of training is highly relevant. As previously noted in Section 4.4, few of the existing staff have formal post-graduate training in public health. How can public health be expected to function as a science and evidence-based field if there are an insufficient number of individuals who have been formally trained in public health?

Epidemiology is one of the basic sciences for public health and there are few public health epidemiologists in the system. One non-permanent position exists in DHAs 7/8 and a new position has been created at the provincial level. Most P/Ts would have a PhD level epidemiologist at the provincial level. No PhD-level epidemiologists exist anywhere within the Nova Scotia system. By comparison, Saskatchewan has 5 positions in its health authorities and additional senior epidemiologic expertise at the provincial level.

Several publications from within and outside Canada have stressed the importance of a comprehensive approach to public health workforce development.⁴⁸⁻⁵⁰ Key components include:

- Monitoring the composition of the public health workforce and projecting the number and mix of practitioners required to meet system needs
- Assessing competency-based training needs
- Working with the academic sector to ensure an appropriate range of competency-based training options for core and continuing education of the public health workforce
- Providing incentives and supports to achieve/improve competencies
- Ensuring the capacity of the public health sector to provide practice placements
- Applying best practices for recruitment and retention of staff and support career path development.

Public health is a relatively small, but specialized niche. Workforce development cannot be left to chance and dedicated efforts need to be made in ensuring that the system has a sufficient, competent and appropriately distributed workforce. There is a clear opportunity for Nova Scotia, working with academic institutions, other Atlantic provinces and national partners, to address current gaps in public health training. For example, there are currently no programs anywhere in Atlantic Canada that provide inter-disciplinary professional graduate training in public health (i.e. MPH programs). Similarly, there are no specialty training programs for public health physicians in this part of the country.

The governmental public health system is the primary employer of public health professionals and has an intrinsic interest in ensuring that public health training programs exist and meet their system's needs. The current workforce needs to be expanded and strengthened. As the system rebuilds, positions will need to be adapted and created that provide attractive mixes of challenges, responsibilities, and remuneration.

System changes will create a variety of demands. For example, the shift from four SSAs to nine DHAs will create immediate needs for a greater number of DHA public health directors and likely other positions with highly developed competencies (e.g. CD coordinators). A variety of strategies will likely be required to recruit, train and mentor staff to fulfill these roles.

8.2. Information and Knowledge Systems

Uses of Public Health Information

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

Public health is an information-intensive field. Effective practice requires availability and analysis of many different types of data including mortality, morbidity, service utilization, health determinants and community values and preferences. The box shows the wide variety of purposes for public health information. The importance of data and information are reflected in two of the five core functions (assessment and surveillance) being specifically focussed on the collection, analysis, interpretation, and dissemination of information. There is a tremendous need to strengthen these functions in Nova Scotia's public health system.

SARS demonstrated that information systems are critically important for outbreak management. As commented on by Toronto's then MOH, the public

health department had to manage a SARS outbreak with hundreds of cases and thousands of contacts with paper charts and colour-coded post-it notes.³ Information and policies were constantly changing but depended on the timely distribution of paper to update the many public health practitioners involved. Fighting a twenty-first century disease using nineteenth century tools is obviously less than ideal.

In the post-SARS era, communicable diseases (CD) information systems are an area of national priority. Nova Scotia's existing information systems are more highly developed for CD than for other areas of public health, but do not meet expected standards. The Health Canada electronic reporting system that was initiated a few years ago is currently inoperative and the system has reverted back to a paper based system. A 2004 gap analysis conducted across the country based on a common Conceptual Solution Architecture Framework (CSA) found that Nova Scotia has moderate-major or major gaps for each of the five CSA business functions.ⁱ

The federal 2004 budget provided \$100 million to *Infoway* to support CD-related information system development across the country, but it is unclear when this will translate into actual implementation at the provincial level. While welcomed, this initiative will only address a portion of the overall information system needs of the public health system.

ⁱ CSA business functions: reference management (client, provider, vocabulary registries); case management (application for); clinical services (availability/integration of clinical data); outbreak management (management of potential outbreaks); data analysis services (tools, statistics, trend analysis, timeliness, geo-spatial tools, etc.).

The public health system prepared a *Public Health Information Technology Strategy* in late 2003 finding that:

- Little investment in information technology solutions over the past many years
- Availability and use of computers vary widely from one SSA to the next
- No consistent province-wide framework
- IT solutions are fragmented, having been developed on a standalone basis to satisfy needs
- Applications in use today are focussed mainly on communicable disease surveillance - little support for the broader mandates of overall health promotion and disease and injury prevention.⁵¹

The IT Strategy notes that the province's Information Strategy makes the implementation of the Electronic Health Record (EHR) a priority. The EHR is a potential source of data for public health surveillance and assessment and public health will also need to contribute to individual's longitudinal health record.

The IT Strategy identified the following strategic directions:

- Nova Scotia should adopt the Internet-based Public Health Information System (iPHIS) that is available from Health Canada – iPHIS is one of the potential modules that will be supported by *Infoway* for CD surveillance and outbreak management.
- Evaluate the use of other existing solutions to support priority requirements not addressed by iPHIS – this includes Lotus Notes applications developed in one SSA and CDC's Epi-Info¹.
- Build/enhance the technology infrastructure required to support the proposed applications and users in public health – includes all levels of infrastructure from desktops/laptops to servers and networks.
- Ongoing support mechanisms to maximize usability and benefits and to ensure sustainability.

The modest initial 5-year implementation plan was estimated at \$6 million. While the strategy still awaits funding, some of the federal infrastructure funding transfers are being directed at individual projects (e.g. biological inventory system).

Needs-based planning presumes the availability of information and data to assess needs. The *Health Authorities Act* outlines the expectations for CHBs in local needs assessment, but no formal supports have been established on a system-wide basis. At least one SSA has developed support agreements between public health and the CHBs. This is also the SSA with the only epidemiologist in the system and the greatest extent of electronic information and knowledge systems. For public health to effectively support needs-based planning, surveillance systems and data sources need to be developed and made available, and the skill sets to utilize this information need to be in place.

¹ Epi Info is a public domain software package designed for the global community of public health practitioners and researchers. It provides for easy form and database construction, data entry, and analysis with epidemiologic statistics, maps, and graphs.

In other jurisdictions, organizations such as public health observatories (England) and health intelligence units (Ontario) have been established to assist with the use and interpretation of information for local decision-making. The Population Health Assessment responsibility centre is envisioned to have a similar lead role to support DHAs and the province to fulfill this expected function. Dalhousie's Population Health Research Unit is a key resource that should be assessed for potential partnership opportunities in this area. Further analysis will also be needed to determine how to balance skill sets between system levels. For example, in Manitoba, each RHA has a lead person responsible for needs assessment while staff with highly developed competencies exist mainly at the provincial level.

Knowledge systems refer to the generation of new knowledge, as well as supporting the use of existing knowledge into practice. With limited human resources, the desired academic linkages for Nova Scotia's public health professionals are under-developed. Without dedicated staff and funding, public health applied research has not been occurring. As described in the preceding description of the public health workforce, practicum settings such as teaching health units provide a natural environment for a combination of teaching, applied research, program development and evaluation. A number of regionally based opportunities (e.g. National Collaborating Centres) also exist that will be described in more detail in a later Section.

Some of the needed public health knowledge management will hopefully be developed and implemented by the PHAC (e.g. portal for national public health data and effectiveness information). There are also provincial-level needs. These include the range of continuously updated manuals, best practices, and protocols that need to be immediately available to support decision making. One SSA has developed a comprehensive set of Lotus Note applications to provide this functionality and which in accordance with the IT strategy, needs to be assessed for province-wide dissemination. From a system perspective, it needs to be stressed that while such innovations are an asset, unless they exist throughout the system they are not a system strength because the system is only as strong as its weakest link.

8.3. Public Health Standards and System Performance

Public health standards define the expectations of the system. For example in Ontario, the stated purpose of their *Mandatory Health Programs and Services Guidelines* is "to set out the minimum requirements for fundamental public health programs and services targeted at prevention of disease, health promotion and health protection."³² The *Quebec Public Health Program* "defines the public health activities that are necessary to enhance the health and well-being of the population."³³ For both of these provinces, these programmatic expectations are formally linked to public health legislation. While Ontario's system defines the "minimum requirements", Quebec's approach is to identify some activities as expected across the province, and others that may apply only to some parts of the province. The local public health plan provides the exact mix of programs for a particular public health organization based on local needs.

As described in Section 6.3, it is envisioned that standards structured as a provincial public health program will be the evidence-based foundation for the development of DHA and provincial public health plans. This differs from the approach used in many jurisdictions in the past where the provincial standards are used to define (and sometimes perceived to control) local public health actions. The suggested approach is to recognize that for any public health issue, there are actions that are appropriate for the DHA level, some that are multi-DHA, and some that are province-wide. These need to be integrated in order to achieve optimal outcomes.

An iterative cycle of assessment, prioritization, selection of effective interventions, program planning, implementation and evaluation occur at the DHA level. Considering the changes in societal norms that public health is attempting to influence, planning and program implementation need to be a comprehensive, multi-year undertaking. Isolated, “one-off” interventions are typically too weak to have any impact and divert resources from the intended outputs. The public health priorities that are identified in the DHA public health action plan will also be reflected in the overall DHA plan. As previously described in Section 6.3, provincial staff would be expected to be available to assist with the various steps of the process. The individual public health action plans from the 9 DHAs would roll up into the overall provincial public health plan with the addition of the provincial level contributions. The use of this process is intended to achieve the following:

- Needs assessment as the basis for program prioritization and planning
- Use of evidence-based interventions
- Tailoring of public health programming to local needs and priorities
- Development of vertically integrated public health programming
- Development of horizontally integrated public health programming within DHAs.

The development of the public health program can build upon the existing 1997 program standards and the substantial work that has been conducted in recent years in other jurisdictions. For example, Quebec, Ontario, and British Columbia have been actively involved in creating and updating evidence-based standards. How the program is applied is important and active engagement of system stakeholders will be critical starting from the developmental stage onwards. Overall, a collaborative atmosphere striving to use the best evidence applied to the most important health issues needs to be achieved and nurtured.

One of the key themes from the various post-SARS reports has been the need for system accountability and the assessment of system performance. The people of Nova Scotia and their elected representatives need to know the extent to which the system is effectively functioning on an ongoing basis and how it will likely perform in the case of an emergency situation. This can only be achieved through investment in monitoring and accountability mechanisms.

There is no one mechanism that can address all of the dimensions that need to be assessed. The preceding discussion of using program standards as part of an overall planning framework provides one component of an accountability framework, but others are needed as well. A key feature needs to be the inclusion of both the provincial and DHA levels as part of the assessment process. Suggested components include the following:

- Needs based planning
- Financial – this includes tracking overall system investment, but also ensuring protected funds for public health within DHAs
- On-site assessment/accreditation – ideally this would be part of the existing accreditation of health authorities, however, there is widespread recognition that the public health component of this process needs to be substantially strengthened if it is to fulfill this accountability mechanism
- System performance reporting – a proposed public health balanced scorecard would provide “insight into how well public health’s structure, resources and activities are aligned with its core functions.”⁵² The proposed scorecard measures performance in four quadrants: health determinants and status; community engagement; resources and services; and integration and responsiveness.

There is a fundamental principle in management: that which gets measured, gets done. In order to plan, implement and have accountability, there needs to be data. As previously described, there is a tremendous need for information and knowledge system development. Similarly, there will be a need for sufficient staff expertise to be able to assess and apply that information and knowledge.

8.4. Public Health Laboratory

The public health laboratory (PHL) is a key element of the public health system and is of central importance in an outbreak. SARS exposed weaknesses in laboratory capacity in Ontario and the consequences of organizationally separating the PHL from the rest of the public health system. System reviews have consequently recommended addressing these gaps and formally linking the PHL and public health system together as is done in leading public health agencies elsewhere (e.g. British Columbia Centre for Disease Control, Quebec Public Health Institute, PHAC, U.S. CDC, UK Health Protection Agency).

Nova Scotia depends on the capacity of two teaching hospital laboratories to fulfill public health laboratory functions. While there is a designated public health laboratory director, there is no specific identification of required public health functionality, targeted funding, or accountabilities to the public health system.

An existing proposal, developed by the PHL director and the OCMOH, is a preliminary step to address some of the existing gaps. The expectations for the province’s PHL need to be identified and explicit accountabilities developed with the public health system. While the PHL could continue to be physically located with the hospital laboratories, the PHL functions need to be made accountable to the provincial public health Director.

Building PHL capacity is an area that Nova Scotia does not need to work in isolation. Considering the relative populations of the four Atlantic provinces, there is likely a role for looking at regional solutions to address specialized laboratory functions and surge capacity.

Nationally, the Canadian Public Health Laboratory Network has developed a multi-year plan for laboratory development across the country. Once implemented, this plan will provide national-level coordination and system development. A key component of this plan is to look beyond the provincial PHL itself, and include the many laboratories that are involved in public health related testing.

8.5. Legislation

Legislation is fundamentally important to public health. As argued by Gostin:

“The enactment and enforcement of law...is a primary means by which government creates the conditions for people to lead healthier and safer lives. Law creates a mission for public health authorities, assigns their functions, and specifies the manner in which they may exercise their authority. The law is a tool for public health practice, which is used to influence norms for healthy behaviour, identify and respond to health threats, and set and enforce health and safety standards.”⁵³

The ACPH capacity report’s national key informant study noted that most jurisdictions planned or desired changes to legislation included “creating an Act that covers all public health functions, making other bodies accountable for actions affecting health determinants, and ensuring accountability for new regional structures.”⁵¹ *Quebec’s Public Health Act*, as well as the model state public health act from the U.S.,⁵⁴ provide examples of modern comprehensive public health legislation. British Columbia is similarly developing a comprehensive framework to describe its public health system. As noted in the Phase I report, Nova Scotia’s recent legislative update focuses solely on the health protection function. This will need to be expanded to address the remaining public health functions and expected approaches and accountabilities. One cannot pursue revised legislation unless one is clear about the specifics that are to go in it. Experience with the various actions outlined in this report will be useful to inform the future development of comprehensive public health legislation in the province. Public health legislative renewal should therefore be sequenced later in the overall implementation of system renewal.

8.6. Emergency Preparedness

Emergency preparedness is a key responsibility of the public health system. As previously discussed, a dedicated responsibility centre is envisioned within the provincial public health organization to address this topic. While there are specific requirements for the planning process, the ability to respond to an emergency is highly dependent on the state of system infrastructure. The single most important determinant of surge capacity is the day-to-day capacity of the system. Unless there is an existing sufficient and competent workforce, strong system organizational characteristics, and adequate information and knowledge systems, it will be highly challenging to be able to respond to a sudden surge in demand. The SARS experience demonstrated the consequences of a lack of pre-event planning and attention to system infrastructure. It is not possible to create a plan in the middle of a complex crisis and the system can be expected to function at its lowest common denominator or critical link.

The SARS outbreaks started with just one infected person in the Toronto area. While due to a novel pathogen, SARS was not a particularly large outbreak nor did it involve an agent that was particularly communicable or lethal. It nevertheless paralysed the province's personal health services system and devastated the tourism industry. Table 10 provides a qualitative comparison of selected aspects of the local level of public health system in the province of Nova Scotia versus the City of Toronto.

Table 10: Qualitative Comparison of Readiness of Nova Scotia to Address Moderate Public Health Event

Indicator	City of Toronto*	Nova Scotia – DHAs**
Communicable disease information system	<ul style="list-style-type: none"> • Archaic DOS-based platform 	<ul style="list-style-type: none"> • Paper-based
Workforce numbers – field level	<ul style="list-style-type: none"> • 75/100,000 population 	<ul style="list-style-type: none"> • 25/100,000 population
Epidemiologic expertise	<ul style="list-style-type: none"> • Insufficient 	<ul style="list-style-type: none"> • Almost none
MOHs	<ul style="list-style-type: none"> • Many 	<ul style="list-style-type: none"> • Some
Public health laboratory	<ul style="list-style-type: none"> • Administratively separate from public health system • Insufficient capacity 	<ul style="list-style-type: none"> • Administratively separate from public health system • Depends on tertiary acute care laboratory for functionality
Pandemic influenza plan	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Partial – mainly checklist of planning steps to be achieved
Formal organizational linkages with acute care institutions	<ul style="list-style-type: none"> • No 	<ul style="list-style-type: none"> • Yes

*At time of SARS; **At time of review.

Table 10 likely addresses any sense of complacency that may exist. For almost all of the indicators, Nova Scotia has less developed capacity than Toronto's public health department. With the existence of DHAs, there is the opportunity for closer linkages with the acute care setting which would be expected to facilitate communication and coordination between public health and acute care both before and during an emergency. The ability to transfer staff from the acute care sector to public health might be useful depending on whether the acute care sector is

also overwhelmed with the consequences of the public health event (as it was with SARS and would be expected with any widespread condition) and whether generic health skills such as the provision of immunizations are needed as part of the outbreak management. If, as in SARS, competencies in disease investigation and outbreak management are primarily required, then acute care sector staff will be of much more limited use because they typically do not possess these competencies.

As the largest public health department in the country, Toronto is obviously not a perfect peer comparator for Nova Scotia. However, its selection is valid from the perspective that it provides clear and incontrovertible evidence of what happened when a moderate sizedⁱ public health threat occurred at their level of infrastructure development.

Due to its size and population characteristics, Toronto will always be at higher risk for imported pathogens. However, considering the presence of an international airport and a major seaport, Nova Scotia is not spared this risk nor other types of public health emergencies. Currently, the province's public health system's infrastructure does not favourably compare with a system that has been characterized as "broken."⁶ As SARS demonstrated, public health emergencies are not only threats to the health of the public, and the public health and personal health services systems, they are also a threat to the province's economy. The initial estimate of the economic impact of that one case of SARS was over \$1.5 billion with almost three quarters of this being lost from the travel and tourism industry nationally.⁵⁵

In addition to the need for adequate infrastructure as basic prerequisites, there also needs to be the dedicated capacity for planning, training and exercising. Emergencies are, by their nature, rare events. Therefore, it requires leadership, communication, and resources to ensure that preparedness continues to occur and that efforts do not succumb to complacency.

8.7. System Expenditures

Many of the structural and infrastructure actions outlined through this report are intended to create a more efficient and effective public health system. The total extent of system investment is critically important. System expenditures determine to a large degree the opportunity for system development. Currently, Nova Scotia's public health expenditures for "core" public health programs and services are about 1.2% of the province's governmental health expenditures. Considering some of the preceding comparisons, it is not unexpected that the investment in public health by other P/Ts is generally greater.

Direct comparisons of public health budgets among jurisdictions is problematic due to the lack of consistent mechanisms in collecting expenditure information and the lack of consistently applied performance measures to assess the impact of those investments. The Naylor Report provides rough estimates of P/T public health expenditures which are provided in Table 11 on a per capita basis.

ⁱ Yes, as public health emergencies might present, SARS was moderate sized. Post-SARS, the Office of Public Health at the Canadian Medical Association suggested a five-point scale to characterize public health emergencies with five being the worst. An informal survey of public health specialists indicated that SARS would be about a 1.8-2.5 out of 5 on this scale - i.e. conceivable public health threats are substantially greater than the SARS outbreaks.

Table 11: Estimated Per Capita Provincial Expenditures on Public Health, 2002

	B.C.	Manitoba	Ontario	Quebec*	Nova Scotia	Provincial Average (extrapolated)
Per Capita Public Health Spending	57	37	37	36	30	44

Source: National Advisory Committee on SARS and Public Health, 2003.³

*Quebec: expenditures not provided in Naylor Report, but published in a Quebec-based report.⁵⁶

Comparisons among jurisdictions are crude because of the lack of information regarding specifically what is being counted (or not). Also, smaller jurisdictions, such as Nova Scotia, are at a relative disadvantage because some aspects of system

infrastructure have fixed costs regardless of population size. While Table 11 shows only a 20% difference between Ontario and Nova Scotia system funding, as discussed earlier, many Ontario public health units have 200-300% of the staff that Nova Scotia does on a per capita basis. While there is therefore some uncertainty regarding the magnitude of the differences between Nova Scotia and other jurisdictions, there appears to be little doubt that the extent of current investment in Nova Scotia lags far behind many other jurisdictions and that based on the numerous post-SARS reports, that their levels of investment and system development have been viewed as inadequate.

The ability to achieve desired outcomes such as improved health, increased sustainability of the health care system and emergency preparedness are going to depend upon the degree and efficiency of investments. While one would not expect a person's high blood pressure to be adequately treated with one tenth of the recommended dose of a medication, one similarly cannot expect desired population outcomes with a fraction of the required preventive dose. For example, delivery of all of the evidence-based tobacco control recommendations identified by the U.S. CDC²⁸ would require an annual investment in Nova Scotia of about \$15 million. This is almost half of the current entire public health budget and for only one risk factor. Yet, tobacco costs the Nova Scotia health care system \$168 million a year in direct health care costs in addition to all of the societal indirect and productivity costs.

A number of organizations have recently begun to assess how much should be spent on public health. Briefly,

- Modeling conducted for HM Treasury in England found that doubling of the investment in prevention and promotion (£250 million) in the first 10 years of the model was associated with the lowest rise in health care costs in the subsequent 10 years.⁵⁷
- Full implementation of Quebec's evidence-based public health program³³ is projected to require an almost doubling of Quebec's annual public health budget from \$265 million to \$506 million.⁵⁶
- The Legislative Select Standing Committee in British Columbia analyzed current direct and indirect health-related costs and estimated health savings from modest improvements in key risk factors recommending that funding for public health initiatives should gradually increase from 3% to at least 6%.⁵⁸
- The British Columbia Cancer Society recently recommended increasing disease prevention funding to at least 5% of the health care budget with a particular emphasis on chronic diseases.⁵⁹

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 in order to achieve optimum results of prevention and promotion initiatives.

Considering that the level of current investment in public health in Nova Scotia is about 1.2%, it is difficult to reconcile a four-fold increase in investment. What is clear though is that Nova Scotia needs to build its public health system and as an initial step, seek parity with other jurisdictions. Therefore, an increase in system investment in the order of 50-100% is the most appropriate and feasible initial step. This level of investment will need to be implemented over a multi-year basis and be used to build capacity at both the provincial and DHA levels. Depending upon the efficiencies achieved with the introduction of modern information management and simplified structures, the impact of this investment will likely exceed that achieved with similar levels of funding in the pre-SARS era. Further analysis will be required in the future regarding the need for additional investments.

Funding of public health at both system levels has the challenge of balancing longer-term prevention with the immediate demands of care. This is not a unique Canadian phenomenon. As discussed in a recent white paper from England 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.”⁶⁰ The Modeling by HM Treasury informed this perspective showing an increased investment in public health can affect the sustainability of the health care system.⁵⁷ Achieving that improved sustainability requires investment.

The investments in public health need to be visible and tracked. If public health is a core business, then its funding needs to be explicit. Funds for public health provided to DHAs need to be visible, monitored, and protected. Consistent with their population health orientation, DHAs are encouraged to find additional funds to further augment their public health budgets. As new public health investments flow to DHAs, attention will be required to address any inequities in funding levels that have developed over time.

8.8. Actions #7-16 for System Renewal

- 7 Establish and implement a public health workforce development strategy with particular emphasis on critical gaps in the existing workforce.
- 8 Expand overall size of the workforce, as well as those with specialized skill sets including, but not limited to:
 - a. Epidemiologists
 - b. Professional Masters trained public health professionals
 - c. DHA Directors of public health.
- 9 Partner with the academic sector to expand/establish training programs and practicum settings including supporting the development of a teaching health unit.
- 10 Review, update and implement an IT strategy to improve the information infrastructure to support public health core functions and programming.
- 11 Establish evidence-based standards for Nova Scotia's public health system applicable to provincial and DHA levels that provide flexibility for tailoring to local circumstances and that support local and provincial level planning.
- 12 Establish a multi-component accountability mechanism for the public health system:
 - a. Planning, priority setting and implementation of evidence-based interventions
 - b. Financial tracking of system investment and its application
 - c. Reporting on system performance
 - d. Reporting on health of the public.
- 13 Develop and implement strategic plan to ensure high quality public health laboratory services in Nova Scotia by the provincial public health laboratory and a provincial laboratory network that are accountable for public health functions to the public health system.
- 14 Prepare public health legislation to comprehensively describe the public health system's functions, approaches, structures, roles and accountabilities.
- 15 Ensure the preparedness of the public health system to address outbreaks and other public health emergencies by:
 - a. Resources to plan, train and exercise for emergencies
 - b. Sufficient ongoing and surge capacity.
- 16 Implement a multi-year plan (i.e. 5-10 years) to achieve a doubling of current public health system funding to improve the capacity of the province's public health system to optimally promote health, prevent disease and injury, and be prepared to address the occurrence of public health emergencies. [Current public health system funding accounts for approximately 1.2% of provincial health system expenditures, or \$31 million, not including vaccine or PHI costs].

9. Opportunities

The inherent challenges for smaller jurisdictions to build system infrastructure creates greater incentives to identify opportunities for partnership. Since other jurisdictions and system partners are similarly assessing opportunities for collaboration, there is an ideal environment to seek out joint initiatives that otherwise may not have been possible previously. This section outlines some key opportunities that are currently visible noting their inter-relatedness, as well as the fact that there are likely others that will become apparent over time.

9.1. Academic Linkages

Nova Scotia has numerous academic institutions that could be more optimally engaged with the public health system. Several opportunities exist for strengthening these linkages:

- Formalized involvement in surveillance and health needs assessment (e.g. Population Health Research Unit)
- Development of training programs
 - Professional Masters degree program for graduate studies in public health (e.g. MPH, MHSc)
 - Training of Community Medicine specialists, which is the source of MOHs
- Formal linkages to support university-affiliated teaching health unit(s) to provide practical training for variety of disciplines, as well as site for applied research and service (e.g. practitioner-researcher funded positions).

9.2. Atlantic Regional Solutions

Many of the challenges facing Nova Scotia are likely common throughout the Atlantic provinces. An increasing number of public health related bodies are providing an Atlantic Regional perspective including:

- Transformation of the regional Health Canada PPHB office into a regional office of the Public Health Agency of Canada
- Regional office of Health Canada's First Nations and Inuit Health Branch – responsible for public health services in First Nations communities in the four provinces
- Establishment of a National Public Health Collaborating Centre on Health Determinants in Atlantic Canada
- Model of a multi-province, multi-academic institutional training model (CHSRF)
- CIHR-funded Atlantic Network for Prevention Research
- Atlantic Health Promotion Research Centre.

The existence of these Atlantic Regional organizations should facilitate the opportunity to pursue Regional solutions to a number of challenges that could include:

- Core training programs planned and delivered Regionally:
 - Community medicine training programs
 - Population epidemiologists
 - MPH programs
- Continuing education programs
- Cross-fertilization among provincial/federal public health systems – secondments, sabbaticals
- Information system development
- Surveillance system development (indicators, analysis)
- Laboratory capacity and surge capacity
- Content/program development (e.g. communicable disease control manuals).

9.3. Federal Public Health System Funding

In addition to partnering with other P/Ts and the federal government on infrastructure development, there is the additional issue of targeted transfer payments to support the public health system. The 2004 federal budget was the first time that this funding transfer occurred. This contrasts significantly with the experience in other countries.

In the U.S., the CDC provides substantial levels of funding to states, with some specific funding that flows through to local levels. In addition to the direct funding, CDC sends numerous staff to state public health departments. In Australia, approximately 50% of the public health system is funded through series of federally targeted public health grants. In England, public health is funded through the national health service.

The 2004 federal budget provided \$100 million over 3 years to P/Ts on a per capita basis to strengthen system infrastructure. This investment is an important precedent and further opportunities will be sought to expand this model in the future. The more Nova Scotia has embarked on a renewal of its public health system, the better the position it will be in to request external assistance. A strong argument for funding can be made based on the nature of funding models in other countries, the intrinsic challenges of smaller P/Ts for public health infrastructure, and the opportunities of regional collaboration and investment to strengthen public health throughout Atlantic Canada.

9.4. Non-Governmental Sectors

Several health charities have an intrinsic interest in the functioning of the public health system and were enthusiastic participants in this review. As previously described, the governmental public health system needs the capacity to collaborate with the non-governmental sector on initiatives. The business sector is another important group that should have an interest in the public health system. This is related not only to having a healthier and more productive workforce, but also to protect business from the preventable impacts of emergencies.

9.5. Actions #17-20 for System Renewal

- 17 Engage the academic sector within Nova Scotia to discuss opportunities for collaboration with the public health system in training, applied research and service.
- 18 Engage Atlantic Canada regional bodies and other Atlantic provinces to discuss opportunities for collaboration with mutually beneficial public health system functions and infrastructure development.
- 19 Partner with the federal government and the Public Health Agency of Canada to collaboratively strengthen public health system in Nova Scotia.
- 20 Engage the non-governmental sector to discuss opportunities for greater collaboration between the formal and informal public health systems in Nova Scotia.



10. Implementation

The state of public health systems in this and other provinces did not occur overnight. The current challenges have been accumulating for many years and it will therefore realistically take years to achieve system renewal. The sooner the rebuilding starts, the quicker this can be achieved. There are three basic reasons why action is necessary, which are the result of public health's contributions:

- To improve the health of the public
- Take concrete steps to address unsustainable increases in health care system funding
- To prevent and mitigate the impact of health emergencies.

Now is the time for action. This report provides a preliminary roadmap for system development. Initial emphasis should be given to addressing the structure and capacity of the provincial level of the system prior to transitioning the SSAs to DHA-based teams. The primary reason is that the DHA teams need to be effectively supported and business processes established to ensure that capacity shortfalls are not intensified. Initial provincial level steps include the following:

- Appoint a provincial public health director
- Consolidate the 3 current divisions with reorganization of the staff into functional teams
- Assess and address capacity requirements
- Begin work on addressing the PHI/environmental health situation.

A series of inter-dependent components need to have been sufficiently addressed prior to beginning the transition from SSAs to DHAs. The preceding steps of consolidating and strengthening the provincial level are a clear prerequisite. In addition, a competent DHA public health director and CD coordinator need to be in place, as well as any other critical gaps created by the shift to a DHA-based model. A number of business processes such as call schedules, mutual aid agreements, and protocols must also be established prior to the transition. The new provincial public health program and accountability mechanisms may not be fully established prior to the transition, but their frameworks need to be sufficiently developed to ensure system functioning.

While this report provides the preliminary roadmap for system development, there are a multitude of implementation issues that will need to be addressed by system stakeholders over the next several months and years. As structures are simplified and business processes change, individual roles and responsibilities will naturally evolve as well. Clearly there is no shortage of tasks to be accomplished. Similar to a hospital undergoing major renovations, the system will still need to function during the rebuilding process. Recognizing this, a dedicated implementation team will be created that will manage the many projects that will be occurring over a multi-year period. For example, many of the action steps are projects in themselves that will need to assess issues in more detail, develop plans, seek approval and then implement. A combination of dedicated staff and external consultants will be necessary to fulfill many of these steps. The implementation team will be the common group to project manage these various components. The group would also perform secretariat duties for a multi-stakeholder steering group that will be needed to oversee the system renewal. The team will also be responsible for ensuring that a variety of communication mechanisms will be utilized to keep everyone up-to-date with the implementation of the many action steps that are required.

10.1. Action #21 for Renewal

- 21** Establish a dedicated team to project manage the implementation of the foregoing strategic actions. This will be a multi-year undertaking requiring a minimum team of 5 individuals to manage the implementation of the foregoing actions.



11. Conclusions

Public health systems around the world have not received sufficient attention in recent years. Nova Scotia is no different in this regard. This province has the opportunity to learn from the experiences of others in building a stronger and more effective public health system that will contribute to the health and wellbeing of all Nova Scotians.



12. Summary of the 21 Actions for System Renewal

The preceding sections of this report provide 21 actions for system renewal. These items are highly inter-dependent and need to be viewed as a package of strategic actions to be implemented over a multi-year period. The reader is invited to review the accompanying discussion in the relevant report section for the rationale and context for each of the actions.

- 1** **Articulate and be guided by a collective vision for the public health system that integrates and supports the fulfillment of public health’s core functions** that effectively contribute to:
 - a. Improving levels of health status of the population and decreased health disparities
 - b. Decreasing the burden on the personal health services system and thereby contribute to its sustainability
 - c. Improving preparedness and response capacity for health emergencies.

- 2** **Establish a single leadership position for Nova Scotia’s public health system:**
 - a. Lead provincial public health organization and be responsible for overall system coordination and development
 - b. Reporting to DM
 - c. Highly developed competencies: public health, leadership, and management (may also fulfil legislated CMOH responsibilities if appropriate)
 - d. Clearly defined roles and responsibilities
 - e. Independence – reporting to public, legislature
 - f. Competitive, transparent selection process with renewable 5-year term

- 3** **Establish integrated public health organization at provincial system level**
 - a. Created by consolidating current 3 public health “entities” (i.e. Office of Chief Medical Officer of Health; Population and Public Health Division; Nova Scotia Health Promotion)
 - b. Fulfills 5 public health core functions in integrated fashion: population health assessment, surveillance, health promotion, disease prevention and health protection
 - c. Structure similarly to other leading domestic and international public health agencies by programmatic area
 - d. Choose name for the public health organization that clearly identifies its responsibilities to staff, decision makers and the public.

- 4** **Decide whether the consolidated provincial public health organization is best located within or outside the Department of Health and establish appropriate Ministerial oversight.**

- 5 Transition the sub-provincial public health system level in a controlled manner from the existing Shared Service Area model to one based within District Health Authorities. This will require:
 - a. Being guided by the vision of a public health system that is vertically integrated between the provincial and DHA system levels, each of which are integrated horizontally with the rest of the health system
 - b. Clear roles, responsibilities and accountabilities of the two system levels
 - c. Directors of public health in each DHA to manage and be responsible for public health programming within the DHA and to provide population-level analysis and advice to senior executive and the board of the DHA
 - d. Maintaining an intact public health team headed by the Director of Public Health
 - e. Adequate capacity at both system levels in order to fulfill roles and responsibilities
 - f. Expectations and commitment for mutual aid among DHAs to address surges in demand (e.g. outbreaks, emergencies)
 - g. Medical Officers of Health to have dual roles:
 - i) Be MOH for one or more DHAs
 - ii) Be member of a provincial programmatic team.

- 6 The Departments of Health, Environment and Labour, and Agriculture and Fisheries embark on a collaborative process to achieve the following:
 - a. Identify, from the perspective of the three departments, the key issues and concerns regarding the current distribution of public health responsibilities and resources.
 - b. Identify the range of public health issues and corresponding programming that needs to be provided.
 - c. Identify the optimal distribution of responsibilities and resources required to address the findings identified in “b” above.
 - d. Develop an implementation plan to achieve “c” above.

- 7 Establish and implement a public health workforce development strategy with particular emphasis on critical gaps in the existing workforce.

- 8 Expand overall size of the workforce, as well as those with specialized skill sets including, but not limited to:
 - a. Epidemiologists
 - b. Professional Masters trained public health professionals
 - c. DHA Directors of public health.

- 9 Partner with the academic sector to expand/establish training programs and practicum settings including supporting the development of a teaching health unit.

- 10 Review, update and implement an IT strategy to improve the information infrastructure to support public health core functions and programming.

- 11 Establish evidence-based standards for Nova Scotia’s public health system applicable to provincial and DHA levels that provide flexibility for tailoring to local circumstances and that support local and provincial level planning.

- 12 Establish a multi-component accountability mechanism for the public health system:
 - a. Planning, priority setting and implementation of evidence-based interventions
 - b. Financial tracking of system investment and its application
 - c. Reporting on system performance
 - d. Reporting on health of the public.
- 13 Develop and implement strategic plan to ensure high quality public health laboratory services in Nova Scotia by the provincial public health laboratory and a provincial laboratory network that are accountable for public health functions to the public health system.
- 14 Prepare public health legislation to comprehensively describe the public health system's functions, approaches, structures, roles and accountabilities.
- 15 Ensure the preparedness of the public health system to address outbreaks and other public health emergencies by:
 - a. Resources to plan, train and exercise for emergencies
 - b. Sufficient ongoing and surge capacity.
- 16 Implement a multi-year plan (i.e. 5-10 years) to achieve a doubling of current public health system funding to improve the capacity of the province's public health system to optimally promote health, prevent disease and injury, and be prepared to address the occurrence of public health emergencies. [Current public health system funding accounts for approximately 1.2% of provincial health system expenditures, or \$31 million].
- 17 Engage the academic sector within Nova Scotia to discuss opportunities for collaboration with the public health system in training, applied research and service.
- 18 Engage Atlantic Canada regional bodies and other Atlantic provinces to discuss opportunities for collaboration with mutually beneficial public health system functions and infrastructure development.
- 19 Partner with the federal government and the Public Health Agency of Canada to collaboratively strengthen public health system in Nova Scotia.
- 20 Engage the non-governmental sector to discuss opportunities for greater collaboration between the formal and informal public health systems in Nova Scotia.
- 21 Establish a dedicated team to project manage the implementation of the foregoing strategic actions. This will be a multi-year undertaking requiring a minimum team of 5 individuals to manage the implementation of the foregoing actions.

Appendix A – Additional Details Regarding Data Sources for Figures 1-3

The data used in Figures 1-3 were obtained from Statistics Canada's *Health Indicators* website: <http://www.statcan.ca/english/freepub/82-221-XIE/free.htm>. Specifically, data published as Volume 2005, number 1 (February 2005) was utilized to create the horizontal bar charts. The following Table provides additional information for each of the measures. Further details are available on the Statistics Canada website.

Indicator	Population	Description	Statistics Canada Data Source
Self-rated health (excellent or very good)	Population aged 12 and older.	Self-rated health on a 5-point scale.	Canadian Community Health Survey, 2003
Life expectancy at birth	Excludes data from births to mothers not resident in Canada, births where mother residency unknown, deaths of non-residents, deaths of unknown residency or age	Number of years a person would be expected to live, starting from birth if the age and sex specific mortality rates were held constant over the estimated life span.	Canadian Vital Statistics, Death Database, 2001
Disability-free expectancy at birth		Starts with life expectancy and then adds consideration of quality of life. Distinguishes years of life free from activity limitation and years experienced with at least one limitation.	Canadian Vital Statistics, Death Database, 2001 and 1996 Census
Potential years of life lost	Includes deaths from age 0-74. Excludes deaths of non-residents, unknown P/T residency or age.	Number of years of potential life not lived when a person dies "prematurely", defined for this indicator as before age 75.	Canadian Vital Statistics, Death Database, 2001
Infant mortality		Death of a child under one year of age. 3-year average	Canadian Vital Statistics, Birth and Death Databases, 2001
Lung cancer incidence	Exclude non-residents of Canada; unknown P/T residency; unknown age	3-year average; Age-standardized to 1991 Canadian population	Canadian Vital Statistics, Death Database, 2001
Circulatory disease deaths	Exclude non-residents of Canada; unknown P/T residency; unknown age	3 year average; Age-standardized to 1991 Canadian population	Canadian Vital Statistics, Death Database, 2001
Cerebrovascular disease deaths	Exclude non-residents of Canada; unknown P/T residency; unknown age	3-year average; Age-standardized to 1991 Canadian population	Canadian Vital Statistics, Death Database, 2001

Indicator	Population	Description	Statistics Canada Data Source
Diabetes	Population aged 12 and older. Includes females aged 15 and older diagnosed with gestational diabetes	Report having been diagnosed by a health professional as having diabetes.	Canadian Community Health Survey, 2003
High blood pressure	Population aged 12 and older	Report having been diagnosed by a health professional as having high blood pressure.	Canadian Community Health Survey, 2003
Unintentional injury deaths	Exclude non-residents of Canada; unknown P/T residency; unknown age	3-year average; Age-standardized to 1991 Canadian population	Canadian Vital Statistics, Death Database, 2001
Injuries in past 12 months	Population aged 12 and older. Household population only.	Injuries serious enough to cause limitation of normal activities in past 12 months. Repetitive strain not included.	Canadian Community Health Survey, 2003
Suicide	Exclude non-residents of Canada; unknown P/T residency; unknown age	3-year average; Age-standardized to 1991 Canadian population	Canadian Vital Statistics, Death Database, 2001
Normal weight	Population aged 18 and over. Exclude pregnant women and persons less than 3 feet tall	Normal: Body Mass Index 18.5-24.9	Canadian Community Health Survey, 2003
Tobacco use	Population aged 12 and over.	Former smokers: smoked previously either daily or occasionally and are now non-smokers	Canadian Community Health Survey, 2003
Physical activity	Population aged 12 and older.	Classification based on duration and intensity of leisure-time physical activity of average daily activity over preceding 3 months. Moderate=1.5-2.9 kcal/kg/day	Canadian Community Health Survey, 2003
High school graduates, aged 24-29	Population aged 25 to 29. Excludes institutional residents.	Have a high school graduate certificate or equivalent.	2001 Census
Children aged 17 and under living in low-income economic families	Children aged 17 and under. Exclude institutional residents.	Children living in economic families with incomes below Low Income Cut-offs (levels of income where people spend disproportionate amounts of money for food, shelter and clothing).	2001 Census
Unemployment rate, 15 years and over	Population aged 15 years and over.	Number of unemployed persons as a percentage of labour force (currently employed and those unemployed but available to work and had looked for work in previous 4 weeks)	Labour Force Survey, 2002-2003

Appendix B – Complementary Roles for Public Health and Primary Health Care

The literature provides some guidance^{61,62} and the following Table attempts to highlight some examples of inter-relationships for specific types of services.

Table 12: Complementary Roles of Public Health and Primary Health Care

Topic	Public Health	Primary Health Care
Immunizations	<ul style="list-style-type: none"> • Set policy (vaccines, schedule) • Delivery agent • Track population coverage rates • Monitor/investigate adverse events • Develop and routinely analyze immunization registry system • Identify and disseminate effective strategies to address gaps in coverage • Investigate cases/outbreaks of vaccine preventable diseases 	<ul style="list-style-type: none"> • Delivery agent • Report adverse events • Participate in implementation of strategies to address gaps in coverage • Monitor coverage rates in local setting (e.g. CHC) • Report immunizations provided (populate registry) • Report vaccine preventable diseases
Communicable Diseases	<ul style="list-style-type: none"> • Set policy (which diseases, when/how to report, treatments) • Investigate cases, clusters – ensure contact follow-up • Provide information to providers regarding trends, management of cases, emerging issues • Develop public health laboratory network • Monitor trends to identify outbreaks • Develop strategies to reduce disease (partnerships, collaboration) • Deliver/arrange for services to address gaps in primary health care (e.g. youth sexual health clinics, needle exchange) • Applied research • Counselling • Social marketing, policy 	<ul style="list-style-type: none"> • Identify, diagnose, treat • Report cases to public health • Contact follow-up in certain circumstances • Counselling • Participate in community needs assessment/gap analysis/solutions
Chronic disease prevention	<ul style="list-style-type: none"> • Population health assessment • Surveillance • Develop comprehensive strategy • Develop inter-sectoral partnerships at all system levels • Social marketing, policy development, regulations • Support effective clinical preventive interventions • Education and skill building 	<ul style="list-style-type: none"> • Screening, case finding • Investigate/treat risk factors, disease • Periodic health examination • Provide clinical preventive interventions • Participate in local partnerships • Education and skill building

The table does not fully capture the dynamic and iterative nature of inter-relationships. It also does not capture some of the opportunities that primary care renewal provides to improve the organization of health services including:

- Tracking of and provision of incentives to achieve high levels of effective clinical preventive interventions
- Generation of richer population data through use of electronic health records (e.g. immunization, risk factors, prevalence of conditions, etc.).
- Address complex health needs in comprehensive fashion (e.g. co-location and case conferencing among relevant providers – health, social services, mental health, home visiting, housing, home care, etc.).



Appendix C – Structures of Public Health Organizations

For example, Quebec's Public Health Institute is concerned with:

- Individual and community development:
 - Individual development and adjustment, safety and prevention of trauma, community development, life styles
- Care and service systems:
 - Screening centre, chronic diseases
- Biological, environmental and occupational risks:
 - Control, prevention and monitoring of infectious disease, immunization, sexually transmitted and blood-borne diseases, occupational health, environmental health
- Laboratory services
 - Toxicology centre, public health laboratory
- Development and programs
 - Health assessment and surveillance, training, research, international cooperation.⁶³

The proposed Health Promotion and Protection Agency in Ontario is similarly being conceptualized to address the spectrum of public health issues. At the federal level, In the U.S., the Centers for Disease Control and Prevention (CDC) is the prototype for a strong, robust public health agency and recently underwent a reorganization:

- Coordinating Center for Environmental Health and Injury Prevention
- Coordinating Center for Health Information and Services
 - National Center for Health Statistics
 - National Center for Public Health Informatics
 - National Center for Health Marketing
- Coordinating Centre for Health Promotion
 - National Centre for Chronic Disease Prevention and Health Promotion
 - National Center on Birth Defects and Developmental Disabilities
 - Office of Genomics and Disease Prevention
- Coordinating Center for Infectious Diseases
 - National Center for Infectious Diseases
 - National Immunization Program
 - National Center for HIV, STD and TB Prevention
- Coordinating Centre for Global Health
- Coordinating Office for Terrorism Preparedness and Emergency Response
- National Institute for Occupational Safety Toxic Substances and Disease Registry.⁶⁴

There are some exceptions to this trend. In the UK, two Agencies were created in the past 2 years, one for health protection and one for health development. It is therefore premature to comment on their relative success, although despite its short existence, the Health Development Agency has already been merged with another centre. As stated in the Naylor Report, a unitary structure is generally preferable to consolidate system functions and responsibilities.³

Appendix D – Abbreviations Used in This Report

ACPH	F/P/T Advisory Committee on Population Health
ACPHHS	F/P/T Advisory Committee on Population Health and Health Security
ADM	Assistant Deputy Minister
CD	Communicable disease
CDC	Centers for Disease Control and Prevention (U.S.)
CEO	Chief Executive Officer
CHB	Community Health Board
CHSRF	Canadian Health Services Research Foundation
CIHR	Canadian Institutes of Health Research
CLSC	Centre Local Service Communautaire
CMOH	Chief Medical Officer of Health
CPHO	Chief Public Health Officer
CSA	Conceptual Solution Architecture
DAF	Department of Agriculture and Fisheries
DEL	Department of Environment and Labour
DHA	District Health Authority
DM	Deputy Minister
DOH	Department of Health
F/P/T	Federal, Provincial, and Territorial
FNIHB	First Nations and Inuit Health Branch (Health Canada)
FTE	Full-time equivalent
GIS	Geographic information system
HER	Electronic Health Record
HM	Her Majesty
IPHIS	Internet-based Public Health Information System
IT	Information technology
MOH	Medical Officer of Health
MOU	Memoranda of understanding
MPH	Masters Degree in Public Health
NHS	National Health Service (England)
OCMOH	Office of the Chief Medical Officer of Health
NSHP	Nova Scotia Health Promotion
P/T	Provincial and Territorial
PAHO	Pan-American Health Organization
PCT	Primary Care Trust (England)
PHAC	Public Health Agency of Canada
PHI	Public health inspector
PHL	Public health laboratory
PHN	Public health nurse
PPHB	Population and Public Health Branch (transferred to PHAC)
RHA	Regional Health Authority
RHB	Regional Health Board
SARS	Severe Acute Respiratory Syndrome

SSA	Shared service areas
STI	Sexually transmitted disease
U.S.	United States of America
UK	United Kingdom
VP	Vice-President
WHO	World Health Organization

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