Environmental Health in Nova Scotia: A Framework for Moving Forward

Master of Public Health - Project

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Abstract

In 2006 the Province of Nova Scotia released a report entitled *The Renewal of Public Health in Nova Scotia*. This report served as a comprehensive overview of opportunities to enhance public health services in the province. The overall intent was to demonstrate the need to elevate public health from the shadow of the traditional acute care model of health care delivery. This report identified deficiencies with existing structure, function and responsibilities, and included broad recommendations for addressing these issues. One of the areas of concern relates to the Environmental Health profession, and the fragmented approach to service delivery and government oversight in the province. As the result of an uncoordinated structure of several departments contributing to safeguarding the health and safety of its citizens, many areas of environmental health have become under-addressed or completely unaddressed.

This project builds upon *The Renewal of Public Health in Nova Scotia* report. It outlines a proposal for how Environmental Health can move forward and be effectively managed across multiple departments / agencies. It identifies a number of strategies related to collaboration, priority setting and core competency skill development to strengthen the overall approach to health protection. Finally, it also demonstrates the value of combining diverse knowledge, strengths and skills to enhance decision-making and service delivery for the protection of environmental public health.

Description of the Project

With a better understanding of the causes of disease morbidity and mortality comes a parallel and often greater public demand for health-care services. Traditionally, these services have focused on primary or acute care delivery provided by physicians and nurses. However, throughout the twentieth century, as the health care system began to better understand preventable disease, there was an emergence of *population-focused* health care services – that is, those addressing the population rather than individuals. Within the context of the Canadian health care system a broad collective of occupations create and implement strategies to address healthcare with a population-based focus. Under the umbrella of "public health services", these professionals work internally, externally, horizontally and vertically, within and outside the health care system to achieve desired outcomes.

Along with monitoring and responding to traditional issues, public health professions must also be vigilant in their observation and mitigation of new threats. The field of public health has gone through a period of relatively quiet evolution until a series of events in the last 15 years thrust its importance to the forefront. In Canada, contaminated drinking water events, communicable disease outbreaks, and internationally the threat of bioterrorism and pandemic outbreaks have demonstrated the integral role public health professionals play as part of the health care system.

The response to the increasing occurrence of serious public health issues has captured the attention of Canadians and spurred action in a number of jurisdictions to review their public health systems. Over the last few years substantial analyses of public health services have been undertaken in various federal, provincial, territorial and local jurisdictions to evaluate and enhance their capacity to respond to ongoing or (re)-emerging issues. A key challenge in

implementing change is the quantity and quality of public health personnel needed to deliver the services (Joint Task Group on Public Health Human Resources, 2005). Changes to complex systems must consider how it constitutes function – recommendations not grounded in how the workforce functions may actually impair performance.

To demonstrate the practical issues and considerations for integrating the public health workforce in restructuring / reorganization of public health, this project will focus on the perspective of one area, Environmental Health. It will examine the unique pressures facing this profession within one province, Nova Scotia, and how to best meet existing and future challenges. The object of this project is to provide a framework for moving forward from the recommendations of an external review of the provincial public health system. It will focus on the use of a consistent and systematic approach to making strategic decisions about environmental health priorities in a complex organizational structure, balancing a range of risk management approaches and optimizing resources and outcomes. Specifically, it will critically examine how the field of Environmental Health could be structured, through form and function, based on collaboration and consultation in order to address weaknesses, build on strengths and maintain and improve its essential role in health protection.

Environment Health Overview

There is no one moment in history that defines when the field of environmental health first began. One could argue that when safe drinking water was first identified as an essential resource requiring protection, those with an oversight role were the first environmental health specialists. As the responsibilities increased to include such issues as shelter and food sanitation, eventually establishment of environmental health as a profession occurred. Founded on these essentials (i.e., safe water, safe housing and safe food) environmental health is one of the

founding occupations protecting and enhancing public health on a population health level. The significance to having a population health focus is that health promotion and prevention activities show significantly greater health outcomes for Canadians (Joint Task Group on Public Health Human Resources, 2005).

Within the last half of the 20th century environmental health in Canada has further evolved into a highly specialized field requiring an even more diverse range of knowledge and skills. Over time the environmental health profession gradually expanded its mandate into environmental hygiene and health protection where applied science was used to ensure a healthy physical environment (Matheson & Gillespie, 2008).

Today it encompasses a broad view of human health, including quality of life. It examines physical, chemical, biological, social and psychological factors in the environment. It also encompasses the theory and practice of assessing, correcting, controlling, and preventing factors in the environment that have the potential to adversely affect the health of present and future generations (Bell & Khodeli, 2004; Gosselin & Furgal, 2002). This includes risk management principles / practices, and developing an understanding of the application of precautionary approaches and social determinants of health (Matheson & Gillespie, 2008). Finally, equally important to the technical aspects, is the necessity for today's professionals to possess and apply skills in effective communication and interpersonal relations.

As such, given the required competencies outlined, environmental health can be best described as both an art and science, ensuring health protection through evidence-based decision making and regulatory oversight, with an equally strong focus on education and health promotion activities.

Within Canada the formalization of environmental health as a profession protecting and promoting public health by ensuring safe food, water, air and housing is less than 75 years old (Canadian Institute of Public Health Inspectors, 2007). In this time, while there have been successes, as in any profession, there have also been challenges to overcome. This project will explore these challenges broadly and then specifically identify issues unique to Nova Scotia and how they can be best addressed.

Issues Identified

Due to current human resource planning approaches and overall lack of investment in the past 20 to 30 years, the public health infrastructure is in a state of crisis (Public Health Agency of Canada, 2003). Public health functions and the professions responsible for their execution are challenged by high proportions of vacant positions, inequitable distribution of resources within and between jurisdictions, and a lack of surge capacity to respond to new and emerging health threats (Joint Task Group on Public Health Human Resources, 2005).

Whereas populations have always been exposed to health hazards in air, food and water, new health risks continually emerge to challenge public health. The Listeriosis outbreak, increase in West Nile virus and health impacts related to climate change are recent public health issues which have captured the attention of Canadians and spurred action to enhance the capacity of public health systems across the country, including environmental health, to respond to these threats.

Even though public health is the first line of defense against natural or man-made health emergencies, public health agencies are facing shortages of critical health personnel (Bell & Khodeli, 2004). Certain fields in public health are particularly suffering, including

environmental health (Association of State and Territorial Health Officials, 2004; Bell & Khodeli, 2004).

While attempting to address these common, overarching challenges, interrelated barriers between professions that affect success must be considered. Such issues, which arise from increased staff turnover, lack of adequate human and financial resources, limited career opportunities, and shifting priorities, are examined below:

Lack of financial resources:

With respect to challenges specific to financial planning, a risk to environmental health programs is that financial pressures caused by internal and external pressures. Internal pressures, such as increased expenditures or external pressures, such as the current global economy may escalate to the point where, if there are limited dollars a results orientated funding allocation may be implemented. Acute care outcomes are traditionally more easily measured than public health interventions. As such, in communities that are underserved by medical services such as physicians and hospitals, financial resources may then be redirected to ensure that people receive access to needed medical care, thereby leaving fewer resources available for public health activities (Mays, McHugh, Shim, Perry, et al., 2006).

Increased staff turnover

Closely tied to financial challenges are issues related to staffing. From an employer perspective turnover can be seen as a difficult human resource and financial issue to manage effectively. Where unlike vacancy rates which have an upper limit of 100%, turnover rates do not have a ceiling, meaning the same position can turnover multiple times in a year making it difficult to forecast and budget accordingly (Lacey & Nooney, 2005; North, Rasmussen, Hughes, Finlayson, et al 2005; Studer, 2006). Posting notifications of vacancies, interviewing candidates,

providing relocation reimbursements, and the orientation of new employees each have direct costs every time there is any staff turnover. Although no specific data exists in Canada relative to environmental health, recent literature estimates turnover of all health professionals represents a minimum of over 5% of the total operating budget (Waldmam, Kelly, Arora, & Smith, 2004; North et al, 2005). In addition, there are also secondary costs related to loss of efficiency, productivity and service delivery, as less staff are trying to do more while waiting for these gaps to be filled. There are also costs that can't be measured, such as the loss of corporate knowledge related to program delivery as people in senior management positions leave the organization.

Each of these factors alone, or in combination, can destabilize environmental health programs and the quality of their services through cycles of turnover, each further impairing staff moral and disrupting communications (Lacey & Nooney, 2005; North et al, 2005; Studer, 2006).

Lack of adequate human resources:

One of the largest areas of concern is the current decrease in availability of environmental health professionals. Over a 30-year period there has been a slow but steadily increasing gap between the number of professionals qualified, trained and specializing in environmental health and the population they serve. In 1971 in Canada there was one environmental health professional for every 10,700 Canadian. However, as of 2001, this increased to one for every 18,300 (Canadian Institute of Public Health Inspectors, 2004). By comparison, in the United States the ratio in 2004 was one environmental health professional to every 15,000 people (Bell & Khodeli, 2004).

Limited career opportunities

In the context of the shortage of environmental health professionals, there is an ongoing trend in public health to pursue other fields of study, such as epidemiology. The attractiveness of

specialized fields has been attributed to increased pay and advancement opportunities as continuing education programs for environmental health specific career development is lacking (Association of State and Territorial Health Officials, 2004).

Shifting priorities

Another major concern is the shifting of environmental health program priorities from proactive inspections and health promotion activities to a focus on responding to issues only after an undesired event, such as an outbreak, has occurred. This may be in response to the inability to find trained environmental health professionals, or economic constraints to departmental budgets. Given this resource constraint, there may be a need to shift focus from addressing all mandated activities to only those deemed to be of a critical nature and achievable (Bell & Khodeli, 2004). For instance, education campaigns and routine compliance-based inspection activities aimed at the protection of public health may no longer be delivered, in favor of responding to issues only when required.

Significance to Public Health

These challenges faced by the profession have had tangible, negative effects on public health [stressor] and has caused significant strain [outcome: job-related stress ➔ mental health effects] on the environmental health profession in particular. This can been seen primarily in two areas, 1) the lack of surge capacity and 2) the need to meet traditional, mandated duties while being tasked with new areas of responsibility (Bell & Khodeli, 2004; Joint Task Group on Public Health Human Resources, 2005; Lacey & Nooney, 2005).

Surge capacity

The widening gap of available environmental health professionals increases the vulnerability of the entire health care system and more importantly, places the health of the

public at risk (Baumann, Blythe & Underwood, 2006). Contaminated drinking water events in Walkerton, Ontario and North Battleford, Saskatchewan, and the Severe Acute Respiratory Syndrome (SARS) outbreak have highlighted the critical importance of public health and the surge capacity weaknesses to respond to emergent events (Joint Task Group on Public Health Human Resources, 2005). The appearance of new threats such as bio/agro-terrorism and potential influenza pandemic also shows the need for a strong and qualified environmental health workforce (Association of State and Territorial Health Officials, 2004).

In Ontario in the 1990s health care organizations adopted a staffing policy of employing fewer full-time workers, scheduling part-time workers to work regular shifts, more casual staff and increasing reliance on agency nurses and overtime to cover shifts (Baumann, Blythe & Underwood, 2006). The result of these policies and practices was seen in the poor management of the SARS outbreak and how, even though SARS was largely confined to acute care hospitals, all health care agencies were affected (Baumann et al., 2006). Although this example cites the impact of a surge on public health services by an understaffed acute care system, the same situation could easily happen in reverse. In a jurisdiction with inadequate staffing, if the program area was unable to fulfill its mandated responsibility to adequately monitor and regulate a community drinking water system, it could create a widespread outbreak of a communicable disease, resulting in a public health emergency which would then potentially overwhelm the acute care system with patients seeking treatment.

Delivering mandated programs

In spite of the important role environmental health has, it is often asked to take on additional responsibilities with little assessment of the human and knowledge resources required or the potential impact on other essential public health programs (Joint Task Group on Public

Health Human Resources, 2005). There is the potential loss of efficiency, productivity and service delivery as less staff are trying to do more while waiting for these gaps to be filled. Program areas that may have been historically delivered or new areas of activity that should be taken on may be pushed aside as the focus shifts solely to emergent and urgent issues.

From an overall program perspective, failing to secure sufficient (numbers and qualifications) resources to deliver mandated programs place the health of the public at risk – for example, hiring no replacement or less qualified (e.g. credentialed and/or experienced) professionals. In the extreme, not resolving these challenges may place environmental health at risk of losing its mandate where duties may be shifted to another, stronger and better positioned public health program.

Eventually, the rise in turnover, the widening gap of available professionals for the population served, and the low surge capacity increases the vulnerability of the entire health care system and, more importantly, places the health of the public at risk (Baumann et al., 2006). These added pressures are occurring at a time when all jurisdictions are facing critical shortages in human and other resources needed to maintain essential public health services (Joint Task Group on Public Health Human Resources, 2005).

These challenges, however, also bring significant opportunities. The environmental health profession has reached a pivotal moment in time to reclaim its essential role within the public health workforce. Failure to do so will result in its marginalization with increasing risk to population health where critical services "fall through the cracks." To do nothing is clearly not an option.

A Proposed Response

Whereas awareness of history is important in planning for the future, it is important not to be locked into the past (Matheson & Gillespie, 2008). In Nova Scotia, initiatives redress prevailing attitudes grounded in historical patterns of restructuring which negatively affected interdepartmental relationships. As such, this project proposes a strategy to build upon past successes and existing strengths to (re)define environmental health roles and responsibilities across the departments that share this mandate. Improved performance will close gaps and enhance public health protection.

Requirements to ensure a consistent minimum level of protection against environmental threats in Nova Scotia have only been aggressed by piecemeal structural and accountability changes since the mid-1990s. The literature suggests that this approach causes role confusion, uncertainty about the future, loss of skills and decreased morale among environmental health professionals (Matheson & Gillespie, 2008). As this project will demonstrate, the three departments that share the mandate for environmental health in Nova Scotia -- the Department of Agriculture (NSA), Department of Environment (NSE), and Health Promotion and Protection (NSHPP) -- do not, themselves, share a common purpose relative to vision, mission, values or strategy in environmental health protection. For example, the NSE and NSA do not take a public health lens that would include health promotion and protection activities to respond to environmental threats to population health. In addition, several other trends also highlight the need to strategically address the existing disconnect in Nova Scotia as these factors, alone or in combination, put population health at risk.

Background Information - Environmental Health in Nova Scotia

While the history of environmental health in Nova Scotia followed the evolutionary path described earlier, recent events over the last 15 years have greatly complicated its current role. Prior to 1994, the responsibility for Environmental Health in Nova Scotia rested solely with the Department of Health. Environmental health services were delivered primarily through public health inspectors located across the province in regional offices with centralized provincial government oversight. Activities included a comprehensive promotion and protection focus on traditional environmental health areas such as recreational water, food and drinking water safety, non-enteric zoonotic diseases and on-site sewage disposal.

Since 1994 the protection of the health of Nova Scotians and advocacy role of addressing (re)emerging environmental health areas has gradually eroded. In 1994 the Environmental Health program, including all staff, was relocated from the Department of Health to the Department of Environment (NSE). Further to that restructure / relocation, in 1995 a portion of environmental health responsibilities, those related to food protection, and associated staff was then relocated from NSE to the Department of Agriculture (NSA) with the remainder of responsibilities staying within NSE. As a result, today there are essentially three streams of environmental health in the province.

Although the importance of environmental health within overall public health activities in Nova Scotia is essential, the historical changes to its role and current structure within the province raises questions as to its current efficacy. Of particular note is that, since the initial move in 1994 through to today, there has been no documented record as to why the decision to relocate these public health responsibilities was made (Moloughney, 2006). In addition, no analysis / evaluation as to the efficacy of the current structure of environmental health in Nova

Scotia has ever been undertaken (Moloughney, 2006). As a result, the existing structure today is unique in Canada in its combination of complexity and fragmentation. The current lack of focus has resulted in a vacuum of organizational roles and responsibilities. As environmental health pressures increase it is unclear who is responsible for ownership and leadership to ensure issues are addressed and health is protected. With little to no collaboration or cohesion the vacuum continues to grow. The current roles and responsibilities are outlined below.

Health Promotion and Protection (NSHPP)

The Minister of Health Promotion and Protection (NSHPP) is granted broad-ranging authority and powers under the *Health Protection Act* (*HPA*) to respond to health hazards, notifiable diseases or conditions, communicable disease or public health emergencies, and to investigate any situation to prevent, eliminate or decrease a risk to public health (Nova Scotia Health Protection Act, 2004). In order to fulfill this legislated role, the Minister designates personnel from within government as 'public health inspectors' and 'medical officers of health' and gives directions to enter into agreements with other provincial government departments to carry out provisions under the *HPA*. In addition, the Environmental Health Responsibility Centre (EHRC) was created within NSHPP to serve a limited consulting role within the department, and externally to other government departments, district health authorities and the general public. The three staff of the EHRC are subject matter experts in broad areas related to environmental health issues. This role is intended to serve as a resource in response to routine and emergent events as well as for proactive critical analysis and input on issues, policy development etc., requiring an environmental public health lens. There are no programmatic ownership or oversight responsibilities of specific environmental health areas.

Environment (NSE)

Under the *Environment Act*, the Department of Environment (NSE) has been designated the lead agency for drinking water safety, watercourses, waste management and ambient (outdoor) air quality (Nova Scotia Environment Act, 1994-95). Personnel designated by the Environment Minister conduct inspections as well as investigations of alleged or possible release of substances into the environment. NSE staff (designated as 'public health inspectors' by the Minister of NSHPP), through a memorandum of understanding assist NSHPP in investigation of health hazards (other than those identified in the *Environment Act*) in collaboration with the NSHPP Medical Officers of Health.

Agriculture (NSA)

The Department of Agriculture (NSA) is designated under the *Health Protection Act* as the lead department responsible for food safety. It oversees Regulations governing food handling, sourcing of product, processing, labeling, transportation and storage in food establishments. NSA staff (designated as 'public health inspectors' by the Minister of HPP) and the NSHPP Medical Officers of Health, through a memorandum of understanding, assist each other in outbreak and potential food contaminant investigations.

Other Government Departments / Agencies

Other departments / agencies are responsible for ensuring activities under their jurisdiction do not cause damage to human health in their own or other jurisdictions. They are responsible to consult with others prior to taking action that could have an impact on environmental health or on operational requirements of departments responsible for environmental health protection. For instance, District Health Authorities employ public health

nurses who deliver a range of health promotion and protection services. Local Municipalities may also have their own municipal by-laws which have a component of health protection.

These historical relocations have resulted in a slow decline in resource allocation of staff, their required competencies and finances to support service delivery of traditional responsibilities. These 'traditional' programs refer to both those which were previously addressed by the Nova Scotia Department of Health as well as those commonly seen in other provincial / territorial jurisdictions, including: safe recreational water, swimming pool/aquatic facilities, safe indoor air, safe and healthy built environments and personal service facilities (e.g. tattooing, body piercing). These program areas are now only addressed on an ad hoc basis, or in most cases, not at all and, as such, have become 'orphans' without government oversight.

Limitations on Moving Forward

Through an analysis of existing strengths within and outside the province there is an opportunity to shape how health protection in Nova Scotia may look in the future in a model that works best for this province. The direction for moving forward was established by the *Renewal of Public Health in Nova Scotia* (Moloughney, 2006).

Historically, environmental health concerns often get submerged beneath what are perceived as more pressing medical needs (Blake, 2008). However, as one of its "big-picture" recommendations, the Renewal report response to concerns about environmental health identified the environmental health profession as a priority area. System renewal recommendations addressing environmental health are:

The Departments of Health, Environment and Labour, and Agriculture and Fisheries embark on a collaborative process to achieve the following:*

a) *Identify, from prospective of the three departments, key issues and concerns regarding current distribution of public health responsibilities and resources.*

b) *Identify range of public health issues and corresponding programming that needs to be provided.*

c) *Identify optimal distribution of responsibilities and resources required to address findings identified in "b" above.*

d) *Develop and implementation plan to achieve "c" above* (Moloughney, 2006)

**Note: at the time of this report NSE was named 'Environment and Labour' and NSA was known as 'Agriculture and Fisheries'. Both departments have since been renamed.*

Limitations on moving forward include the language of the recommendation, or lack thereof, in not calling for restructuring to position environmental health as a program area under one government department as a viable or acceptable option. Also, unspoken recognition that disrupting the NSE's and NSA's established programs (i.e., deemed but not proven creditable) from reassigning staff to the overarching program would have political ramifications, was not balanced by the implications of the monumental challenges of aligning and coordination across three departments.

The most direct method to understand concerns about the Renewal plan specified for Nova Scotia would be to compare its organization and function to existing successful environmental health programs elsewhere. However, the unspoken requirement to not change the structure of environmental health makes such comparison moot. This was a limitation evident in the final recommendations of *The Renewal of Public Health in Nova Scotia* and therefore presents a significant constraint to this project. As such, the proposed model for change and associated framework outlined in this project is not intended to abandon the exiting structure and/or capacity. Rather, the intent is to integrate the existing strengths found across the three departments in a cooperative and consultative approach consistent with the approach of the *Renewal of Public Health* report.

Conceptual Framework

The proposal is to maintain the three separate departments of NSE, NSA and NSHPP but unite their expertise as centers of excellence in a collaborative manner. The way forward should be to keep the existing areas of environmental health expertise within NSHPP, NSE and NSA with no new changes initially to their respective mandates. However, by bringing the three departments together in a collaborative manner, all three would:

1. Work together to identify existing under/un-addressed programmatic areas of environmental health.
2. NSE and NSA would jointly support NSHPP in a request for resources necessary to address these issues in a manner agreed upon by the three departments.
3. The three departments would develop a business case to present to government which would outline the long-term success of the three centers of excellence model.

The focus of this project is the creation of a framework to accomplish the desired outcome of a strong, three centers of excellence model of environmental health program. In order to outline a cohesive approach to Environmental Health in Nova Scotia this framework is based on the following overarching criteria:

- A need for a shared vision, goals and objectives
- A necessity to have a common set of principles in which to work together

This framework provides guidance in the use of a consistent and systematic approach to making strategic decisions about environmental health priorities. It balances responsible risk-taking with a range of regulatory and non-regulatory risk management approaches and optimizing resources and outcomes through formalized collaboration.

Vision, Goals and Objectives

The following statement represents a vision for environmental health in Nova Scotia: *a province where there is clean air to breathe, safe food and water to eat and drink, and the natural and built environments are free from adverse health hazards.*

In order to meet this vision, the goal of the three departments should be to undertake mandated activities to reduce or eliminate health conditions caused by environmental hazards through a range of health protection activities. This includes the following objectives:

- Apply sound standards/policies/practices/regulations in a uniform manner across the province,
- Involve a broad range of stakeholders in fostering environmental health protection,
- Provide timely and appropriate response to health hazards,
- Inform, educate and empower Nova Scotians on issues of environmental health protection,
- Monitor emerging issues to identify community needs,
- Monitor the effects and maintain quality assurance of implemented environmental health protection strategies,
- Maintain high quality, efficient, effective and accountable environmental health protection,
- Develop effective environmental health leadership,
- Communicate and market environmental health services,
- Enhance environmental health capacity to achieve the essential services,
- Develop a competent environmental health workforce, and
- Develop strategic partnerships between public, private, and community organizations and academia. (Osaki, Hinchey & Harris, 2007).

Principles

The principles below represent what is necessary for shared understanding that must be held by the three departments responsible for environmental health protection. The general principles guide decisions about priorities, strategy development and resource allocation to meet the objectives outlined above.

- Interdepartmental / Inter-jurisdictional collaboration
- Uniform regulatory approach
- Shared concept of risk
- Population health approach
- Shared accountability
- Evidence-based decision making
- Coordinated approach to capacity building

Interdepartmental / Inter-jurisdictional Collaboration

The population-wide focus of public health issues requires comprehensive responses and the involvement of many individuals, agencies, groups, associations and government stakeholders. Resolution of environmental health issues often requires multiple strategies applied within different settings and supported across sectors. Collaboration directly or indirectly on environmental health protection is necessary to optimize capacity, reduce duplication, and represents the foundation for building a strong approach to the three centers of excellence model. The key elements of collaboration for the three departments should include:

- Consensus on shared goals and objectives through joint planning and evaluation
- Common process development, e.g., risk communication
- Clarity on roles, procedures and expectations associated with joint activities

- Understanding of relevant legislative powers and responsibilities
- Respect for diverse knowledge and skill base
- Knowledge of required and existing capacity
- Shared planning, program development and evaluation

A collaborative approach involving coordination of the environmental health programs is necessary to ensure prescribed duties are met and to adequately prepare for emergent events. Mays et al. (2006) found that organizational reconfiguring through consolidation and enhanced intergovernmental coordination showed promise for improving the performance of essential public health services. It also showed that small public health systems might benefit by combining resources and operations or through collaborative initiatives to deliver services jointly. Therefore consideration should be given to the development of policy initiatives directed at opportunities where environmental health can be better integrated with other public health program areas outside of the existing three departments.

Environmental health risks can be both complex and uncertain, necessitating application of diverse skills and knowledge. The strength of collaborating for environmental health protection lies in leveraging both resources and expertise. The skill sets of numerous relevant disciplines are situated within a variety of government departments, agencies and academic institutions in Nova Scotia. Collaboration combines diverse knowledge and skills to enhance decision-making and service delivery, and can also leverage resources to obtain expertise which does not reside within government or within the province.

However, collaboration cannot be left to chance, it must be formalized. In support of strengthening Nova Scotia's environmental health system, NSA, NSE and NSHPP should develop a common framework for environmental health protection through creation of a Joint

Environmental Health Protection Collaborating Committee (JEHPCC). Creating a JEHPCC is the recognition that there are existing environmental health areas that are shared in delivery or overlapping mandates across government departments. It will also address the fragmented approach to how issues have historically been addressed.

Under the direction of the JEHPCC, working groups representing the three departments would collaborate on policy and programmatic direction while examining their interconnectedness and collective resource needs. This will ensure a fit within the regulatory, policy or program mandates of the departments. In addition, by working together on the identification of the essential services of environmental health, additional opportunities may be identified for integrating programs or standards across departments (Osaki et al., 2007). Where the Environmental Health Responsibility Centre (EHRC) within NSHPP provides support and expertise, it was established to simply serve an ad hoc, consulting role, providing a public health lens across government and not intended to absorb the environmental health responsibilities of NSE and/or NSA. However, it does not preclude the appropriateness, given the responsibilities of the Minister of NSHPP, to assume the leadership / coordinating role in bringing the three departments together under JEHPPC.

Uniform Regulatory Approach

The Government of Nova Scotia is responsible for demonstrating sound decision-making, in line with increasing expectations of due diligence and transparency of open government. Resources can be applied where they can do the most good and the health risk is highest by considering science, risk levels, risk tolerance and capacity issues in implementing strategies. Ultimately strategies must be effective, sustainable and cost-effective.

The three centers of excellence model of environmental health in Nova Scotia, through NSE, NSA and NSHPP, demonstrates horizontal government, maximizing and leveraging expertise, regulatory accountability and open collaboration to minimize duplication of services.

In order to accomplish the common goals and objectives of environmental health protection, joint activity must focus in areas of policy development and operations. From the programmatic side, in order to establish clear roles, responsibilities and communication mechanisms, policy manuals should be created and maintained. In addition, annual processes of performance monitoring, evaluation and accountability reporting should be established.

To further demonstrate shared accountability for environmental health, all regulatory documents should be regularly reviewed and revised to ensure that legislative and structure changes and contemporary practice are reflected. Where possible, opportunities to strengthen environmental health protection should also be pursued across government departments by creating linkages among complementary or overlapping pieces of legislation.

Shared Concept of Risk

It is understood that not all risks to human health can be controlled. Factors such as a nonexistent knowledge or inadequate capacity render some hazards beyond control. However, many hazards may be anticipated and the effects mitigated.

Individuals are entitled to make decisions about environmental health issues that directly affect their lives. People can choose to avoid a risk or accept some risk in return for a greater benefit. In balancing the mandate to protect health and safety of citizens with the right of individuals to make personal choices, environment public health interventions must consider the degree of comfort held by the public with regard to various levels of risk. Only when necessary, in the analysis of risk mitigation, should the three departments employ the harm principle, where

legislative regulatory controls must out weigh the individual choices to assume risk (Diekema, 2008). Although enforcement of legislation will always be an important public health function, other functions are growing in importance and require similar skills such as building healthy public policy and supportive environments (Matheson & Gillespie, 2008).

Population Health Approach

Population health aims to maintain and improve health status by addressing the health determinants and their interaction. Environmental health hazards represent one factor among multi-factorial causes of injury and disease. Environmental health issues should be addressed within the context of other health determinants such as socioeconomic status. Proactive prevention of potential threats to a population posed by environmental health hazards is preferable to reactive mitigation of the results of exposure.

Shared Accountability

The population-wide nature of public health issues requires comprehensive responses and the involvement of many individuals, agencies, groups, associations and governments (Moloughney, 2006). No one individual or organization bears sole responsibility for environmental health protection.

The common goals and objectives articulated in this framework provide a backdrop against which roles and responsibilities for collaborative and independent activity can be framed. In Nova Scotia, a multi-faceted public health system brings together multiple departments and levels of government, non-governmental organizations, individuals and the private sector to work collaboratively on improving the health of the population:

Individuals: Each individual has a responsibility to contribute to the protection of his/her own health, the health of others, and the health of the environment (Council of Managers – Environmental Health, 2001).

Communities: The success of environmental health protection is based on results, not processes or structures. However, the public should expect to be informed about processes being used to assess and manage human health risks as well as the results achieved. Community support and engagement is essential to ensure environmental public policy is not viewed as paternalistic. In addition, the complexity of the three centers of excellence model of environmental health needs to be communicated to community partners. In the mind of most community members, there is no logical separation when the environment impacts human health (Blake, 2008).

Governments: Each province / territory is responsible for the administration and organization of its public health system in order to best meet the needs of residents. In fulfilling legislated responsibility for health protection, Nova Scotia government departments play both individual and joint roles. It is also understood that while working as an integrated team can contribute to successful outcomes in complex situations and can optimize resources, it cannot preclude independent action to fulfill legislated responsibilities

Other Agencies: Other departments and agencies play direct or indirect roles in environmental health protection. They are responsible for ensuring that activities under their jurisdiction or control do not cause damage to human health in their own or other jurisdictions. They are responsible to consult with others prior to taking action that could have an impact on environmental health or on operational requirements of departments responsible for environmental health protection. In addition, concerns about health hazards should be discussed

with the relevant lead agency. Exploration of opportunities to collaborate directly or indirectly on environmental health protection is necessary to optimize capacity and reduce duplication.

District health authorities employ public health nurses and other public health professionals who are engaged in delivering a full range of health promotion and protection services. They play a critical role as personnel designated by the Minister of NSHPP under the *Health Protection Act* to monitor and investigate notifiable diseases or conditions and communicable diseases and manage outbreaks.

Under the *Municipal Government Act*, municipalities are responsible for providing good government, providing services and facilities, and developing and maintaining safe and viable communities (Nova Scotia Municipal Government Act, 1998). This includes broad authority over premises that constitute hazards to the health and safety of the public as well as over the disposal, collection and removal of solid waste.

Collaborative Priority-Setting

In order to determine the degree of risk related to environmental health hazards, the three departments should embark on a process of creating a priority list of environmental health issues. These issues may be known hazards and/or programmatic errors current under oversight in other jurisdictions or potential future hazards that may evolve.

In addition, on an annual basis, the collaborating departments should engage in a process of priority-setting. Given capacity considerations, the annual priority-setting process will identify a timeframe for addressing environmental issues in a phased and considered fashion. By developing a set of measures that could be used, environmental health issues can be prioritized, programmatic goals and objectives can be tracked and improvement in environmental health interventions can be made over time (Barron, Glad, & Vukotich, 2007). The process involves:

- identifying emerging or changing environmental health issues,
- assessing the effectiveness of current approaches,
- assessing any new risks or changes to previously identified risks,
- sorting the relative level of importance of risks associated with health hazards or settings, and;
- considering issues of intervention such as ability to control or mitigate risk and evidence-based leading practices

Decisions made following the annual priority-setting process may include reconsidering, redesigning, expanding, reducing or ending existing approaches, or designing approaches for new and emerging issues. The process, supporting information, and tools may be refined each year as the joint process evolves. As priorities are identified they can be tasked to one or more departments depending on linkages with respective mandate(s).

Evidence-based decision making

The ongoing, systematic collection, analysis and interpretation of health data are essential to planning and implementation (Dreyling, Dederick, Chari, Resnick, et al., 2007). Effective environmental health surveillance requires a coordinated approach that identifies hazards, evaluates exposures and tracks population health.

Monitoring involves the collection and analysis of measurements aimed at identifying changes in the environment, the health of human populations, or both. Further, it can involve the assessment of actions taken to address issues related to these environment-human interactions. Surveillance has become a critical task in many governmental organizations responsible for ensuring the health and well-being of populations and/or the environment. The relationships between environments and human health are complex making it difficult to know what measurements are most appropriate to take when monitoring the status of environmental compartments, human health, or the relationship between them (Gosselin & Furgal, 2002).

To measure all factors would be too resource-intensive (especially time) and thus measurements that are indicative of the relationships and impacts should be chosen as "indicators" to document and track. Environmental health indicators report on defined geographic locations (communities, administrative areas) for population health changes (populations, sub-populations, or clusters of individuals) from defined human-environment interactions. Such indicators are more sensitive to potential impacts on health, thus requiring more attention than the wider population (Gosselin & Furgal, 2002). This choice of monitoring the 'most susceptible' becomes important when considering the resources required to monitor all interactions for all environments and all populations (Gosselin & Furgal, 2002). Analysis of the relationship between exposure and health outcome in the context of other temporal and geographic trends enhances the validity of surveillance to help prioritize and guide interventions (Dreyling et al., 2007).

Specific environmental health indicators would allow an assessment and improvement to the state of these environments and their impact on health. For example, the importance of the built environment is critical to consider when contemplating human-environment interactions. Half of the world's population now lives in urban settlements, with North America being approximately 80% urbanized and with individuals spending as little as 5% of their time in what one might consider "natural" environments (Gosselin & Furgal, 2002). Thus the health of these built environments is becoming increasingly important in assessing and monitoring the determinants of human health.

The identification and tracking of issues will support the establishment of priorities and implementation of programs to address these issues. Imperfect information collected under known constraints is much better than no information at all (Gosselin & Furgal, 2002).

Uniform approach to capacity building

A strong public health infrastructure is necessary in order to achieve desirable environmental health outcomes. A lack of available, competent environmental health professionals increases the vulnerability of the entire health care system and more importantly, places the health of the public at risk (Baumann et al, 2006). Addressing capacity (including recruitment and retention) and competency are explored below.

Capacity Building: Capacity to carry out the essential public health services must be measured to ensure appropriate resourcing of environmental health programs. The concerns related to current staffing trends clearly demonstrate a threat to the stability of the profession and public health of the community. To reverse the staffing trends of the last 30 years and ensure a strong and viable delivery of services, a long-term aggressive plan must be implemented to educate, recruit and retain competent professionals (Association of State and Territorial Health Officials, 2004). By assessing performance, a focus can be made on strengthening areas with little or no capacity, setting priorities, and allocating resources to improve the delivery of environmental health services (Barron et al., 2007).

One of the most pressing issues related to capacity is the need to address the current high retirement rates of professionals. As employees approach retirement age both human resource issues related to filling vacancies and succession planning related to retaining corporate knowledge of these individuals must be considered. These two issues go hand in hand and both have significant impact on the evolution of the environmental health roles across departments. Once senior staff have moved on there may no longer be any means to retrieve the knowledge they take with them. An organizational structure that promotes and actively fosters the culture of

mentoring would go a long way to ensure corporate knowledge is retained as it is passed on to the next generation of professionals.

Once appropriate staffing levels are determined, the funding solution, while never 100% accurate due to the potential for multiple turnovers in a fiscal year, can certainly be better managed. Adequate government funding is a necessary ingredient for strong and effective public health systems and, from an accountability perspective, increased local public health spending is associated with higher levels of performance (Mays et al., 2006). With an influx of funding there should be increased expectations for improvement and greater accountability for results challenging public health to show that its infrastructure, including its workforce, are improving (Gebbie & Turnock, 2006). To demonstrate financial accountability it will be necessary to have both short-term strategies for coping with the current staffing and turnover situation, and long-term strategies related to recruitment and retention.

First, with respect to recruitment, aside from offering competitive pay and benefits, long-term solutions require innovative programs (Association of State and Territorial Health Officials, 2004; Studer, 2006). In difficult economic times budgets do not always allow for salary increases so another way to increase the attractiveness to environmental health is through non-financial benefits. Telecommuting and other flexible scheduling opportunities, improving outreach practices to market public health careers, partnering with institutions to provide professional development opportunities to enhance skills and train future public health leaders are all non-salary related benefit incentives to make the field attractive and recruit individuals into an organization (Association of State and Territorial Health Officials, 2004; Bell & Khodeli, 2004).

With respect to retention, in addition to implementing the tangible recruitment incentives listed above, fostering a culture that will make employees want to stay in an organization is essential. The professional work environment must be such that newly recruited staff, as well as existing staff, will want to remain and be a contributing part of the organization's activities and its evolution. This is clearly a role for environmental health leaders. When recruiting staff into an environmental health program, screening for organizational fit will ensuring that candidates brought into the organization are willing to support and model the organization's values (Studer, 2006). Skills can be taught, but attitudes are hard to change if individuals don't fit the culture or standards of an organization (Studer, 2006). Environmental health leaders must also create a culture of an open environment which fosters increased job satisfaction, thereby improving retention and reducing turnover costs. This will ultimately give professionals time to develop and enhance both their individual skills and the system in which they work (Waldmam, Kelly, Arora, & Smith, 2004). To achieve this desired culture the environmental health program areas across the three departments must be based on the establishment and ongoing professional development of leaders, and an environment that fosters mentoring and professional development of all staff.

Finally, finding out why staff are leaving is an important step in determining how to retain current staff as well as making the environment welcoming to others. Conducting exit interviews with vacating employees would help to gain insight into the circumstances that contributed to their departure. The results of these surveys could then be used to improve the existing recruitment and retention strategies.

Competency: The next phase is to address competency. It is essential in this analysis, and what is often overlooked are the competencies needed for the challenges environmental health

professionals face in the 21st century. The public health infrastructure is dependant directly on an adequate supply of competent public health professionals, with the right knowledge, skills and supports to do their jobs (Bell & Khodeli, 2004; Joint Task Group on Public Health Human Resources, 2005). New and emerging public health threats require an educated staff ready to respond. Providing education incentives to improve skills will ensure a better-prepared workforce and a better managed response (Association of State and Territorial Health Officials, 2004). Continuing education incentives also keep the current work force up to date with the latest developments and are essential to meet the escalating demands of new technologies and methodologies (Bell & Khodeli, 2004).

Critical to the infrastructure of environmental health protection are a skilled workforce with access to specialized expertise, information and analytical capacity. Environmental health professionals have significant assets that should be fully utilized. They possess a unique range of skills in epidemiology, communication, statutory interpretation / enforcement, team work, information technology, risk / health impact assessment, and development of networks, particularly with local / regional government agencies and communities (Matheson & Gillespie, 2008).

Workforce development cannot be left to chance. Dedicated efforts need to be made in ensuring that the system has a sufficient, competent and appropriately distributed workforce (Moloughney, 2006). The environmental health workforce must have capacity to respond to high profile public health issues such as environmental justice, land use, emergency preparedness and response, food safety, and zoonotic diseases (Osaki et al., 2007).

The Canadian Joint Task Group on Public Health Human Resources (2005) noted that public health is highly inter-professional with many providers working together, sharing skills

and knowledge. As such, they suggest that there should be a focus on skills or competency-based training, rather than discipline or profession-based. This was supported by Baumann et al. (2006) as they noted that a more flexible workforce would also help to address surge capacity in the event of an emergent public health issue. Only recently have policies related to the core competencies required by the profession been examined (Public Health Agency of Canada, 2007).

Until a thorough analysis of current staff competencies and future capacity needs are undertaken, (re)structuring and prioritizing to address only critical issues from a population health approach may be the wisest course of action. This was best demonstrated by the Toronto Public Health - Environmental Health program through their development of risk-based programs (Serapiglia, Kennedy, Thompson, & de Burger, 2007). These programs were designed to address staffing pressures, an ever-increasing program mandate and to maximize efficiency, while ensuring both the protection of public health and the public right to know about issues that affect their health. Focused, risk-based and evidence-based programs demonstrate evidence-based decision making, public accountability and the efficient use of available professional human resources and existing competencies.

A combination of minimum required staffing levels as well as core competencies is required to address mandated programs, surge capacity needed for emergent events and the ability to implement new program responsibilities. It is therefore necessary to both audit staffing levels throughout the departments engaged in environmental health protection as well as establishing minimum core competencies for all staff. To do this proper consultation should not only occur within the three government departments with oversight of environmental health but should also include all other appropriate government departments, allied heath care and

professional agencies and the post-secondary education institutes that provide environmental health training in Canada.

Conclusion

The situation in Nova Scotia has reached a point where significant constraints on the ability of the environmental health profession to fulfill its role in health protection. Meeting existing responsibilities in the face of new, emerging and re-emerging diseases, a rise in emergency response requirements and the development and incorporation of new program areas have placed significant stress on the profession. A symptom of the derived strain in response to this stress may include turnover.

The prevailing reality of environmental health services that three government departments have created is not consistent with protecting the health and safety of its citizens from environmental threats. In addition, the skill sets of numerous allied disciplines are fragmented across several government departments, as well as other agencies. Addressing these fundamental structural issues in Nova Scotia is further complicated in that restructuring to create an overarching program is not politically acceptable.

Given these limitations, this project has presented a proposal to manage the professional responsibilities through a number of strategies related to collaboration, consultation and cooperation. The belief being that the strength of combining diverse knowledge and skills will enhance decision-making and service delivery.

The plan forward addressed in this project is just one small step toward meaningful change. The intent is that the broad recommendations outlined in this project could one day be used as the roadmap toward the next phase, implementation. However, in the end, regardless of the direction that may be undertaken, the focus must always remain on what is best for the health

of Nova Scotians. In the context of political considerations on its organization and function, the strength of environmental health in Nova Scotia and its role within the community of public health professional directly depends on achieving and maintaining a collaborative, consultative and cooperative approach to addressing existing and future challenges.

Reference

Association of State and Territorial Health Officials (2004). *State public health employee worker shortage report: A civil service recruitment and retention crisis.* Retrieved August 27, 2008 from www.astho.org/pubs/Workforce-Survey-Report-2.pdf

Barron, G., Glad, J., Vukotich, C. (2007). *The use of the national public health performance standards to evaluate change in capacity to carry out the 10 essential services.* Journal of Environmental Health 70(1), 29-31. Retrieved June 1, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=1316737081&sid=2&Fmt=3&clientId=29636&RQT=309&VName=PQD

Baumann, A., Blythe, J., Underwood, J. (2006). *Surge capacity and casualization: Human resource issues in the post-SARS health system.* Canadian Journal of Public Health 97(3), 230-232. Retrieved July 26, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=1074983001&sid=1&Fmt=3&cl ientId=29636&RQT=309&VName=PQD

Bell, M., Khodeli, I. (2004). *Public health worker shortages. Trends Alert, Critical information for state decision-makers.* The Council of State Governments. Retrieved June 27, 2008 from www.csg.org/pubs/Documents/TA0411HealthWork.pdf

Blake, R. (2008). *Remarriage of Environmental Health and Environmental Protection.* Journal of Environmental Health 70(8), 4-5. Retrieved June 27, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=1454494261&sid=6&Fmt=3&clientId=29636&RQT=309&VName=PQD

Canadian Institute of Public Health Inspectors (2004). Canada's public health protection system: The need for a national strategy to revitalize frontline environmental public health (EPH) services. Retrieved November 1, 2008 from http://www.ciphi.ca/pdf/ephps.pdf

Canadian Institute of Public Health Inspectors (2007). *Core competencies*. Retrieved September 1, 2008 from http://www.ciphi.ca/corecomp.htm

Council of Managers – Environmental Health (2001). *A common reference system and operational standards for Alberta Regional Health Authority environmental health programs*. Retrieved September 1, 2008 from: http://www.ciphi.ab.ca/doc/other/DC9_TheBlueBook.pdf

Diekema, D. (2008). *Commentary: Public health, ethics, and state compulsion*. Journal of Public Health Management & Practice 14(4), 332 – 334. Retrieved September 9, 2008 from http://www.nursingcenter.com/library/JournalArticle.asp?Article_ID=799304

Dreyling, E., Dederick, E., Chari, R., Resnick, B., et al. (2007). *Tracking health and the environment: A pilot test of environmental public health indicators*. Journal of Environmental Health 70(5), 9-16. Retrieved July 15, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=1420041551&sid=4&Fmt=3&clientId=29636&RQT=309&VName=PQD

Gebbie, K., & Turnock, B. (2006). *The Public Health Workforce, 2006: New challenges*. Health Affairs. 25(4), 923-933. Retrieved September 1, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=1083916731&sid=3&Fmt=4&clientId=29636&RQT=309&VName=PQD

Gosselin, P., Furgal, C. (2002). *Challenges and directions for environmental public health indicators and surveillance*. Canadian Journal of Public Health. 93(5), 5-8. Retrieved September 14, 2008, from ProQuest Nursing & Allied Health Source database. (Document ID: 636298711)

Joint Task Group on Public Health Human Resources (2005). *Building the public health workforce for the 21st Century: A pan-Canadian public health human resources planning framework*. Public Health Agency of Canada. Retrieved June 27, 2008 from http://www.phac-aspc.gc.ca/php-psp/pdf/building_the_public_health_workforce_fo_%20the-21stc_e.pdf

Lacey, L., & Nooney, J. (2005). *Turnover rates and related spending in. North Carolina public health departments*. North Carolina Center for Nursing. Retrieved August 1, 2008 from http://www.ga.unc.edu/NCCN/research/empsurv2004/turnover - public health.pdf

Matheson, D., Gillespie, G. (2008). *A vision for the health protection workforce-and challenges for the future*. Journal of Environmental Health 70(6), 44-45. Retrieved July 28, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=1419337711&sid=7&Fmt=3&clientId=29636&RQT=309&VName=PQD

Mays, G., McHugh, M., Shim, K., Perry, N., et al (2006). *Institutional and economic determinants of public health system performance*. American Journal of Public Health. 96(3), 523-531. Retrieved August 2, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=1003141701&sid=5&Fmt=4&clientId=29636&RQT=309&VName=PQD

Moloughney, B. (2006). *The renewal of public health in Nova Scotia: Building a public health system to meet the needs of Nova Scotians*. Retrieved June 1, 2008 from http://www.gov.ns.ca/hpp/publichealth/content/renewal_public_health.htm

North, N., Rasmussen, E., Hughes, F., Finlayson, M., et al (2005). *Turnover amongst nurses in New Zealand's district health boards: A national survey of nursing turnover and turnover costs*. New Zealand Journal of Employment Relations. 30(1), 49-62. Retrieved August 2, 2008 from http://proquest.umi.com.ezproxy.lakeheadu.ca/pqdweb?did=854123861&sid=10&Fmt=4&clientId=29636&RQT=309&VName=PQD

Nova Scotia Environment Act (1994-95). Government of Nova Scotia. Retrieved September 5, 2008 from http://www.gov.ns.ca/legislature/legc/statutes/envromnt.htm

Nova Scotia Health Protection Act (2004). Government of Nova Scotia. Retrieved September 5, 2008 from http://www.gov.ns.ca/legislature/legc/statutes/healthpr.htm

Nova Scotia Municipal Government Act (1998). Government of Nova Scotia. Retrieved September 1, 2008 from http://www.gov.ns.ca/legislature/legc/statutes/muncpgov.htm

Osaki, C., Hinchey, D., Harris, J. (2007). *Using 10-essential-services training to revive, refocus, and strengthen your environmental health programs* Journal of Environmental Health 70(1), 12-17. Retrieved September 1, 2008 from ProQuest Nursing & Allied Health Source database. (Document ID: 1316737111).

Public Health Agency of Canada (2003). *Learning from SARS – Renewal of public health in Canada*. Retrieved April 1, 2009 from http://www.phac-aspc.gc.ca/publicat/sars-sras/pdf/sars-e.pdf