Chapter 7

PUBLIC HEALTH HUMAN RESOURCES

Public health, like other aspects of the health care system, relies on a highly skilled workforce as its most valuable resource. Although sufficient funding and an effective organizational structure are necessary ingredients in a flourishing public health system, the quality of Canada's public health will ultimately rest on the shoulders of its public health workers.

Over the last decade, various task forces and academic reports have usefully addressed issues related to the supply of health professionals and technologists. The focus of most of these studies, however, has been on the human resources necessary for the provision of personal health services. These reports have also served as the basis for intergovernmental agreements; for example, the 2003 First Ministers' Health Accord states that "appropriate planning and management of health human resources is key to ensuring that Canadians have access to the health providers they need... Collaborative strategies are to be undertaken to ... ensure the supply of needed health providers (including nurse practitioners, pharmacists and diagnostic technologists)." The 2003 federal Budget allotted $90 million over five years for health human resources, but no funds were earmarked specifically for the public health workforce.

A shortfall in public health human resource planning and development was recognized in the *Survey of Public Health Capacity in Canada*, a report to the F/P/T Deputy Ministers of Health by the Advisory Committee on Population Health. As we noted in Chapter 3, this report was neither formally endorsed nor taken as a basis for action.

In this chapter, relying partly on the aforementioned *Capacity* report as well as expert opinion, stakeholder input, and existing sectoral surveys, we present a brief assessment of the public health workforce in Canada. The paucity of data on public health human resources, analogous to the limited data on public health spending, illustrates that insufficient attention has been paid to this field.

The Committee took particular note of the very wide range of stakeholders who commented on the challenges of human resources in public health. Among them were the Association of Nursing Directors and Supervisors of Ontario Health Agencies [ANDSOOHA], Canadian Hospital Epidemiology Committee, Canadian Medical Association, Canadian Public Health Association, Canadian Infectious Disease Society, Ontario Hospital Association, National Specialty Society for Community Medicine, Canadian Pharmacists Association, Canadian Association of Medical Microbiologists, Canadian Society for Medical Laboratory Science, Canadian Association of Emergency Physicians, Community and Hospital Infection Control Association of Canada, and front-line nurses and support staff interviewed in focus groups arranged by Health Canada's Office of Nursing Policy.

Some human resource issues raised by stakeholders rest more in the matter of operational and institutional policy, such as the right to refuse dangerous work mentioned in Chapter 9, or pay for time in quarantine. Our focus in this chapter is on the capacity side: Does Canada have enough skilled personnel in various public health fields, and if not, how can the nation close these gaps?

Although the major focus of this chapter is to discuss how human resources issues affect public health functions like health promotion and outbreak management, it seemed salient to recognize the impact the SARS outbreak had on education, and thus the impact future public health crises could have on health human resources. We accordingly begin by describing how the SARS outbreak affected the education of health sciences students. We then present a brief review of information about the supply of public health professionals in Canada. Moving past the numbers, we touch on issues about education and qualifications—are our public health professionals appropriately trained for their work? Finally, we discuss strategies to strengthen the public health workforce and present a set of recommendations.

7A. The Effect of SARS on Professional Education

Post-secondary institutions in Toronto and elsewhere coped with the unprecedented and unanticipated challenges posed by the SARS outbreak. Exams proceeded as scheduled, and no student lost a year or had their program prolonged due to SARS. Nevertheless, clinical training programs for various disciplines were seriously interrupted in Toronto as administrators were forced to devise and then amend policies on an *ad hoc* basis. Nursing students and educators in focus groups described the challenge of searching for timely and reliable information, and the need for a better communications strategy in future outbreaks. Hundreds of students and teaching staff, especially those situated in hospitals, had to deal with uncertainty and stress. A number of medical students and resident physicians were quarantined during the outbreak. One medical student developed SARS but recovered rapidly. In addition to interfering with clinical education, SARS disrupted work at hospital-based research institutes and the progress of graduate students in those environments.

SARS had perhaps its largest impact on continuing education for qualified health professionals and health researchers. A dramatic bellwether was the cancellation on two days notice of a long-anticipated meeting of the American Association for Cancer Research in Toronto. There were 16,000 registrants and local organizers had worked for years on the event. Similar cancellations affected scores of other health education and research meetings, as part of the general decimation of the convention and conference business in the GTA.

Issues also arose with local meetings because of increased risks inherent when health professionals from different institutions congregate. This response was rooted less in personal fears of SARS itself, but rather a broader concern that one infected individual attending a continuing education event could force all other attendees into quarantine. For example, when all of Toronto's cardiac surgeons and others from across Canada met for a day of continuing education during the second wave of the SARS outbreak, attendees worried that a catastrophic disruption in cardiac surgery services would occur if just one attendee were infected with SARS and others were forced into quarantine. The outbreak unquestionably lent new momentum to the use of distance-based educational methods for health professionals.

Most resident physicians (i.e., doctors completing their specialty training) continued their usual work, albeit with restrictions on inter-hospital movement. Although many felt understandably anxious about having to resuscitate or intubate a SARS patient, the vast majority of residents viewed themselves as integral members of the health care team, and willingly volunteered to care for SARS patients. Nevertheless, clinical teachers generally sought to limit the exposure of resident physicians to SARS and took the position that residents should be kept off primary SARS unit duty. Educators and ethicists would be well advised to discuss the role of health professional students and trainees in confronting risks posed by dangerous infectious diseases, and frame guidelines for the next outbreak of SARS or a similar organism.

In the end, SARS had only a minimal negative impact on the education of the next generation of nurses, doctors and other health professionals. Some of its impacts were presumed to be positive, as health professionals-in-training saw firsthand the importance of public health and clinical infection control. However, the potential impact of a public health crisis on the health human resource pipeline is obvious. Training institutions should heed SARS as a warning and better prepare themselves for future disruptions. This includes developing emergency plans in collaboration with health care facilities that offer clinical teaching and with local public health units.

7B. Current Supply of Public Health Professionals

Our assessment of the state of public health human resources in Canada is limited by sparse data. For example, public health human resources have not been well characterized in either the Canadian Medical Association or the Canadian Institute for Health Information [CIHI] databases. Sectoral studies sponsored by Human Resources Development Canada have not focused on public health. Other interested parties, including the F/P/T Advisory Committee on Population Health, have also concluded that there is little quantitative information on the state of public health human resources in Canada.

7B.1 Public Health Physicians

The number of doctors engaged in the practice of public health in Canada is difficult to quantify. Canada has about 400 community medicine specialists (physicians who have completed a course of post-graduate education, passed examinations, and maintain professional competence according to Royal College of Physicians and

Surgeons of Canada standards), as well as an unknown number of physicians with other relevant public health qualifications (e.g., a master's degree, a diploma, etc.).

Approximately 135 local or regional health departments employ a total of roughly 150 medical officers of health [MOH] and associate medical officers of health [AMOH]. Governments also employ some of these physicians directly. Table 1 shows medical officer of health positions based on a recent survey of Chief Medical Officers of Health across Canada. Simple math indicates that a large number of doctors have been trained in community medicine or public health but are not actively working in the public health sphere—including academics, those practising occupational or international health, those engaged in clinical practice, and retirees.

Vacancy data are not particularly reliable because physicians working part-time or without formal qualifications occupy many of the filled positions. The National Specialty Society for Community Medicine points out that 8 of 37 health units in Ontario do not currently employ a full-time medical officer of health. The need for additional public health physicians is most acute in rural areas, the Atlantic provinces, the territories and areas served by Health Canada's First Nations and Inuit Health Branch [FNIHB]. Because of human resource constraints, some Canadian provinces simply cannot require that medical officers of health have formal public health qualifications. In Ontario, where specific requirements have been legislated, many health units are forced to rely on acting medical officers of health, who can be hired without the full set of formal qualifications required of medical officers of health.

TABLE 1

Public health physicians employed in provincial or municipal positions in Canada.

Province/ Territory	Ministry-employed	MOH	AMOH	Population[1]
NF	1	6	0	531,145
PEI	1	0	0	140,412
NS	2	4	1	944,456
NB	1	5	0	756,368
QC	5	35	0	7,467,626
ON	11	37	11	12,109,514
MB	2	15	1	1,150,564
SK	2	10	3	1,009,225
AB	2	9	5	3,134,286
BC[2]	8	22	6	4,155,779
NU	2	0	0	28,955
YK	1	0	0	29,841
NWT	2	0	0	41,389
Total	**40**	**143**	**27**	**31,499,560**

1. Population figures based on Statistics Canada preliminary post-census estimates for 1996.
2. Data for British Columbia include 6 MOHs at the British Columbia Centre for Disease Control.

The Committee intends no criticism of those physicians without full specialist credentials now working as medical officers of health. These individuals are bulwarks of a strained system. Instead, we wish to highlight that Canada faces a shortage of public health specialist physicians with contemporary qualifications.

Objective information on the age of the medical officer of health workforce is currently being collected; preliminary results show that up to 31% of public health physicians in MOH positions will retire in the next 10 years.

The educational pipeline currently has limited capacity. The usual route to public health specialization for a doctor is five years of training after medical school. However, Canada has only 11 residency positions each year for community medicine training. In 2003, only 7 spots were offered in a pool for graduating medical students outside Quebec.

Even more important than the limited number of training spots is the proportion of community medicine residents who actually work in public health after completing their specialty training. This is variously described by the three largest programs as "most", "very few", and "about half". Only a handful of Canadian-trained physicians, therefore, enter the public health workforce each year. A few more public health physicians are recruited from countries like the United Kingdom and South Africa each year but overall, the supply pipeline remains extremely

constrained. Preliminary survey results show that 83% of public health physicians believe that there should be more residency positions, and 87% support easier re-entry into post-graduate training for doctors already practising family medicine or another specialty.

Compensation is frequently cited as a barrier to recruitment and retention of public health physicians. Whether compensation-related or not, interest in the specialty is limited.

In Quebec, public health physicians are able to bill the provincial health insurance program on a sessional basis instead of receiving a salary from the public health department. This arrangement, along with a provincial strategy of self-sufficiency in health human resources, has given Quebec many more physicians working in public health departments than elsewhere in the country—more than 140 specialists are registered with the Quebec Association of Community Health Physician Specialists.

Relatively poor remuneration is not the only drawback to working as a public health physician. Other potential disincentives are the challenges of working in a political and bureaucratic environment and bearing ultimate responsibility for the health of thousands of citizens in a particular region.

7B.2 Public Health Nurses[1]

Public health nurses are the single largest group of professionals in the public health workforce. By most estimates they account for almost one-third of the total public health human resources. Experts estimate that there are approximately 12,000 public health nurses in Canada. (CIHI reports 21,334 in 2002, but this figure includes nurses working in community health centres, day care centres, and several other settings).

The Canadian Nurses Association has noted that the number of registered nurses in Canada rose from 113,000 in 1966 to 262,000 in 1991, but was only 253,000 in 2001. The Canadian Nurses Association estimates that Canada will be short 7,000 registered nurses by 2011 and 113,000 by 2016. Some experts suggest that Canada is already short 16,000 nurses. Unfortunately, information about the nursing workforce is not collected in a way that makes it possible to extract data on public health nurses.

Shortages are reported in rural, remote and First Nations locations. For example, about 50% of FNIHB's nursing positions were reported to be unfilled two years ago. Overall, our best estimate is that the shortage of nurses for public health positions is similar to that for other nursing specialties. Some would argue that the situation might actually be better in public health. The hours and nature of the work and the relative independence in decision making make these positions attractive choices for many nurses. To quote one interview participant, "It's easy to find applicants to recruit, especially with nurses wanting to leave the poor conditions of acute care, and move to Monday to Friday schedules." On the other hand, Committee informants reported that nurses are demoralized by a mismatch between funding and service demands. One public health nurse observed that: "There is an increased expectation to do more with less. This expectation is becoming increasingly unmanageable."

Nursing recruitment into public health is particularly difficult in rural and remote northern areas. Remote northern areas have the unique challenge of extreme social isolation, although turnover in rural and northern areas is reportedly low. Remote areas that have retained experienced public health nurses for long periods now face the challenges associated with an aging workforce. Nurses new to the north need opportunities to develop the breadth of skills and depth of knowledge needed to practice independently. Funds and mechanisms for continuing education are therefore an important part of retention and career development for public health nurses in remote areas.

In some jurisdictions, the restructuring of health systems has resulted in the integration of public health staff and budgets with those for patient care. Integration may also include one collective agreement for all nurses employed by the regional authority. This has contributed to identity loss for public health nurses. As one individual told the Committee, "A frustrating by-product of regionalization is that public health nursing has no central leadership, no one to address broad public health nursing mandates."

A related problem is the reintroduction of "integrated practice" or "community health nursing", where the distinction between traditional public health nursing and individual care is blurred. Where a nurse is responsible not only for community health promotion, but also for

1 Information for this section was obtained by Health Canada through 13 key informant interviews, 20 survey responses (from a convenience sample), and a non-exhaustive literature review. Interviews and surveys reflected input from British Columbia, Alberta, Saskatchewan, Ontario, Nova Scotia and Newfoundland and Labrador. Urban, rural and remote perspectives were captured. Respondents included public health nurses, administrators, educators, and consultants.

home care or ambulatory clinic care, limited public health resources may end up diverted into other areas of the health care system.

The crucial work that public health nurses perform is sometimes invisible. The submission by the ANDSOOHA spoke eloquently to the essential role of public health nurses during the SARS outbreak, but these contributions have received little public attention. Indeed, the Committee heard repeatedly that public health nurses feel that governments, the public, other health professionals, and perhaps most discouragingly, nurses in other sectors are insufficiently aware of the contribution of the public health nurse.

Public health employers currently use a wide variety of recruitment and retention strategies to entice nurses into public health practice. In addition to better compensation packages, employers use recruitment strategies such as offering funds for continuing education, advertising campaigns, establishing wellness projects designed to enhance the work environment, and implementing monitoring tools like exit interviews. In some cases, however, recruitment strategies themselves have been compromised by budget cuts.

7B.3 Laboratory Personnel

Working behind the front lines, laboratory personnel are essential members of the public health workforce as the preceding chapter indicated.

Medical microbiologists are in very high demand. As with community medicine, there are few residency positions for MD-prepared medical microbiologists, and available spots often go unfilled. PhD-trained microbiologists are also in short supply, and the erosion of public health laboratories has limited the attractiveness of this career stream. Even were the applicant pool large enough to replace those who retire—and most expert informants believe that it is not—newly-qualified persons rarely have the additional skills essential (e.g., epidemiology and management training) for public health work. Unlike the United States, Canada has no formalized post-doctoral program providing for medical microbiologists interested in a public health career.

The alignment of responsibilities and salary remains an issue. The Canadian Association of Medical Microbiologists commented on "the lack of competitive financial remuneration in the public health sector." For example, in August 2003, the Committee noted that a provincial government was advertising for a laboratory specialist to manage a regional public health laboratory. The advertisement sought applicants with a knowledge of bacteriology, virology, mycology, parasitology and serology who had an MSc or PhD from a university of "recognized standing", demonstrated managerial experience, highly developed interpersonal skills, and a willingness to travel. The salary range was $60,000 to $77,000.

PhD-trained microbiologists are critically important in staffing reference laboratories and research centres. The Committee did not have a detailed inventory of training opportunities and output of research scientists who have the capacity to play a role in cutting-edge laboratory activities that will lead to better diagnostic and therapeutic capacity for emerging infectious diseases. However, we are concerned that these highly-skilled personnel are not being trained, recruited, and retained in sufficient numbers.

Aside from the recurring theme of rural undersupply, the supply of technologists is more or less adequate at present. However, this is partly a function of recent trends to mechanization and centralization of laboratory functions, but these trends have reduced the number of full-time positions and may have ripple effects on longer-term labour supply. The Canadian Society for Medical Laboratory Science [CSMLS] notes that "Half of Canada's medical laboratory technologists will be eligible to retire by 2016…Thirty per cent of medical laboratory technologists work part time. The number of part-time positions reflects the cutbacks in laboratory staff that have taken place in institutional workplaces, which in turn have an impact on the ability to recruit new people into the field." CSMLS estimates that 281 new training positions are required based on current demands and demographics in their discipline.

7B.4 Infection Control Practitioners and Hospital Epidemiologists

Infection control practitioners—The US recommendation for the provision of trained hospital infection control practitioners [ICP] is one per 250 active care beds. More recently, the Infection Control Alliance (an alliance between the Canadian Infectious Disease Society, the Community and Hospital Infection Control Association and Health Canada) has recommended a ratio of one ICP per 175 active care beds. Forty-two percent of Canadian hospitals fail to meet the former standard, and 80% cannot attain the latter. Health Canada has been considering even more stringent standards; these envisage one practitioner per 115 acute beds, and one per 250 long-term beds. These ratios would drop further for institutions with critical care beds. Given our hospitals' inability to

meet the current standard, it is obvious that they will be unable to come close to the new Health Canada standard. This suggests a massive shortfall in the number of infection control practitioners necessary to provide optimum infection control in the hospital sector.

Infection control practitioners are mostly either nurses (88%) or laboratory technologists (10%) who learn on the job. Fifty-five percent are certified—usually by the Certification Board of Infection Control and Epidemiology in the United States. Certification requires two years' experience, learning from a self-study guide and passing an examination. Continuing education is required to maintain certification.

Health Canada was formerly involved in infection control training; a senior Health Canada nurse led modular training courses for practitioners across the country. These courses were well received, but Health Canada has neither offered nor been directly involved in infection control training courses since 1989. There is now one formal training program in Canada—the Canadian Hospital Infection Control Association and Centennial College partner to train infection control practitioners in an intensive two-week course.

Hospital epidemiologists—Some physicians, usually trained in infectious disease, spend part or all of their time as medical directors of infection control programs. These individuals are known as "hospital epidemiologists" in the USA, although few have full training in epidemiology. Only one Canadian university, the University of Calgary, currently offers post-graduate training in hospital epidemiology. The number of fully-trained hospital epidemiologists in Canada is extremely limited, and most of them received their education in the United States. Many physicians working as infection control directors lack this background. The advantage of hospital epidemiology training is that it helps to create a conjoint public health and infection control approach.

Fewer than 60% of Canadian hospitals have a physician serving as infection control director. Those who fill these roles sometimes lack formal training, and others with infection control or hospital epidemiology backgrounds are spread across multiple institutions. The reason for this undersupply is clear—infection control activity does not count as 'billable time' for physicians, and hospitals are understandably reluctant to divert scarce resources into unfunded programs.

Surge capacity—Severe understaffing of Toronto-area hospitals from an infection control standpoint became clear during the SARS outbreak. As noted in Chapter 2, even if the government had ordered hospitals to conduct comprehensive syndromic surveillance after the first wave of SARS cases, most hospitals would not have been able to operate such a program without outside help. During outbreaks, when multiple institutions are affected simultaneously, the problems inherent in sharing infection control practitioners and directors among institutions also become apparent.

Integration between hospitals and public health units—Outbreaks obviously do not confine themselves to hospitals. Therefore, formal linkages between hospital infection control programs and public health units are important. In Ontario, for example, mandatory guidelines require that an employee of the local public health unit sit on each hospital infection control committee. Informal contacts are common, but as we shall see in Chapter 8, compliance with guidelines is variable.

7B.5 Infectious Disease Specialists

Infectious disease specialists are physicians certified in internal medicine or paediatrics who have taken additional sub-specialty training in infectious disease. Most infectious disease physicians choose to work at academic rather than community hospitals. Committee interviewees speculated the preference for teaching hospitals might be related to compensation. It is not uncommon for these specialists in teaching hospitals to be supported by a variety of salary sources to maintain a competitive income, given the relatively limited potential for generating fee-for-service revenue through patient care. In community hospitals, infectious disease physicians are not able to bill as much as other specialists. More generally, infectious disease specialists face the same income gap as other cognition-based medical specialties when contrasted with procedurally-oriented specialties.

The continued challenges of older and emerging infectious diseases, including the appearance of more antibiotic-resistant organisms, has led more community hospitals to search out infectious disease specialists. In the Greater Toronto Area, for example, there are now 12 community-based specialists in infectious diseases as contrasted with two a decade ago. However, this remains a specialty that is undersubscribed and inconsistently supported by conventional fee-for-service billings.

7B.6 Epidemiologists

Committee informants were virtually unanimous in their belief that Canada needs more epidemiologists who can do outbreak investigation and infectious disease research. While Canada does train a modest number of epidemiologists, they are drawn largely into non-communicable disease epidemiology, including cancer and cardiovascular disease, as well as health services research where their observational and analytical skills are both valuable and valued. A prominent exception is HIV/AIDS; many highly-trained epidemiologists are working on controlling this disease. Canada must draw more students into the field of infectious disease epidemiology and provide support and training opportunities for them. It has also been argued that short courses in infectious disease epidemiology are an essential part of capacity building for many aspects of public health practice and leadership, but are not widely available.

7B.7 Other Public Health Workers

Many other disciplines do work that is relevant to public health. Examples include public health inspectors, dental hygienists, nutritionists, health promotion specialists, communication officers, sociologists, and community development workers to name a few. Little or no information is available on the number, trends, and challenges facing these groups, emphasizing the need for a comprehensive inventory of the public health workforce. In disciplines such as pharmacy and veterinary medicine, there is more reliable information on the workforce but, as indicated in submissions by national associations for both these professions, insufficient attention has been paid to how their work could be integrated with public health priorities.

7B.8 Overall Assessment

Although data are scarce, the SARS outbreak made clear that even in Toronto, where the public health infrastructure is relatively strong, public health human resources are deficient. Indeed, one of the rate-limiting steps in the Committee's plan to enhance Canada's public health infrastructure is the lack of qualified personnel to take on the relevant roles and responsibilities. Several provincial and territorial ministries have vacancies in key positions. Although urban centres are currently able to fill most of their public health positions, problems with recruiting and retaining public health physicians were reported in all jurisdictions and public health nurses are in particularly short supply in rural and northern areas. Anecdotal reports suggest that the situation with public health inspectors is only marginally better, and infection control practitioners are in critically short supply given the new standards about to be released. Infectious disease epidemiologists are few and far between, and Canada also lacks medical microbiologists and fully-qualified directors of hospital infection control. Existing human resources, in sum, are insufficient to meet current and future public health challenges.

7C. Nature of Education and Training

Although Canada needs more public health workers, increasing the supply alone would be a half-measure. A thorough review of public health training programs is also needed—new entrants to the public health workforce should be appropriately qualified, and existing public health workers should be provided with opportunities to acquire additional skills if necessary. We focus here on just three of the groups reviewed above—physicians, nurses, and epidemiologists.

7C.1 Physicians

Although we produce far too few public health physicians, the ones who do undergo specialty training are well qualified. Unlike in the United States and the United Kingdom, all residency programs in Canada must be university-based. The Royal College of Physicians and Surgeons of Canada closely monitors all specialty residency programs, ensuring uniformly high standards across the country. According to the National Specialty Society for Community Medicine [NSSCM], all nine fully-accredited training programs for public health specialization offer relevant didactic training plus supervised field-based experience in responding to communicable disease outbreaks.

On the other hand, the nature of this outbreak experience clearly varies. At least part of the problem in combating SARS was that the generation of public health physicians who had faced massive outbreaks of life-threatening respiratory or enteric viruses is no longer practising. An outbreak of an enterovirus like Norwalk has a significant effect on the health care system but does not threaten lives the way that SARS did. HIV has its own relatively distinct epidemiology. West Nile virus is not transmitted from person to person, and tuberculosis is rare. The generation of public health physicians who fought outbreaks of polio has long since retired. The public health physicians and hospital epidemiologists who fought SARS have a unique experience that is shared only by some who have fought outbreaks through international outreach and training. Their experiences should be distilled and shared widely.

Exposure of public health physicians to hospital infection control issues varies with the site of their training and early practice experiences. The NSSCM highlighted that regional health authorities have offered an opportunity for more seamless integration of the public health and clinical perspectives. Many regions have a Communicable Disease Advisory Committee that includes representatives with expertise in broad public health, hospital and long-term care infection control, epidemiology, and surveillance.

Relatively few public health physicians maintain active clinical practices while working for a public health unit. Aside from reporting mandatory diseases, even fewer clinical specialists and family doctors interact in a meaningful way with their local public health units. Opinions presented to the Committee varied as to the merits and nature of "cross-training". Some endorsed the idea of dual training in general internal medicine and community medicine. Others pointed out that specialists in community medicine have ample clinical exposure during their post-graduate training, including full certification in family medicine. The NSSCM suggested that cross-training would be best constructed by focusing not on public health specialists but on clinicians, viz. requiring family medicine, emergency medicine, general pediatrics and internal medicine, and infectious disease residents "to complete at least a one-month rotation in communicable disease control in a local public health unit."

The *Survey of Public Health Capacity* in Canada found a widespread belief that continuing education opportunities are lacking for public health practitioners. About half of respondents reported that continuing education to be somewhat or completely inadequate. Greater continuing education opportunities are especially needed in the areas of informatics and technology.

Limited linkages to academe add to the problems with recruitment and retention of public health practitioners in urban areas. Among the various medical specialties, community medicine provides perhaps the fewest opportunities for active practitioners to form a working relationship with a university. Some community health practitioners hold unpaid adjunct appointments, but there are only a few instances where public health physicians engage in both academic work and public health practice. Community medicine specialists who work entirely within the university sector are also becoming rare. As Prof. Harvey Skinner, chair of public health sciences at the University of Toronto has written, strengthened linkages between the academe and the public health sector "advance an evidence-based culture of learning, stimulate interdisciplinary research and knowledge translation, [and] accelerate basic and advanced training."

7C.2 Nursing

Traditionally, registered nurses had to complete an additional one-year diploma before becoming a public health nurse. Nursing degrees are now becoming the norm, and diplomas have been discontinued. Most public health nurses today are baccalaureate-trained, and further specific training in public health is no longer mandatory. Instead, public health nurses learn on the job through formal and informal in-service training.

Some experts believe that specific public health nursing training should be reintroduced. Public health nurses have expressed the view that public health nursing should be regarded as an advanced practice specialty. Acceptance of this position has apparently been hampered by the unavailability of graduate programs in public health nursing. When nurses with longstanding experience in the clinical sector move to public health posts, formal retraining is appropriate, but the formal training and retraining opportunities in public health are limited. Relatively few registered nurses go on to a master's degree in public health or similar graduate credential, and career paths in public health nursing have not been well-defined.

Some respondents also suggested that the educational system could better equip nursing graduates for public health practice. The undergraduate nursing curriculum tends to focus on acute care; population and public health courses are limited. In addition to ensuring adequate credit hours for public health theory and practice, training institutions need to hire faculty members with public health expertise.

Many faculties/schools of nursing would benefit from closer collaboration with public health units to provide meaningful practicum experiences for nursing students. Some Committee informants remarked that curricula should be more collaborative—public health nurses work in interdisciplinary teams, and they should train in an interdisciplinary environment as well.

As already suggested, opportunities for upgrading knowledge in public health nursing are limited. Some employers fund continuing education; few fund it satisfactorily and some do not fund it at all. Some Committee informants reported workplace policies supportive of continuing education; others described an environment with rigid schedules (compromising the ability to attend courses), a complete lack of tuition fee support, and an unwillingness or inability among supervisors to provide the on-site practical experience necessary for certain qualifications. Unique challenges were identified in northern, rural and remote settings where in-person continuing education is prohibitively expensive. Keeping rural public health nurses energized by contemporary best practices is nearly impossible with the current communications infrastructure.

National standards for public health nursing practice would be helpful in establishing a set of core competencies in the public health nursing workforce. They must be implemented carefully to avoid compromising an already limited workforce by erecting new barriers to entry. The necessary core competencies suggested by Committee interviewees include an understanding of:

- population health principles
- epidemiology and surveillance
- basic statistics
- environmental health
- informatics and data management
- program planning, management and evaluation
- adult education
- advocacy
- negotiation
- interdisciplinary practice
- injury prevention
- health promotion
- community development
- social marketing
- public policy and legislation
- research methodology and statistics

7C.3 Epidemiologists

It was abundantly clear during the SARS outbreak that Canada needs more epidemiologists with an orientation to field investigation and outbreak response. Canada has many university epidemiology programs, but most of these are research-oriented. One exception is the University of Toronto's Master of Health Science program—its content is relevant to public health, and many of its enrolees are practising health professionals looking to upgrade their skills. However, the program constitutes a broad preparation for a career in public health and does not offer the depth or experience required for outbreak investigation. Furthermore, PhD-stream epidemiologists seem to be drawn largely to non-communicable diseases, HIV/AIDS, and health services research.

One non-university option is the Field Epidemiology Training Program operated by Health Canada. This program takes in just five or six individuals per year (mainly health professionals who already have a master's degree in epidemiology), provides further training and then assigns them to supervisors in the field. Under supervision, the trainees usually have the opportunity to investigate outbreaks. The result has been a small but growing cadre of field epidemiologists who are better prepared for leadership positions in local, provincial or national public health agencies.

The program has tremendous potential. US experience with a similar program illustrates the many advantages of a dynamic field-epidemiology training program in creating cross-linkages among jurisdictions and strong expertise in outbreak investigation and response, including issues of institutional infection control. We believe the field epidemiology program should be reviewed and greatly augmented as part of a broad F/P/T strategy for renewal of human resources in public health. The proposed F/P/T Network for Communicable Disease Control, and a National Public Health Service within the Canadian Agency for Public Health would provide training opportunities and a career path for those enrolled in this program.

Health Canada's Skills Enhancement for Health Surveillance program is a web-based distance education program aimed at front-line and supervisory workers in local health departments. While not intended to substitute for master's level training, and still under development, it aims to provide basic, high-quality training in epidemiology, surveillance and information management.

7D. A Public Health Human Resources Strategy

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. Our national aim should be to produce a cadre of outstanding public health professionals who are adequately qualified and compensated, and who have clear roles, responsibilities and career paths. Without urgent implementation of a public health human resources strategy, that aim cannot be achieved.

Other nations are also grappling with this challenge. In the USA, partly as a result of a fragmentation of public health services at the local level, skills and qualifications are suboptimal. A CDC report published in 2000 reported that only 44% of the public health workforce had formal training in public health and just 22% of local health department executives had graduate degrees in public health. Despite (or perhaps because of) these discouraging statistics, the USA and several other countries we reviewed have specific initiatives directed towards developing and sustaining the public health workforce. For example, joint initiatives between the CDC and post-graduate schools of public health target the continuing education needs of the United States public health workforce.

We have highlighted already that Canada faces a serious shortage of public health physicians. However, simply creating more training positions will not suffice. Incentives are needed that will draw medical students into community medicine as a specialty training program. In turn, given the clear problem with graduates who leave the field, there is a need to provide community medicine graduates with more rewarding careers in public health per se. Some small rural regions with few resources will continue to find it difficult to attract qualified medical officers of health; it may be necessary to combine health regions for public health purposes, or to have a two-tier system of medical officers of health, with senior staff acting as consultants or supervisors to several regions.

Medical officers of health and senior public health nurses also need better linkages with universities. Most physicians practising at teaching hospitals receive university appointments—in addition to treating patients, they teach medical students and resident physicians, and are often supported to do research. In the public health sphere, the teaching health unit is the teaching hospital equivalent. This valuable concept should be embraced in every city where the 16 Canadian health science faculties are located. "Teaching health units" are critical if public health is to attract its share of exceptionally able physicians, nurses, epidemiologists, social scientists, and other public health workers. Analogously, in fields such as medical microbiology, both Health Canada's laboratories and the British Columbia Centre for Disease Control have demonstrated that close links with university departments are beneficial. These academic connections feed a cycle of training and research opportunities that help to make knowledge-based workforces self-renewing and dynamic.

The available data suggest that shortages and challenges from insufficient training and suboptimal work environments affect many constituents of the public health workforce. A national initiative to frame a public health strategy is clearly needed. Part of the exercise must be to hear out the concerns of public health practitioners in all the relevant disciplines. Any national strategy for renewal of human resources in public health can only succeed if developed in consultation with a broad range of stakeholders and supported by a dedicated national secretariat. Moreover, a plan on its own will do nothing—it must attract resources and be put into action as a matter of urgency. This is why, in budgeting for the Canadian Agency for Public Health, the Committee projected a recurring expenditure of $25 million per annum for health human resource renewal.

Training, professional development and continuing education will be prominent activities in reconfiguring the public health workforce. Existing programs can be bolstered. The Field Epidemiology Training Program, for example, should be significantly expanded beyond its current intake of five or six trainees each year.

As outlined in earlier chapters, the Committee envisages a system of federally-funded training placements that would constitute a logical career path for young Canadians interested in public health. A public health nurse fresh from his baccalaureate could take a part-time Master's degree in Public Health with a tuition bursary while doing disease surveillance projects in one of the regional nodes on the F/P/T Network for Communicable Disease Control. He could then spend a year doing front-line general public health work in an Aboriginal community and return to a health promotion position in Vancouver's public health department. A physician trained in community medicine could do a Field Epidemiology Placement, learning the essentials of outbreak management as part of a mobile response team based in Winnipeg. She could go on to become an Associate

Medical Officer in Toronto, then rejoin the federal system as the director of a non-communicable disease surveillance program in the Canadian Agency for Public Health. Internet-based distance education could be used more extensively. All of these activities would be undertaken with academic, voluntary sector, professional and international partners, linked to and by a series of formal and informal networks, and set out in a multi-year plan with milestones and measurement of progress.

Public health workers, like other Canadians in the workforce, want and need stimulating career paths. A National Public Health Service, where interested individuals could move through medium-term assignments in different disciplines or locations, would build capacity by strengthening individual skills and by sharing knowledge across jurisdictions. This movement of personnel would assist with disease surveillance and coordination of health promotion. A wider range of pan-Canadian experiences for public health leaders would also facilitate sharing of experiences with new programs and systems. Canada's F/P/T health systems are pluralistic and innovative; better learning across the systems would save costs, boost morale, and build collaboration. Last, in emergencies, a cadre of individuals familiar with change and accustomed to steep learning curves would be ready for deployment to municipal and provincial public health agencies.

The Committee did review several options for improving our public health human resources. The ***status quo*** is clearly insufficient—the public health human resources situation would continue to deteriorate, leaving Canadians vulnerable to a wide range of infectious diseases in the future, and subject to preventable morbidity and mortality from chronic diseases and injuries. A strategy to increase the number of public health workers by ***lowering standards*** was briefly considered. When properly qualified persons are unavailable, one could, in theory rely upon untrained persons. The Committee believes this would lead to a "race to the bottom", would negate gains made over several decades of gradual improvement in standards, and increase the risk to the public's health. Notwithstanding these concerns, there may be valid reasons to examine critically some of the competencies and qualifications required for effective public health practice. The public has a right to know that their tax dollars are flowing to support the most cost-effective approach to provision of services.

In an ***incremental/disjointed*** strategy, each F/P/T jurisdiction might attempt to address issues as they arise. Education and recruitment issues, however, as well as the inter-jurisdictional nature of public health practices, necessitate a national approach. The western provinces, for example, cannot currently meet their needs for public health physicians without recruiting from Ontario.

We could also ***recruit our public health workforce from abroad***. While this may be suitable in select instances, relying on foreign recruitment is subject to fluctuations in international supply, arguably unethical when we raid developing countries such as South Africa that have health human resource challenges of their own, and unlikely to meet Canadian needs in the longer-term.

All this leads us back to the view that a coherent ***national strategy*** is the only way forward. A national public health human resources strategy should be based on a partnership (after the Australian model) involving federal, provincial and territorial governments, as well as academic stakeholders and professional associations. Under the guidance of a director and with the support of a secretariat, such a partnership must develop a strategy, implement it, and monitor its progress. The secretariat should work with regulatory bodies, CIHI and other organizations to support data collection, develop better baseline information about the workforce, compare roles of public health workers in Canada and other countries, and evaluate the roles of different members of the public health workforce. The secretariat must also explore why certain professionals choose public health practice and others do not; help define the educational standards needed to achieve, maintain and enhance competence for public health; and make recommendations regarding public health pay scales.

Institutional infection control provides an illustration of how the strategy and secretariat might function. Relevant stakeholders would be pulled together into a task force to address this specific sector. A first phase of activity might see assessment of current standards and training programs, along with a more precise delineation of the supply of infection control practitioners and anticipated shortfalls. The next phase could be the rapid development of strategies to increase training opportunities and offer incentives to nurses, laboratory technologists, and others who might be trained in infection control. These strategies would be rolled out with support from the Canadian Agency for Public Health and provincial/territorial jurisdictions as well as institutional partners. Creation of continuing education and recertification programs could also be part of the strategy for sustaining the ICP workforce. Last, to maintain a cycle of workforce renewal, graduate programs in infection control could be developed in a limited number of universities, thereby training the next generation of teachers of infection control practitioners.

Any national human resource strategy should be closely aligned with other plans to enhance surge capacity. The HERT concept, for example, appears best suited to full-blown emergencies. Might there also be a system of human resource clusters so that redeployment of personnel would be possible in the event of other shortfalls in local or regional response to a particular set of health threats? From the Committee's perspective, any human resource strategy should not only aim at making Canada self-sufficient as regards public health personnel; it should also explicitly aim at enhancing inter-jurisdictional collaboration on a continuing basis. A national strategy could therefore provide for more varied positions, flexible employment, exchanges between different job positions (both within Canada and internationally), and cross-jurisdictional continuing education.

Either through the partnership or through the creation of a virtual national public health institute focused on education and training in public health, dedicated funding mechanisms must be developed to support public health workforce development. The $25 million per annum from the Canadian Agency for Public Health would go some distance to catalyzing workforce renewal. But shared funding will be necessary to create regional consortia and teaching health units, to augment graduate and post-graduate training positions in public health, to increase the presence of actively practicing public health professionals in universities, to support opportunities for advanced training in public health for nurses already in the workforce, and to provide scholarships and bursaries targeted at high-need areas such as First Nations and rural communities.

The strategy will depend, as noted, on more than F/P/T collaboration. Partnerships must be developed with educational institutions, relevant national and provincial associations, regulatory bodies, major municipal health units, industry, research agencies, rural communities, Aboriginal groups, and other stakeholders. Educational institutions, in particular, would need incentives to review curricula in relevant health disciplines to ensure adequate exposure to public health and the control of infectious diseases. A major step forward would be development of an 18-24 month non-thesis applied epidemiology and public health master's degree for health professionals, available in full-time and 'executive/part-time' formats, at multiple sites across Canada. Other foci for new programming include "summer schools" or short courses in epidemiology, outbreak investigation, public health informatics, health promotion, and similar topics relevant to the practice of public health, targeting public health practitioners already in the workforce. We also urge the creation of a one-year public health leadership and management program, and funding of post-doctoral positions in public health laboratory science. Finally, Canadian universities, the Canadian Institutes of Health Research, the new Canadian Agency for Public Health, and other federal agencies and departments, must play an active role in increasing the opportunities for public health workers to develop or strengthen their research skills.

7E. Recommendations

The Committee recommends that:

7.1 Health Canada should engage provincial/territorial departments/ministries of health in immediate discussions around the initiation of a national strategy for the renewal of human resources in public health. This F/P/T strategy should be developed in concert with a wide range of non-governmental partners, and include funding mechanisms to support public health human resource development on a continuing basis.

7.2 Health Canada should catalyze this strategy by urgently exploring opportunities to create and support training positions and programs in various public health-related fields where there are shortfalls in workforces (e.g., community medicine physicians, field epidemiologists, infection control practitioners, public health nursing, and others).

7.3 The Canadian Agency for Public Health should develop a National Public Health Service, with a variety of career paths and opportunities for Canadians interested in public health. The National Public Health Service should include an extensive program of secondments to and from provincial/territorial and local health agencies, with arrangements for mutual recognition of seniority and a range of collaborative opportunities for advancement.

7.4 Educational institutions, in collaboration with teaching hospitals as applicable, should develop contingency plans to limit the adverse impact on their students and trainees from infectious disease outbreaks, while maximizing learning opportunities from these events. These plans should include communications, education regarding infection control, preparedness with appropriate protective gear, guidelines for support of students/trainees in quarantine or work-and-home isolation, strategies to limit the impact of impeded access to usual teaching and research sites, and guidelines for the involvement of students in the care of patients with serious infectious conditions.

Sources and References

Santana, S., "Containing SARS: University of Toronto rises to the challenge," *AAMC Reporter*, July 2003. (www.aamc.org/newsroom/reporter/july03/sars.htm)

McGugan, Susan. "Medical school on bypass during the SARS outbreak," *Clinical and Investigative Medicine*, June 2003, 26(3):106-7.

Advisory Committee on Population Health and Health Security, Final Report of the Public Health Human Resources Task Group. June 2003.

Report to the F/P/T Deputy Ministers of Health by the Advisory Committee on Population Health, "Survey of Public Health Capacity in Canada, Highlights," March 2001.

Health Canada, Centre for Surveillance Coordination, "End-to-End Surveillance Project, Consolidated Gap Analysis," September 2002.

National Public Health Partnership, Australia, http://hna.ffh.vic.gov.au/nphp/index.htm

US Centers for Disease Control and Prevention, Public Health Practice Program Office, http://www.phppo.cdc.gov/

US Centers for Disease Control and Prevention, Epidemiology Program Office, http://www.cdc.gov/epo/index.htm

Interviews:

Dr. Cory Neudorf
Medical Officer of Health, Chief Information Officer and Vice-President, Information, Saskatoon Health District

Dr. Stephen Whitehead
Associate Medical Officer of Health, Saskatoon Health District; formerly Director of Public Health, Derbyshire, United Kingdom

Ron de Burger
Director of Environmental Health, Toronto City Health Department

Shirley Paton
Chief, Nosocomial Infections, Centre for Infectious Disease Prevention and Control, Health Canada

Dr. Richard Musto
Head, Department of Community Health, University of Calgary

Dr. Rick Matthias
Department of Health Care and Epidemiology, University of British Columbia

Dr. Bart Harvey
Director of Community Medicine Residency Program, Department of Public Health Sciences, University of Toronto

Dr. Dick Zoutman
Medical Director, Infection Control, Kingston General Hospital, and Vice-President, Canadian Hospital Infection Control Association

Dr. Sam Ratnam
Director, Public Health Laboratory, St. John's, Newfoundland.

Dr. Tony Mazzuli
President, Canadian Association of Clinical Microbiology and Infectious Disease.

Dr. Susan Richardson
President, Canadian Association of Medical Microbiologists