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Health Policy Research

Bulletin

Health Human Resources: Balancing Supply and Demand

Health care delivery is highly labour intensive. As a result, an effective and sustainable health care system depends on having the right number and mix of health care workers. Increasingly, reports of current and impending work force shortages are becoming the subject of public concern and debate.

This issue of the *Health Policy Research Bulletin* identifies the key policy levers that are available to address the imbalances in health human resources (HHR) in Canada and explores the type of evidence that is shaping the current planning and policy development process. In particular, this issue focuses on:

- paid health care providers and the complexity of the health care work force
- how pressures on both HHR supply and demand contribute to work force imbalances and create HHR “shortages”
- the challenges in assessing HHR shortages and emerging evidence about where these shortages are
- the influence of demographic trends such as population growth and aging on escalating HHR requirements “down the road”
- how improving working conditions can help ease current imbalances and attract new recruits
- the need to situate HHR issues within the global context and how integrating foreign-trained health care providers helps address short-term HHR imbalances

A clear message emerges from these articles: averting future HHR shortages requires a committed and sustained effort now, with researchers and forecasters working closely with planners and policy makers to develop sound, evidence-based decisions.

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Federal/Provincial/Territorial Reports

Following are web links to a sampling of relevant reports.

Senate Standing Committee on Social Affairs, Science and Technology: *The Health of Canadians — The Federal Role: Final Report on the State of the Health Care System in Canada* (Kirby), 2002, pp. 185–199
<<http://www.parl.gc.ca/37/2/parlbus/commbus/senate/com-e/soci-e/rep-e/repoct02vol6highlights-e.htm>>

Commission on the Future of Health Care in Canada: *Building on Values: The Future of Health Care in Canada* (Romanow), 2002, pp. 91–114
<<http://www.hc-sc.gc.ca/english/care/romanow/hcc0086.html>>

BC: *Patients First: Renewal and Reform of British Columbia's Health Care System*, 2001
<<http://www.legis.gov.bc.ca/cmt/37thparl/session-2/health/reports/healthtoc.htm>>

AB: *A Framework for Reform* (Mazankowski), 2001
<<http://www.premiersadvisory.com/reform.html>>

SK: *Caring for Medicare: The Challenges Ahead* (Fyke), 2001
<http://www.health.gov.sk.ca/mc_dp_commission_on_medicare-bw.pdf>

MB: *Worklife Task Force: Renewing our Commitment to Nurses*, 2001
<<http://www.gov.mb.ca/health/documents/worklife.pdf>>

ON: *A Public Dialogue on Health Care*, 2002
<http://www.health.gov.on.ca/english/surveys/archives/sur_02/dialogue_0701/dialogue_report.pdf>

QC: *Emerging Solutions* (Clair), 2001
<<http://ftp.msss.gouv.qc.ca/publications/acrobat/f/documentation/2001/01-109-01a.pdf>>

NB: *Health Renewal Report from the Premier's Health Quality Council*, 2002
<<http://www.gnb.ca/0089/phqc/pdfs/health.pdf>>

NS: *A Study of Health Human Resources in Nova Scotia*, 2003
<<http://gov.ns.ca/health/hhr/default.htm>>

PE: *Nursing Recruitment and Retention Strategy*, 2003
<<http://www.gov.pe.ca/hss/recruitment/nursing.php3>>

NL: *Healthier Together: A Strategic Health Plan for Newfoundland and Labrador*, 2002
<<http://www.gov.nl.ca/health/strategiehealthplan/pdf/HealthyTogetherdocument.pdf>>

NT: *Retention and Recruitment Plan for the Northwest Territories' Allied Health Care Professionals, Nurses and Social Workers*, 2002
<http://www.hlthss.gov.nt.ca/Content/Publications/Publication_index.htm>

YK: *Report to Yukoners on Comparable Health and Health System Indicators*, 2002
<http://www.hss.gov.yk.ca/docs/health_indicators_2002.pdf>

NU: *Our Words Must Come Back To Us*, 2003
<<http://www.gov.nu.ca/hsssite/lnungni%20Sapujijit%20E.pdf>>

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Health Human Resources:

A Key Policy Challenge

In this issue, Nancy Hamilton, Managing Editor of the Health Policy Research Bulletin, speaks with Cliff Halliwell (CH), Director General of the Policy Research and Coordination Directorate, Strategic Policy and Planning Branch, Human Resources and Skills Development Canada (former Director General of the Applied Research and Analysis Directorate, Information, Analysis and Connectivity Branch, Health Canada); Judith Shamian (JS), Executive Director of the Office of Nursing Policy, Health Policy and Communications Branch, Health Canada; and Robert Shearer (RS), Director of the Health Human Resource Strategies Division, Health Policy and Communications Branch, Health Canada.

Q When policy researchers use the term “health human resources” (HHR), what do they mean?

RS: The term “health human resources” generally refers to those individuals who provide health care or health services to the public, from physicians, nurses and allied health professionals — such as medical laboratory technologists, pharmacists, psychologists and physiotherapists — to family and volunteer caregivers. The health care work force is extremely complex. It’s made up of a mix of regulated and unregulated workers, unionized and non-unionized workers, as well as those working under various public and private funding arrangements, such as dentists and chiropractors.

JS: I’d like to reinforce Robert’s point about complexity. There are several dozen professional regulated and non-regulated categories of health care workers in Canada, with the former being regulated at the provincial and territorial level.

RS: We also need to recognize how labour intensive health care really is. The health and social services sector accounts for approximately 10 percent of the overall work force in Canada and employs over 1.5 million Canadians.

CH: Another point worth emphasizing is the tremendous amount of voluntary labour within the health system. Of the total hours of effort going into the system, about half are contributed by volunteers. So, for every hour of paid work, there is about one hour of unpaid work, although in some cases the unpaid work is for personal care services rather than strictly health care services.

Q From the recent reports on health care reform, it’s clear that HHR is an increasingly important priority for all levels of government. What kinds of HHR policy issues were identified in these reports?

RS: Many provinces and territories commissioned reports on health care reform during 2001–2002 (see page 2). There were also two key pan-Canadian reports: the Senate report, *The Health of Canadians — The Federal Role*, chaired by Senator Michael Kirby; and the report of the Romanow Commission,



Building on Values: The Future of Health Care in Canada. Both reports highlighted HHR shortages and called for a national strategy to increase the number of physicians, alleviate nursing shortages and obtain more data on allied health professionals. The Romanow Commission, however, also recommended a new, more integrated approach to HHR that would focus on scopes of practice, having the right provider mix in rural and remote communities, and interdisciplinary education and training.

Q *The HHR issues raised in these reports are not really new, but there seems to be a growing urgency in policy discussions. What makes the current situation so pressing?*

CH: Certainly these issues are not new. For example, we've always worried whether there are enough physicians. Governments have to be concerned since they control the primary levers governing the supply of health care workers — namely, medical and nursing school enrolments, and the flow of immigrants into the country. However, concerns are mounting, and this is largely due to the demographics of the “baby boom” generation (see page 17). While population aging will inevitably increase service demand, its effect will be most immediate on HHR supply — the “bow wave” of population aging. In this decade alone, many of today's health care workers will retire and will need to be replaced at a time of overall slowing in population and labour force growth.

We're also trying to fundamentally alter how we deliver health care — especially primary health care. This has implications for the workers required, what they do and the training they need. Given the lengthy training times for most health professionals, we need to take action now to avert shortages in the future.

Q *Are these challenges unique to Canada's health care system?*

CH: No, quite the contrary. The fact that the rest of the industrialized world is facing similar pressures is actually causing more concern here in Canada.

The dynamics are global. The industrialized world is about to face very slow labour force growth, a critical concern for a labour-intensive sector like health care.

JS: I agree. This is an international problem, but it poses a particular challenge for Canada being a neighbour of the United States, with an HHR shortage 10 times greater than ours.

RS: We need to approach this from a broad international perspective, looking at both the industrialized and the developing world. The World Health Organization and the Organization for Economic Cooperation and Development play a leadership role in this regard, and Canada must be prepared to participate since about 23 percent of our present physician work force is foreign trained.

CH: The dynamics are global. The industrialized world is about to face very slow labour force growth, a critical concern for a labour-intensive sector like health care. In contrast, the developing world faces explosive labour force growth. However, at present their service levels are low relative to their requirements. This poses important policy questions about the appropriateness of industrialized countries drawing human capital from countries where the needs are infinitely greater.

RS: Because of this, the Commonwealth countries have signed a Code of Ethics stating that it is not appropriate to actively recruit significant numbers of trained health care providers from countries like South Africa. However, we need to distinguish between active recruitment and simply ensuring that unnecessary barriers are not preventing foreign-trained professionals who are already in Canada from working in the health field (see page 28).

Q *In light of these dynamics, what will be the most critical gaps in the health care labour force of the future?*

CH: While we are living longer, the evidence suggests that our extra years of life are a mixture of years in good and less than good health. With advances in medical technology, people are living with conditions they might not have survived a few years ago. This increasing prevalence of chronic disease suggests that the greatest pressures will be in areas like nursing and

family practice that provide more continuous levels of care. The pressures may be less in medical and surgical specialties, although this depends on what technologies are in place and whether health problems require surgery or pharmaceutical treatment.

RS: Although we are not certain about the direction of all of the demand pressures, we are beginning to see some trends in HHR supply. For example, while in the past there has been a near 50-50 split between family physicians and specialists, recent statistics show a major reduction in the percentage of new physicians entering family practice (see page 12).

CH: We can also expect to see the usual regional differences in work force distribution, which may be exacerbated by the demographic trends. For example, pressures from population aging will likely be greatest in the Atlantic region and in rural and remote communities where many people leave to find work and eventually return to retire.

Q *Cliff pointed out that nursing is likely where we'll see the first shortages. What are some of the factors contributing to the situation facing Canada's nurses?*

JS: We can look at this in several ways: "Who is in nursing now?," "Who is going to be there in the coming years?," "Who is coming in?" and "Who is staying?" Evidence shows that the nursing work force is aging, with a large number of nurses expected to retire in the next five to ten years. Although nursing school enrolments have increased, the number of current new entries will not keep pace with retirements.

We also need to look at "what nurses do" — both now and in the future. We know there is a major health

The evidence suggests that our extra years of life are a mixture of years in good and less than good health. With advances in medical technology, people are living with conditions they might not have survived a few years ago. This increasing prevalence of chronic disease suggests that the greatest pressures will be in areas like nursing and family practice that provide more continuous levels of care.

care transformation under way that will have significant implications for the nursing work force (see page 22). Initiatives like primary health care, home care and public health all bring requirements for an additional nursing work force, often with different competencies and scopes of practice than at present. There is growing recognition and long-standing science suggesting that situations like chronic illness can be dealt with more effectively with a collaborative team approach. Health Canada is taking steps to ensure that the necessary educational investments are made to support this new, patient-centred, interdisciplinary team approach.

Q *Addressing these HHR challenges will involve more than simply having the right number of health care workers. What other factors will have to be considered?*

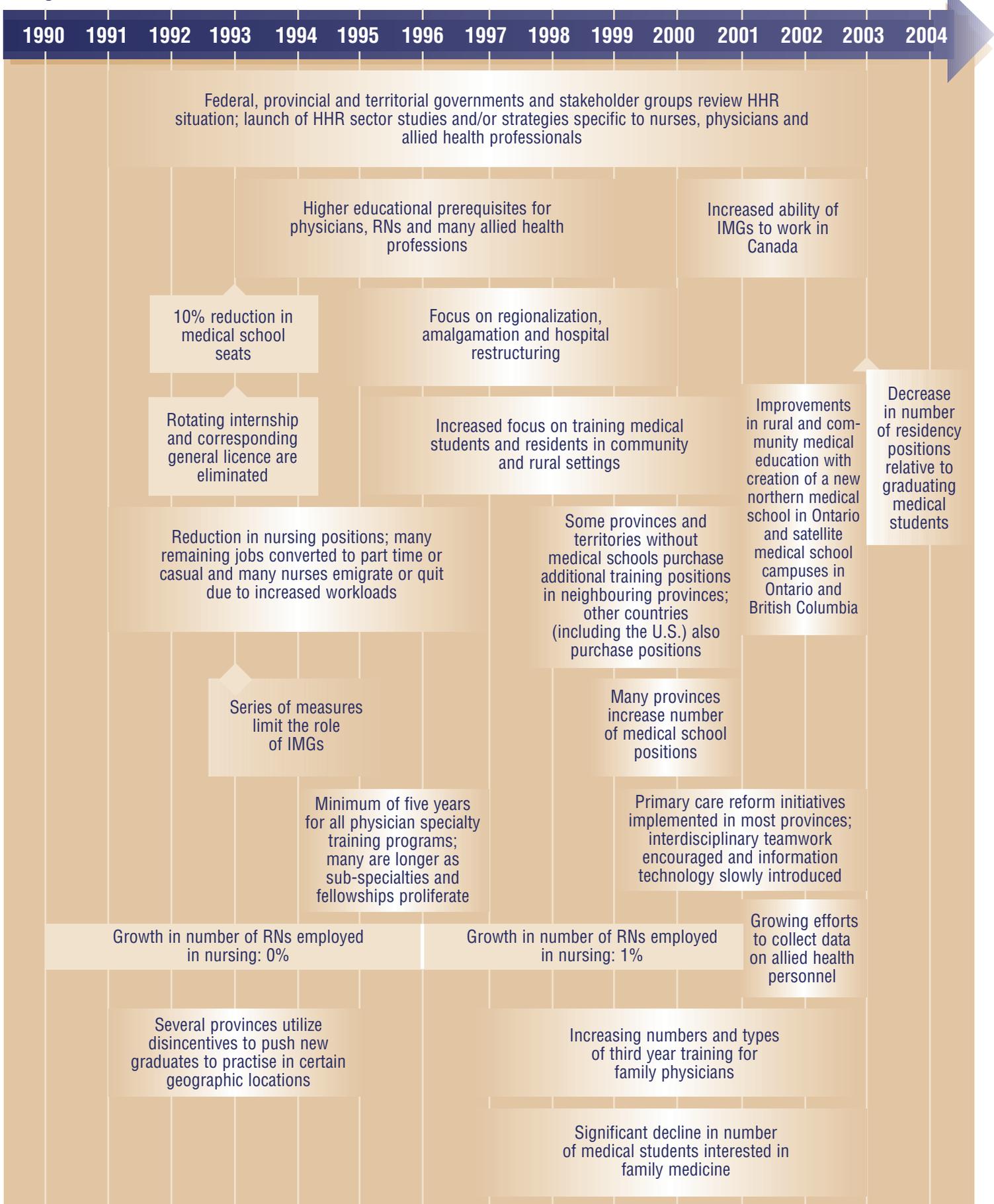
JS: Yes, various policy levers have been used and must be used to address these challenges. It's important to recognize that our current shortages are "policy driven" and related to the downsizing that took place through the 1990s (see timeline, page 6). Also related to this are accounts that health care professionals are not happy with their workplaces. This is a relatively new phenomenon that emerged in the 1990s and it has major implications for being able to retain health care workers, especially nurses. Nursing is experiencing significant rates of absenteeism (see page 23). In

Canada, for example, nursing has an 80 percent higher absenteeism rate than 47 other occupations and absenteeism is equivalent to about 10,000 positions per year.

CH: I think nursing is where the "rubber is going to hit the road" because a number of factors are coming together. Unlike the situation 30



Major Trends and Initiatives in HHR



years ago, women today can pursue almost any career they want; at the same time, the educational investment to enter nursing is higher than ever. As Judith said, the working conditions are often difficult and the work can become physically trying with age. Finally, since many nurses are in public sector-type benefit pension plans, retirement becomes increasingly attractive as nurses move into their fifties with 30 years of service behind them.

JS: Despite these factors, it's interesting to note that for every nursing school seat there are two to three applicants.

Q *What type of evidence will be needed to address these challenges and what role should Health Canada play in developing this evidence base?*

CH: I'll preface my remarks by saying that, while Health Canada need not do this itself, the department should push to ensure that it is done. What is needed is a framework for assembling the evidence and systematically thinking about the issues. We need to explore the broad brush issues in HHR supply and demand, and then build and operate the forecasting, scenario-building and policy-testing tools that can help us understand the emerging pressures and their potential solutions. We also need a focused and committed effort to assemble the projections into regularly updated reports that are tested against outcomes on a year-to-year basis. This is especially important in light of the long time horizons with which HHR planners are working. Although not necessarily easy, with the right investments in data and a committed effort, we could do much better than we have to date.

JS: Cliff is right. There is a lot of "noise" but no "music." Even if we were able to collect all the data, analyses would be difficult since HHR issues are measured differently across the country. Consequently, we've been unable to take the rich expertise and draw it together into a national HHR story. However, Canada does have some of the leading international thinkers in this area.

CH: I believe it's also important that the work be carried out independent of organized interests, so that the results will not only be objective but will be perceived to be objective. Another key will be having

the necessary "buy-in" — something that will require a truly collaborative effort with researchers and forecasters working together with planners and policy makers.

Q *Although the analytical tools might not be as robust as we would like, there is a growing evidence base. How is this evidence being used in the HHR planning process and what role does the federal government play?*

RS: In the past, HHR planning was primarily initiated by individual jurisdictions. However, since health care providers are a mobile resource, a coordinated approach to HHR issues is important to reduce competition within and among provincial/territorial labour markets. Recognizing this, the 2000 First Ministers' Health Accord directed federal, provincial and territorial governments to strengthen the evidence base for national HHR planning. Consequently, in 2003, the federal government committed \$90 million over five years to improve HHR planning, including better forecasting of HHR needs. To facilitate dialogue, Health Canada plays a crucial role on the Federal/Provincial/Territorial Advisory Committee on Health Delivery and Human Resources, which is currently grappling with priority HHR issues, including entry-to-practice credentials, international medical graduates and the concept of a pan-Canadian HHR plan.

CH: I'd like to underscore Robert's last point. Coordinating opportunities for provinces and territories to discuss what works in different jurisdictions is an important federal role. The federal government also plays a role in other areas — including data and research — where individual jurisdictions are unable to make sufficient individual investments. For example, Statistics Canada has always been the primary locus of Canada's national statistical systems and has been a key source of HHR data along with, more recently, the Canadian Institute for Health Information.

On a final note, I'd like to emphasize the importance of moving forward *now* to address the challenges we've been discussing. Ten years ago, we may have had a 15-year window for dealing with these pressures. Now, we have five years at the outside! 🌀

Canada's Health Care Workers:

A Snapshot

Gordon Hawley, *Microsimulation Modelling and Data Analysis Division, Applied Research and Analysis Directorate, Information, Analysis and Connectivity Branch, Health Canada*

A “healthy” health care system is one that can meet its health human resource (HHR) requirements adequately. This article profiles the major categories of health care workers underpinning Canada’s publicly funded health care system and identifies work force characteristics contributing to current and future HHR challenges.

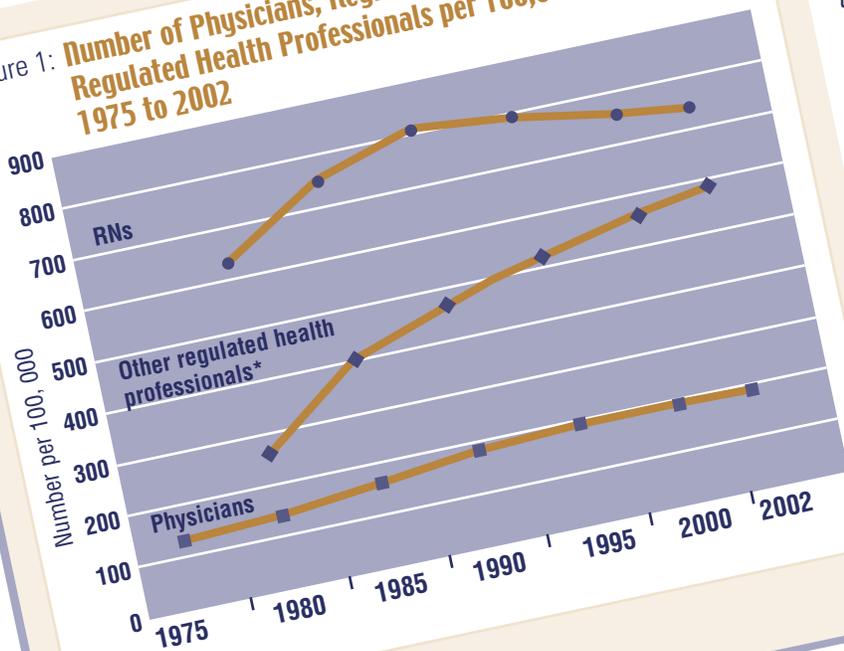
The Big Picture

Canada’s health care sector is labour intensive, with most of the \$112 billion in health expenditures in 2002 spent on health care services — including incomes to health care providers — as opposed to goods such as pharmaceuticals and medical equipment.¹ Health care providers include physicians, nurses and other health professionals regulated by provincial legislation, as well as unregulated health care providers.

Figure 1 provides an overview of the number of physicians, nurses and other regulated health professionals from 1975 to 2002. The number of Registered Nurses (RNs) per 100,000 population has declined steadily since peaking in 1990, while the number of physicians remained fairly stable during the same period. However, simple “head counts” don’t give a complete picture about the supply of health professionals. For example, many nurses work part time.

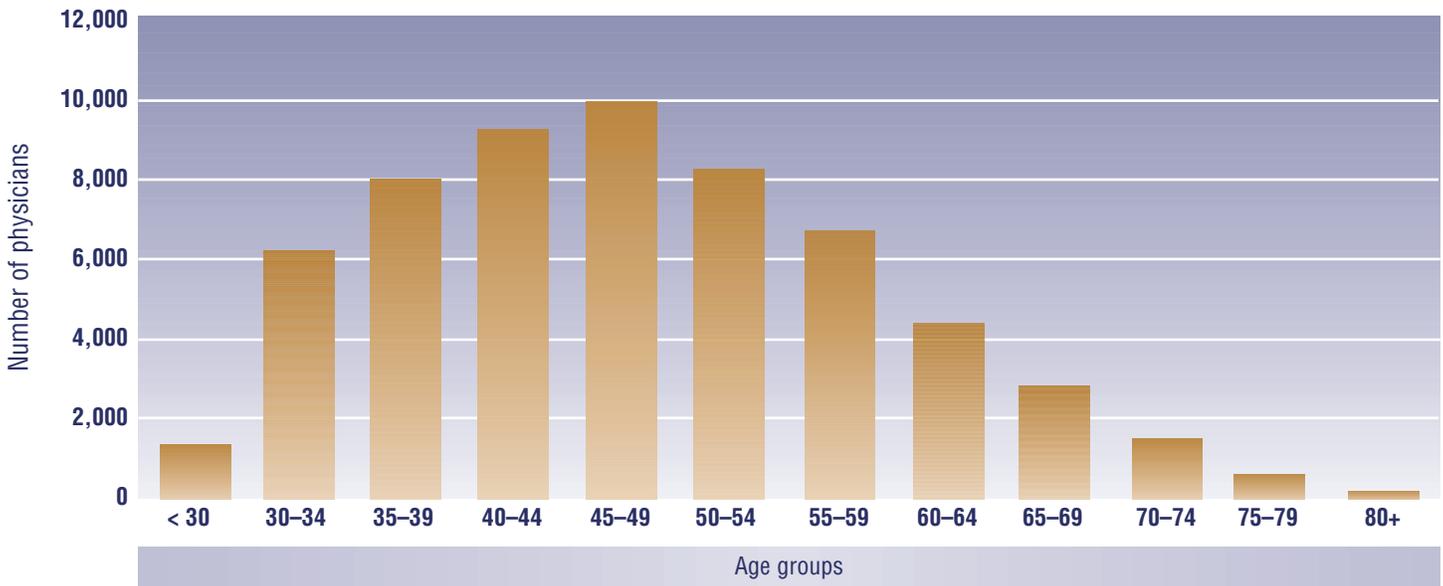
Other regulated health professionals, such as dentists, social workers, pharmacists, chiropractors and nutritionists, typically require a diploma or, increasingly, a degree to enter practice. Some of the increase in other regulated health professionals depicted in Figure 1 is due to the regulation of previously unregulated groups and the inclusion of certain groups, such as pharmacists and midwives, in data collection efforts during this period (see Figure 1).

Figure 1: Number of Physicians, Registered Nurses (RNs) and Other Regulated Health Professionals per 100,000 Population, 1975 to 2002



Source: See references 2–9.

*Other regulated professionals included in Figure 1: chiropractors, dental hygienists, dentists, dietitians, health record professionals, health service executives, medical laboratory technologists, medical radiation technologists, midwives, occupational therapists, optometrists, pharmacists, physiotherapists, psychologists, respiratory therapists and social workers. Registered Psychiatric Nurses and Licensed Practical Nurses are not included in the figure.

Figure 2: **Number of Physicians, by Age Group, 2002**

Source: Canadian Institute for Health Information, Southam Medical Database.

Unregulated health care providers, such as nursing aides and orderlies, also make an essential contribution to the publicly funded health care system. Complementary and alternative health care providers — who may be regulated or unregulated, depending on the province or territory and type of practice — make up a significant part of the continuum of care as well.¹⁰

Volunteers also play a pivotal role in the provision of health care. A recent study found that informal volunteers contributed 2.3 billion hours of care per year while volunteers with recognized organizations contributed an additional 93 million hours. In comparison, paid workers provided 1.7 billion hours of health care per year.¹¹ Historically, the family has been key in providing care. Today, however, most women participate in the paid labour force and have less time to meet the needs of family members who are ill, especially when they must care for their own children as well. In addition, the nature of in-home informal care is becoming increasingly complex. These challenges make providing care to family members more demanding than in the past.

Canada's Physicians

Family Practice: On the Decline?

In 2002, 49 percent of physicians were specialists and 51 percent were family physicians (FPs).¹² However, this ratio has been changing as FPs have made up less

than 40 percent of new practice entrants since 1993.¹³ Among the reasons for this shift are that students can no longer revert to general practice if they dislike a specialty field, and specialists' higher incomes make it worthwhile to invest in the additional years of training (see *Did You Know?* on page 34). The relative decline in FPs is a concern because they have typically acted as the “gatekeepers” to the rest of the health system — 86 percent of Canadians have a family physician¹⁴ and look first to their FP for most routine or ongoing care.

The Changing Face of Canada's Physicians

In 2002, the average age for FPs was 46.6 years and 48.8 years for specialists,¹² compared to 39 years for the general labour force (see article on page 17). As Figure 2 illustrates, new entrants to medicine (physicians under age 35) make up 13 percent of the physician population, while 16 percent of physicians are potential retirees (physicians age 60 or over).

In 2002, about 30 percent of physicians were women. That proportion is rising as slightly more than half of medical students are now female.¹⁵ Most family practice trainees are women (60.5 percent), while a smaller proportion are in medical specialties (48.5 percent), lab medicine specialities (50 percent) and surgical specialities (34.5 percent).¹³ By 2030, it is expected that women will make up half of the medical profession.¹⁶ This has implications for projecting the

future physician supply because, on average, female physicians work 10 fewer hours per week than male physicians.¹⁵

As discussed in the article on page 28, Canada has a long tradition of including international medical graduates (IMGs) as part of the physician work force. IMGs tend to be older than Canadian-educated physicians (47 percent are age 55 or older, compared with 29 percent of all physicians) and a smaller proportion are female (22 percent versus 30 percent).

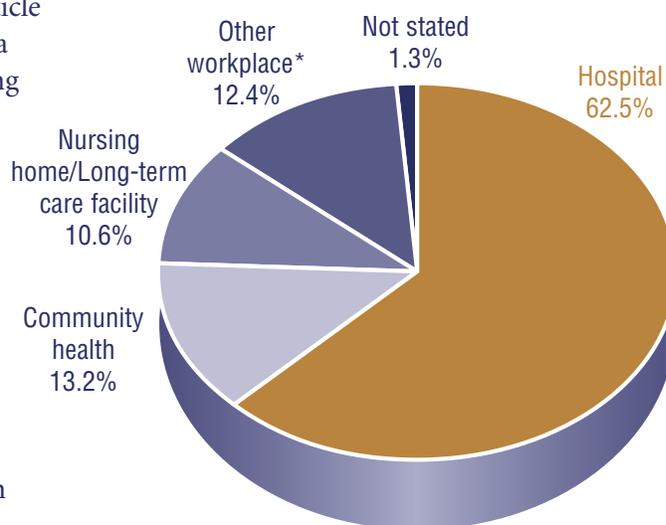
Longer Training Time

After a four-year medical degree, graduates begin post-Medical Doctor (MD) training with residency programs that range from two to three years for family medicine to five to seven years for some specialties. From 1993 to 1998, the average length of FP training increased from 1.8 to 2.3 years, while the length of specialist training rose from 4.5 to 5.3 years. These increases are the result of physicians taking a third year of family medicine¹⁷ and selecting specialty training with longer residency requirements,¹⁷ as well as the elimination of one-year rotating internships in 1993.¹⁸

Canada's Nurses

Nurses are the largest group of health care workers, totalling almost 300,000 in 2002, or five for every doctor. Canada has three groups of regulated nurses: Registered Nurses (RNs), Registered Psychiatric Nurses (RPNs), and Licensed Practical Nurses (LPNs).

Figure 3:
Percentage of Registered Nurses (RNs) Employed in Nursing, by Place of Work, 2002



*Such as industrial settings, government, self-employed and physicians' offices

Registered Nurses are the largest group of regulated nurses, with the broadest and most independent scope of practice and generally the highest level of decision making and education. RPNs share many characteristics with RNs, such as high employment rates, years of training, wages and average age.

RNs are the largest group of regulated nurses, with the broadest and most independent scope of practice and generally the highest level of decision making and education. RPNs share many characteristics with RNs, such as high employment rates, years of training, wages and average age. However, they differ in two significant ways: 24 percent of RPNs¹⁹ are male, whereas only 5 percent of RNs are male;²⁰ also RPNs are educated and regulated only in the four western provinces.¹⁹

LPNs need a diploma or equivalency for certification,²¹ whereas most provinces now require RNs to have a baccalaureate degree.²² Consequently, LPNs have a narrower scope of practice and usually work with less complex cases. Although LPNs and RNs share similar age and sex profiles, almost 40 percent of LPNs work in geriatric/long-term care, compared to 10 percent of RNs. Since the most comprehensive nursing data available are for RNs, the remainder of this article focuses on that group.

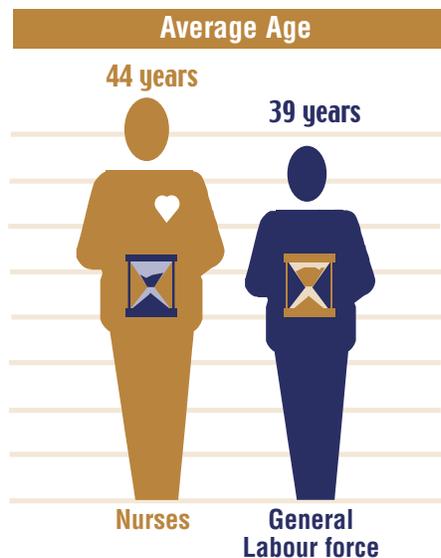
Where Nurses Work

In 1981, 74 percent of RNs worked in hospitals, but this proportion fell to 63 percent by 2002. As Figure 3 demonstrates, a substantial proportion of RNs now work in various locations outside of hospitals.²¹

In 2002, 86 percent of RNs worked in direct health care delivery.²⁰ Slightly more than half of nurses work full time (54 percent), with 34 percent working part time and 12 percent on a casual basis.

The Work Force is Aging

Data for 2002 show that the nursing work force is older than the general labour force, with an average age of 44 compared to 39.²⁰ A third of RNs were 50 years of age or older in 2002, compared to 21 percent of all working Canadians. While the demand for nursing services is expected to increase as the population ages (see article on page 12), the current replacement rate for nurses is less than the pending retirement rate. For example, for every RN aged 35 or less, there are 1.7 nurses aged 50 or more.²⁰ The average age of retirement for nurses is 56. Assuming that all RNs work until age 55, Canada is poised to lose 64,248 RNs to retirement or death by 2006, an amount equal to 28 percent of the 2001 work force.²³ Currently, there are 44,499 RNs under 35 years of age, 19,749 fewer than the number of pending retirees.²⁰



More Education

Seven provinces require a baccalaureate degree in nursing (BNS) to register as an RN, while a two- or three-year diploma or certificate is sufficient in other provinces.²² After completing their degree, RNs may get an advanced degree in nursing or national certification in 14 specialities. Nurses with additional education can become, for example, clinical specialists, nurse midwives, educators or nurse practitioners (NPs).

Some 912 nurses identified themselves as NPs in 2002.²⁰ Because NPs can offer some services typically

provided by physicians, such as ordering tests, diagnosing illness and prescribing drugs,²⁴ they play an important role in isolated or inner city communities, including where physician shortages occur.

Canada's supply of nurses is enhanced through immigration. Today, almost 7 percent of Canada's RNs graduated from a foreign nursing program, with the highest proportion coming from the Philippines (27 percent) and the United Kingdom (24.5 percent).

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In Closing

Many of the work force characteristics outlined here will have an impact on the future supply of HHR in Canada and are examined further in the following articles. A better understanding of the challenges posed by these characteristics, notably training requirements, age distribution and the work intensity of each profession, can lead to more appropriate policy solutions. 🌐

Acknowledgements

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Supply and Demand

Frank Cesa and Suzanne Larente, *Health Human Resource Strategies Division, Health Policy and Communications Branch, Health Canada*

There is a growing body of evidence highlighting serious current and impending shortages in the supply of health care providers.¹ This article examines the factors that influence the supply and demand of health human resources (HHR) and presents an overview of reported shortages. It also points to the urgent need for action now to meet the HHR needs of the future and describes tools that can help policy makers forecast HHR supply and demand.

Planning is Essential

There are indications that Canada is experiencing shortages in its supply of health care providers. In simple economic terms, a shortage occurs when demand exceeds supply. For years, the supply of health professionals has been characterized by “boom and bust” cycles. At times, planners have perceived an oversupply of health care providers and, at other times, a shortage (see the timeline on page 6). Cycles such as these are typical of markets where there are lags between when decisions are made — such as increasing medical school enrolment — and when the impacts of these decisions become apparent. Policy makers now recognize that smoothing out these cycles requires an improved evidence base for HHR planning, including regular forecasting of future supply and demand.

Influences on Current Supply and Demand

The *supply* of HHR services is a function of how many providers are available, their workload and their productivity. Productivity is further affected by other inputs to the system, such as technology.¹ Government policies have a strong impact, as the number and types of providers trained are controlled by provincial and territorial governments. Government policies also affect immigration, as well as the number of foreign health care providers licensed to practise.

Demand for HHR services “depends on such factors as the size of the population, the prevalence of disease and public expectations. The latter two factors are, in turn, influenced by such things as the age and gender of the population, education level and socioeconomic status.”¹ Demand is further influenced by the activities of the providers themselves. For instance, physicians can increase the demand for diagnostic services by ordering more tests. A number of other factors and trends are putting increasing pressure on the demand for services, including new diseases, more knowledgeable consumers, new technologies and

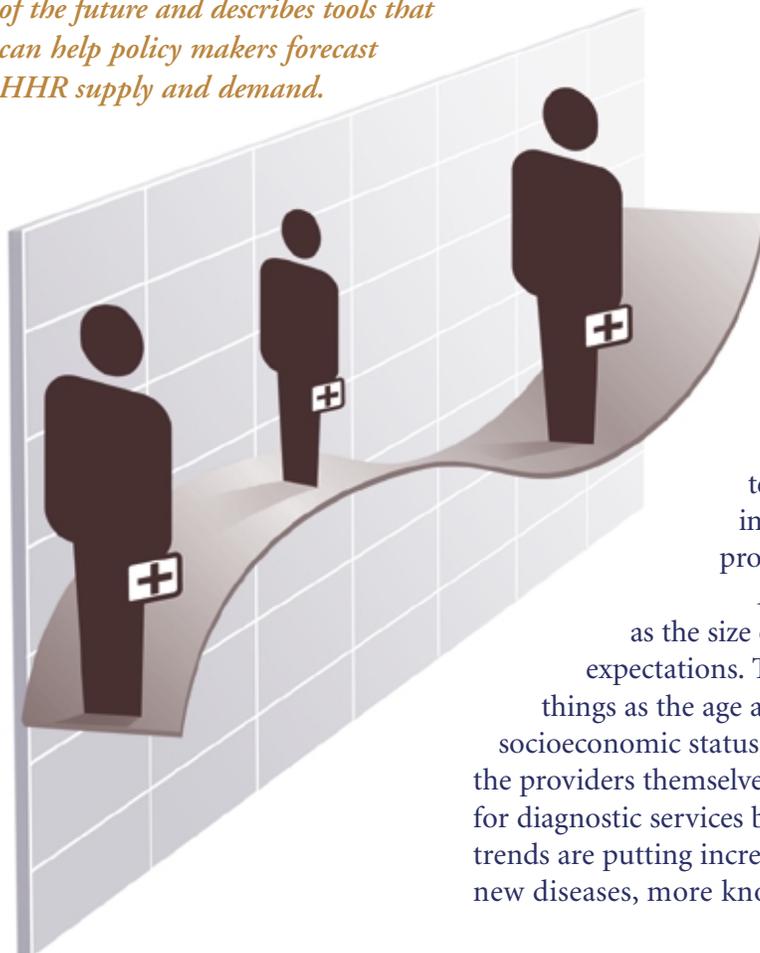
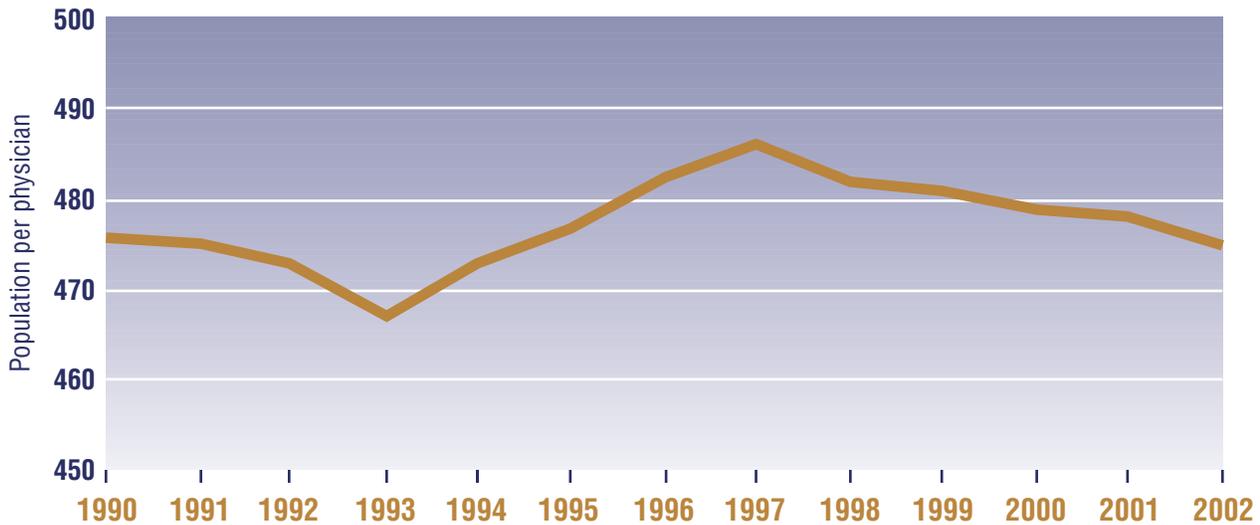


Figure 1: Population per Physician, including Interns and Residents, 1990–2002



Source: Canadian Institute for Health Information, *Supply, Distribution and Migration of Canadian Physicians, 2002*, Table 5.2.

pharmaceuticals, changes in professional practice and an aging population.² While “upstream” interventions characterized by a health promotion/population health approach can also influence demand, their impact is difficult to evaluate.³

Measuring Supply and Demand

Current health care work force data are limited, affecting analysts’ ability to determine the supply of many types of health care providers. Other than for physicians and Registered Nurses (RNs), data-gathering activities for the health care professions is primarily limited to conducting head counts (see *Who’s Doing What?* on page 32).

Demand for HHR can be approximated using utilization-based measures. Utilization is the degree to which the population uses the health care system. For example, utilization of physician services can be measured by looking at billing data and the number of visits to a practitioner. However, utilization-based measures do not take account of demand that is unmet. In many cases, estimating the size of a shortage comes down to making an “educated guess” based on anecdotal evidence such as longer wait times for patients or providers complaining about their workload. Sometimes, supply-side measures such as vacancy rates are used to identify a shortage. However, all these types of information tend only to reveal larger problems. By the time problems are apparent, it can take

years before they are corrected because of the long lag time before policy adjustments are evident in the system.

In the absence of the best possible information, some simple measures of shortages do exist. For example, the provider-to-population ratio is the crudest but most widely known measure.¹ Unfortunately, this measure does not account for factors affecting supply or demand and gives no information on the best provider-to-population ratio. For example, Figure 1 shows that the current physician-to-population ratio is about the same as it was in the early 1990s. However, planners then believed there was a surplus of physicians, while the common belief now is that there is a shortage.¹

Where Are the Gaps?

Despite their shortcomings, it is important to use currently available measures to attempt to identify shortages and surpluses. Several national reports provide evidence based on available data.⁴⁻⁶

Nurses

According to research, there are nursing shortages in certain practice areas and an uneven distribution of nurses across geographic regions, especially in rural and remote areas. A recent report by the Canadian Institute of Health Information (CIHI) shows that the number of RNs per 10,000 Canadians declined from 75.1 in 1998 to 73.4 in 2002.⁷ The Canadian Nursing

Advisory Committee perceives a shortage of nurses, suggesting that 16,000 additional nurses are needed to achieve the same ratio of nurses to population in Canada today as 10 years ago.⁸

Physicians

An analysis by the Association of Canadian Medical Colleges (ACMC) indicates that the current production of physicians will not meet future demand.⁹ The ACMC estimates that, to maintain the existing physician-to-population ratio of 1.9:1,000, Canada needs to increase annual medical school enrolment to 2,500 by the year 2007 from the current level of approximately 2,000. In addition, 500 more international medical graduates (IMGs) are also needed each year to offset exits from the system through emigration and other routes.

Shortages are also evident in rural communities. For example, recent research suggests that the rural physician-to-population ratio will grow from the current 1:1,235 to 1:1,887 in 2021. Although rural shortages have been a long-standing problem, shortages are now being reported in major urban areas as well. According to the College of Family Physicians of Canada, 16 percent of Canadians in metropolitan areas do not have a family doctor, compared to 12 percent in rural areas.¹⁰ The College has stated that Canada

requires a total of 3,000 more family physicians alone to meet current demand, which could be achieved through licensing more IMGs and increasing medical school enrolment.¹¹ However, as Figure 2 shows, fewer medical school graduates are choosing family medicine as a career. Figure 2 presents the results of the Canadian Resident Matching Service (CaRMS), which matches medical school graduates with post-graduate medical training (residency positions) over two iterations.

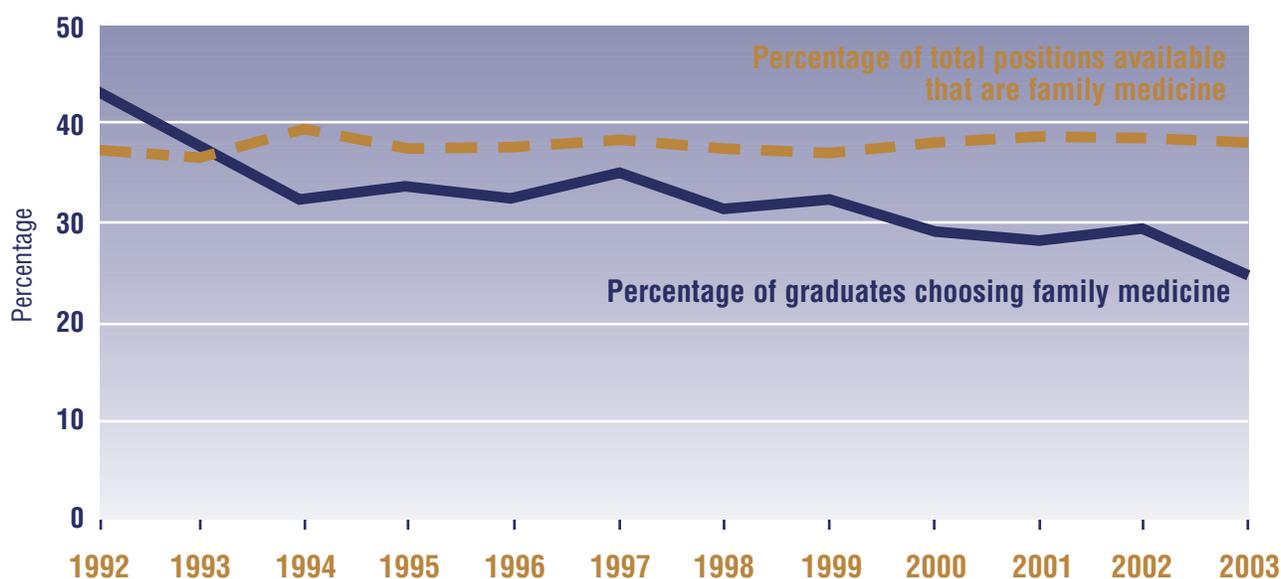
Many provincial medical associations and specialty societies have published estimates of shortages in their areas. For instance, while the current radiologist-to-population ratio is 1:18,000, the Canadian Association of Radiologists (CAR) suggests that 1:13,000 is a more appropriate target.¹²

Other Health Professionals

Limited data make it difficult for policy makers to identify shortages in professions other than nursing and medicine. With support from Health Canada, five professional groups began preliminary work in 2002–2003 to identify sources and availability of data, as well as gaps and future requirements.

Attention has recently been focused on reported shortages in the pharmacy, medical laboratory

Figure 2: **History of Family Medicine as the Career Choice of Canadian Graduates, 1992–2003**



Source: Sandra Banner, *CaRMS PGY-1 Match Report 2003, Table IX, p. 10.*

technology (MLT) and medical radiation technology (MRT) professions. For example, the Canadian Pharmacists Association (CPA) reports a current shortage of pharmacists, based on observations of an increased number of vacancies, longer times to fill these vacancies and increases in overtime. Similarly, the Canadian Association of Occupational Therapists (CAOT) reports widespread shortages, along with significant variations in regional distribution and clusters in high-density population areas.¹³

Planning for Change

Reports from professional associations underscore the need for concerted, ongoing HHR planning to identify gaps early on and develop appropriate policy responses. The Canadian health care system depends heavily on health care providers, yet the system has a limited capacity to respond quickly to shortages. It takes years to change immigration policy and the capacity of medical schools and other programs, not to mention training new providers. This highlights the importance of predicting and planning for changes in supply and demand to ensure the health care system's long-term sustainability.

The First Ministers' 2003 Health Accord directed health ministers to undertake collaborative strategies to strengthen the evidence base for national planning, improve recruitment and retention, and ensure the supply of needed health care providers. National planning is crucial because many jurisdictions do not have the capacity to collect data or engage in major planning exercises. In addition, several provinces and territories do not have medical schools and rely on other jurisdictions to train their physicians.

Factors Affecting Future Supply and Demand

Many of the factors affecting current HHR supply and demand will have an impact in the future. Supply will continue to be affected by demographics, discipline choice, retention, workplace health, job satisfaction

and changes to the way care is delivered (see *Interdisciplinary Teams* on page 22). As outlined in *International Medical Graduates* on page 28, Canada's ability to integrate internationally trained health care providers into the system will also affect the supply of providers.

The future supply of HHR will also be affected by what health care providers do in practice. For example, a recent Health Canada funded study of general internal medicine specialists showed that 19 percent were sub-specializing in an area of internal medicine without the required credentials.¹⁴ Similarly, over 50 percent of general surgeons are sub-specializing without the required credentials.¹⁵ This indicates that there are likely fewer physicians practising general internal medicine and general surgery than estimated, and more practising sub-specialties of internal medicine and surgery. If this behaviour indicates a response to demand, it could help planners provide the right mix of HHR. On the other hand, the overall lack of data on practice patterns such as these could negatively affect planners' ability to "get it right."

Clearly, planners need to understand what the demand for health care services will be if they are to predict the required number of health care providers. Given the apparent trend towards specialization and sub-specialization, HHR planning must also incorporate the appropriate number and mix of specialities. Among the planning challenges are estimating the impacts of changing technologies, reform initiatives, chronic diseases, emerging and re-emerging infectious diseases, individual behaviours and scopes of practice.

Canada's aging population is a major influence on future demand, as it will lead to a higher prevalence of age-related diseases and increases in the demand for certain types of HHR. For example, the Canadian Nurses Association expects the demand for nursing services to rise by as much as 46 percent by 2011.¹⁶

Modelling: Projecting the Future

Modelling is a tool for projecting future supply and demand. One of the strengths of modelling is that it can incorporate a number of variables related to, for example, aging, immigration and school graduates,

National planning is crucial because many jurisdictions do not have the capacity to collect data or engage in major planning exercises. In addition, several provinces and territories do not have medical schools and rely on other jurisdictions to train their physicians.

and determine what happens to supply and demand when these variables change. If the variables are known to be moving in a particular direction, then the model can simulate those changes and demonstrate the potential outcomes. This can help to identify possible gaps that need to be addressed.

Modelling has limitations, however. While it can account for current productivity in HHR, predicting future productivity is much more difficult. On the demand side, these models tend to have a utilization-based approach with a population-based utilization rate. This assumes that the current delivery model and level, and mix and distribution of services are appropriate and meet existing health care requirements. It is difficult for models to account for changes in future utilization resulting from factors such as new technologies.

Predicting Shortages

Predictions about future shortages or oversupply must grapple with the uncertainty of a changing population, complex institutional structures and health care reform initiatives. As the following discussion shows, professional associations have traditionally been the major source of HHR forecasting information.

Physicians

Forecasting studies predict shortages in family medicine. Today, 51 percent of physicians are family doctors and 49 percent are specialists.¹⁷ Figure 2 shows that well below 50 percent of medical graduates are choosing family medicine residency positions in the CaRMS match each year, so based on existing trends the proportion of family physicians is expected to decrease over time. Some specialties will also experience shortages. For example, in 2000, there were only 144 geriatricians in Canada, far fewer than



Many reports project that the current shortage of nurses will worsen. At a time when an aging population will require more nursing services, a large cohort of nurses will be retiring and will not be replaced by a similar number of new graduates. A shortage of 78,000 RNs is predicted by 2011 and 113,000 RNs by 2016.

the estimated 481 that were needed. By 2006, the forecast is that there will be 198 geriatricians, but a requirement for 538.¹⁸ There is also evidence that, if current trends prevail, medical school graduates will continue to choose subspecialties, leaving a void in general internal medicine and general surgery.

Nurses

Many reports project that the current shortage of nurses will worsen. At a time when an aging population will require more nursing services, a large cohort of nurses will be retiring and will not be replaced by a similar number of new graduates. A shortage of 78,000 RNs is predicted by 2011 and 113,000 RNs by 2016.⁶

Other Health Professionals

The acute lack of comprehensive data on other health professionals adds to the difficulties in forecasting shortages. However, a report on medical laboratory technologists and medical radiation technologists indicated that shortages for both groups had increased from 1998 to 2001 and further increases are expected.¹⁹

In Conclusion

The benefits of advance planning and forecasting the supply and demand of HHR are clear. While the field is still developing, available models are useful tools in helping planners determine the number and mix of HHR required to meet Canadians' future needs. As an example, the following article describes a set of models developed at Health

Canada that can help project the effects of population growth and aging on the future supply and demand for physicians and RNs. 📍

@ [Click here for references.](#)

Projecting the HHR Impacts of

Demographic Change

Kisalaya Basu, *Microsimulation Modelling and Data Analysis Division, Applied Research and Analysis Directorate, Information, Analysis and Connectivity Branch, Health Canada, and*
Cliff Halliwell, *former Director General of the Applied Research and Analysis Directorate, Information, Analysis and Connectivity Branch, Health Canada*

Being able to project broad trends in future supply and demand for health care workers is critical to effective planning. This article illustrates how information about Canadian demographic changes can be used to predict future health human resources (HHR) requirements and supply.

Introduction

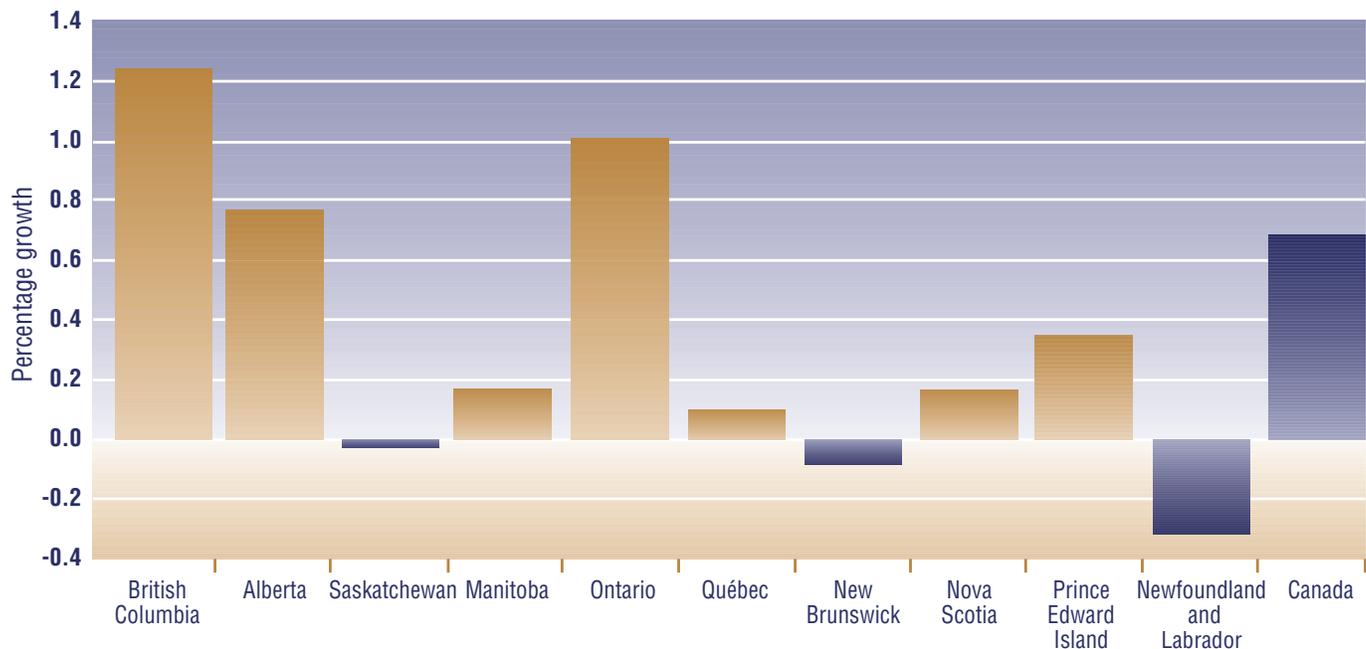
Broad Canadian demographic changes have a substantial impact on HHR requirements and supply. Demographic trends are particularly critical as they affect the quantity and type of HHR services required, as well as the actual and potential supply of health care workers. Not only is the projected number of Canadians important, but also the population's demographic composition, particularly the aging of Canada's large baby boom generation. Another key factor is the geographic location of health care workers.

The good news is that demographic change is fairly easy to predict, as it is slow to develop. The projections presented in this article suggest two conflicting pressures: future demographics will significantly increase the demand for HHR over the next two decades (and beyond); and without significant changes, the supply of HHR may well decrease as today's health care professionals age.

Numerous other factors also influence HHR requirements and supply; however, they are more difficult to predict (see previous article on page 12). For instance, the healthier lifestyles of today's baby boomers may postpone and "smooth out" their age-related health care needs, making the next generation of seniors healthier than ever before.^{1,2} That being said, demographics are likely the most powerful driver of HHR requirements and supply. For this reason, the country's demographic



Figure 1: Average Annual Growth in Population, by Province, 2000–2020



makeup will have a substantial influence on the HHR issues that policy makers across Canada face over the coming years.

Canada’s Evolving Demographics

The overall relationship between demographics and HHR requirements is relatively simple. First and most obviously, the more Canadians there are, the greater the HHR requirements. Based on Statistics Canada’s medium-growth population projection, the population of Canada will increase at an annual average rate

of 0.68 percent between 2000 and 2020, the slowest rate of growth in decades. Nonetheless, the Canadian population will increase by 14.5 percent over this period.

There will also be changes in where Canadians live. As Figure 1 shows, some provinces will experience strong annual growth, including British Columbia (1.2 percent), Alberta (0.8 percent) and Ontario (1.0 percent). Between 2000 and 2020, Ontario’s population will increase by over 22 percent. In contrast, some provinces will have declining populations, including Saskatchewan (-0.01 percent annual decrease), New Brunswick (-0.07 percent), and Newfoundland and Labrador (-0.3 percent).

Figure 2: Percentage of Population Aged 65+ in 2000 and 2020, by Province

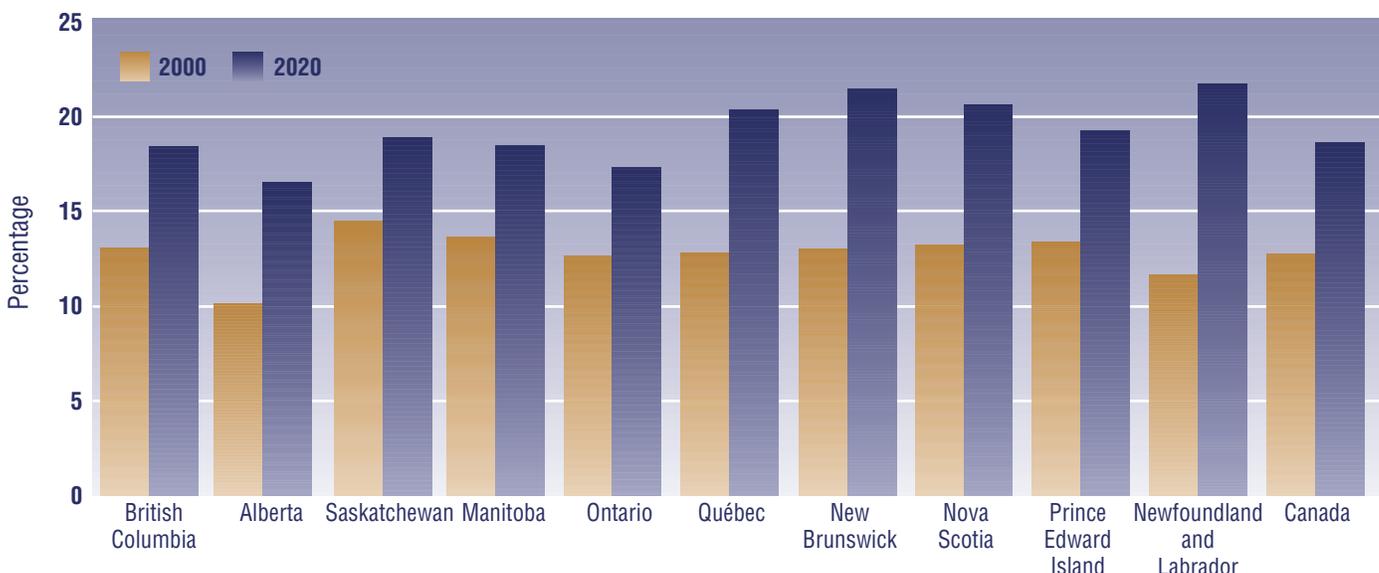


Table 1: **Utilization for Physicians and Registered Nurses (RNs) per 100,000 Population, by Age Group, Nova Scotia, 2000**

Age group	Family	Medical	Surgical	Diagnostic	All physicians	RNs
0–64	71.53	44.42	16.70	5.98	139.83	330.89
65+	204.02	104.37	57.90	23.64	389.94	1,410.36
Ratio	2.85	2.35	3.47	3.95	2.79	4.26

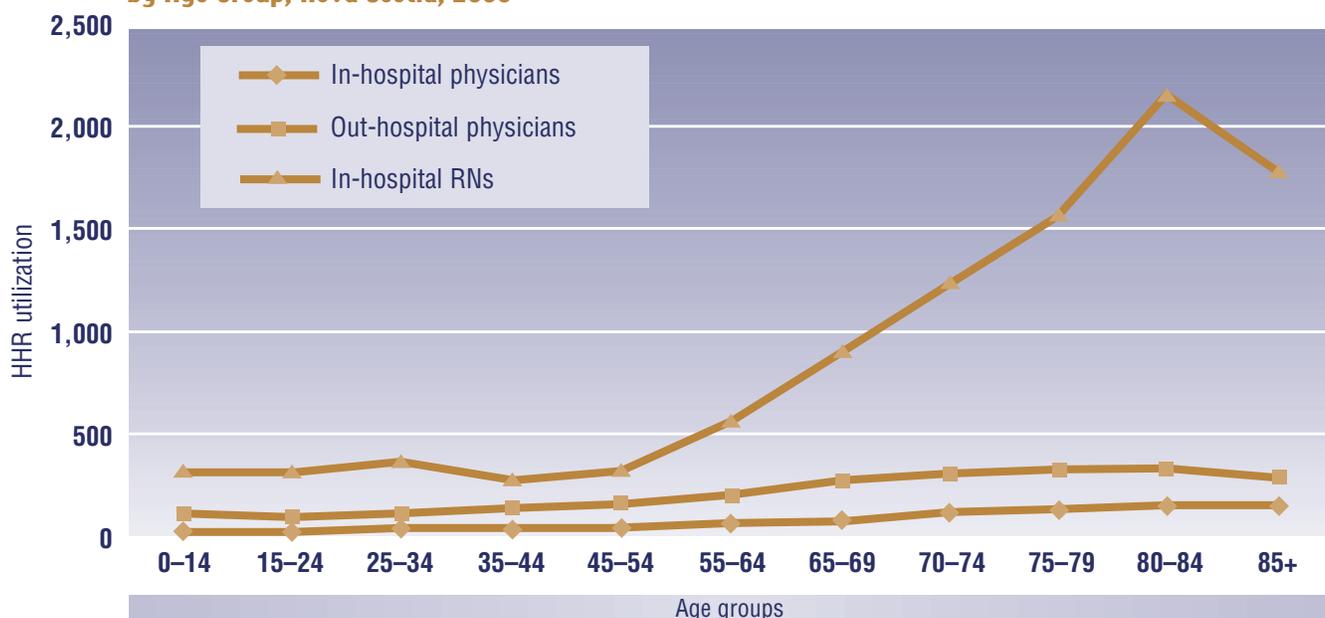
More importantly, the composition of the population will change. As shown in Figure 2, the percentage of Canadians aged 65 and over will increase by 5.8 percentage points between 2000 and 2020. While all provinces will experience increases in their population aged 65 and over, provincial increases will vary widely — from 5.3 to 10.3 percentage points. This variation reflects an increasing reliance on immigration for population growth, with settlement primarily in major urban areas. As well, there will be out-migration of working age populations from less advantaged regions, with some people returning to their home regions when they retire. Newfoundland and Labrador is a good illustration: in 2000, the province had the second lowest share of the 65 and over population, but is projected to have the highest by 2020.

Demographics and HHR Requirements

Population composition is critical in determining HHR requirements. The dominant driver is that older Canadians use much more HHR than do younger

Canadians. Nova Scotia serves as an illustrative case study, with physician data from the Nova Scotia Physician Billings Data and Registered Nurse (RN) data from CIHI's Discharge Abstract Data and Registered Nurses Database.

The aging of Canada's population will lead to a marked increase in age-related ailments, notably for people 65 years of age or older. For example, consider that over the next 20 years, Nova Scotia will see a modest total population increase of 3.5 percent, but the proportion of the population aged 65 and over will rise from 12.6 percent to 18.4 percent. Assuming other factors remain the same,³ there will be significant increases in treatment requirements for diseases of the circulatory system (38 percent), neoplasm (29 percent), endocrine, nutritional and metabolic diseases, and immunity disorders (29 percent), as well as diseases of the blood and the blood-forming organ (liver) (23 percent). However, demographics will drive down requirements in other areas, such as complications related to pregnancy, childbirth and the

 Figure 3: **In-/Out-Hospital Physicians and In-Hospital Registered Nurses (RNs) per 100,000 Population, by Age Group, Nova Scotia, 2000**


puerperium, which are expected to decline by 11 percent over the same period. For paediatric patients, the incidence of all diseases will decline as well.

Table 1 compares the utilization for physicians in four key specialities, as well as utilization for RNs (in hospitals), by residents of Nova Scotia who are less than 65 years of age and those aged 65 and older. On average, the older age group uses 2.8 times more physicians and 4.3 times more RNs than the younger group.

Figure 3 shows how the utilization for full-time equivalent (FTE) in-hospital and out-hospital physicians and in-hospital RNs in Nova Scotia increases with the age of the patient. The utilization for in-hospital RNs and physicians starts to increase at age 55 and continues to grow till 84. Beyond 84 years, the utilization for both RNs and physicians decreases (note that this refers to in-hospital RN utilization only; utilization in other care facilities such as nursing homes may continue to rise).

Implications for HHR Requirements

Physician and in-hospital RN demand models built by Health Canada’s Microsimulation Modelling and Data Analysis Division are able to project the requirements for both physicians³ and RNs in Nova Scotia.⁴ The projections are made by a series of mapping exercises for a base year (2000): HHR allocation of effort by treatment category; treatment activities by diagnosis categories; and diagnosis categories by patient age and sex cohort, using utilization data at

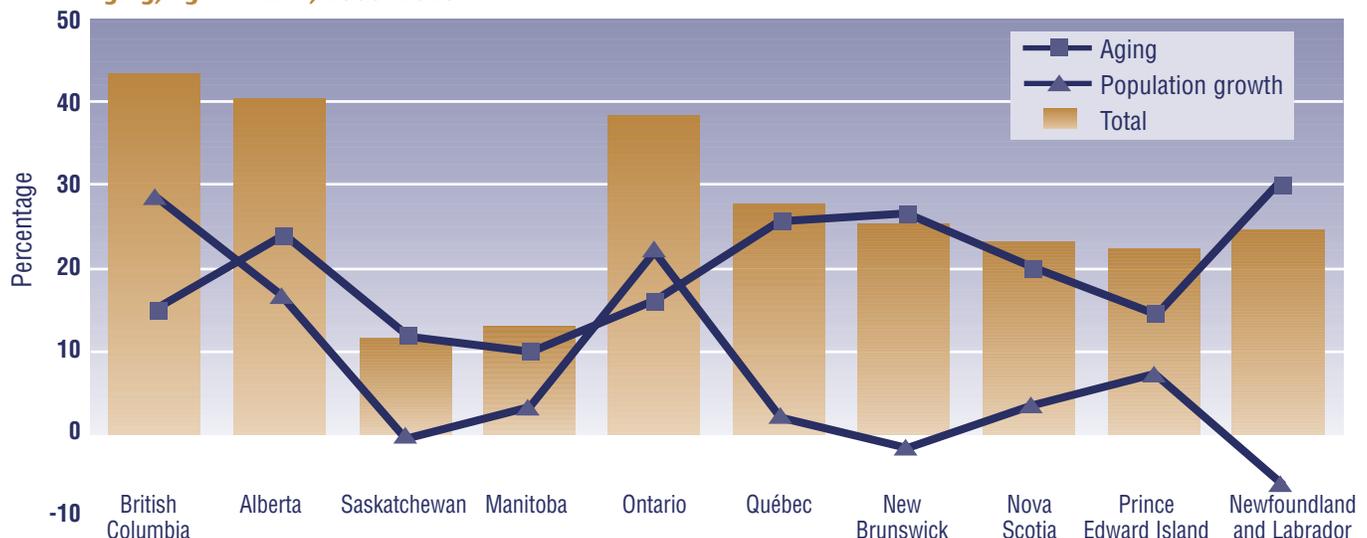
the patient level. Future HHR requirements can then be projected based on forecasted demographic changes.

Clearly, utilization-based models such as these have weaknesses. Perhaps most importantly, they assume that prevalence of disease by age-sex cohort and utilization rates will remain constant. Utilization is also not a perfect measure of demand because use is influenced by other factors such as supply. But utilization-based models also have strengths. One important attribute is that they are based on actual utilization of HHR resources at the patient level, making them a valuable tool and a good starting point in the complex field of HHR demand modelling. As well, these models can project requirements based on “what if” situations, such as how future requirements will be affected if the prevalence of certain diseases changes or if productivity affects utilization.

According to Health Canada’s projection tool, HHR requirements for doctors in Nova Scotia will rise by 18.3 percent and 23.4 percent for in-hospital nurses from 2000 to 2020. These increases are primarily due to aging, as Nova Scotia’s overall population will only increase by 3.5 percent during the same period.

In fact, aging will offset some of the slowed growth in regional HHR requirements that would otherwise result from slow population growth, as affected provinces will tend to face greater aging pressures. Figure 4 illustrates this phenomenon by showing a provincial breakdown of demographically driven future requirements for in-hospital nurses into: (1) the contribution from overall population growth, and (2) the contribution from population aging. This shows the diversity

Figure 4: **Percentage Growth in Registered Nurse (RN) Requirements Due to Population Growth and Aging, by Province, 2000–2020**



and magnitude of the effects across different provinces over 20 years. Provinces with low population growth tend to have a higher aging effect (clearly evident in Atlantic Canada) and vice versa.

Projecting the Supply of Physicians and RNs

Demographics exert a strong upward pressure on HHR requirements, but it is also important to examine how they will affect the supply of health care providers. With this in mind, Health Canada has developed preliminary physician and RN supply models based on national data. Some of the methodologies and data for the physician supply model are described in *Using Canada's Health Data* on page 36. The RN supply model is conceptually similar to the physician supply model.

The models show that the overall supply of full-time equivalent (FTE) physicians and RNs will not even keep up with general population growth over the next 20 years if other factors remain at current levels (e.g., the flow of new entrants, patterns of immigration, emigration and retirement, and the death rates of physicians and RNs). This negative growth reflects a key underlying factor: Canada's current HHR stock, which includes a significant number of baby boomers, is aging and a high proportion will retire or die over the next two decades.

If immigration, emigration, retirement and mortality rates remain the same over the next 20 years, to meet the requirements due to both population growth and aging, Canadian medical school admissions and nursing school admissions must have average annual growth rates of 3 percent and 13 percent, respectively. About half of this growth is to keep up with population growth and the other half is to keep pace with population aging. However, as Figure 4 shows, there will be substantial provincial variation in population and aging effects on HHR requirements. For example, while New Brunswick's total population will decline and British Columbia will experience strong growth,

the aging effect in New Brunswick will be almost double that of British Columbia. As a result, the two provinces will face significantly different HHR challenges over the next 20 years, both in the amount and type of HHR they will require.

A Final Word

Although a range of factors affect HHR requirements and supply, demographics are one of the most powerful influences. Over the next two decades, planners can expect that: (1) the population of Canada will continue to grow, so that by 2020 there will be 14.5 percent more Canadians than in 2000, and (2) the population will be older everywhere in Canada and thus will require even more HHR services. Moreover, the provinces with the lowest (even negative) population growth will tend to experience the most population aging. In contrast, the supply of both physicians and nurses will diminish if current baseline trends and policies continue. For two reasons, the gap between supply and demand will be greater for RNs than physicians: the supply of RNs is more vulnerable to decline under status quo assumptions; and requirements for their services will grow faster than for physicians (note that these models do not account for nursing requirements outside of hospitals). The projected gap in nursing supply and demand is an important issue as there are almost five times as many nurses as physicians. While many other factors may change between now and 2020, only prompt policy action can be relied on to offset the powerful impact of demographics on HHR. 🌟

Acknowledgements

Special thanks to Teklay Messele and Louise Meyer of Health Canada for helpful discussions, Dr. Keith Jackson of the Nova Scotia Ministry of Health for providing the Physician Billing Data, and Jeremy Karn and Aakarsh Nair for outstanding research assistance.

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If immigration, emigration, retirement and mortality rates remain the same over the next 20 years, to meet the requirements due to both population growth and aging, Canadian medical school admissions and nursing school admissions must have average annual growth rates of 3 percent and 13 percent, respectively.

Interdisciplinary Teams: Planning for the Future

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A key component of primary health care reform involves the introduction of interdisciplinary primary health care teams. This article examines the health human resource (HHR) challenges associated with implementing an interdisciplinary team approach.

About Interdisciplinary Teams

Primary health care is undergoing significant change across the country. One important change involves making primary health care accessible through interdisciplinary organizations or teams set up to serve specific populations.

While interdisciplinary teams will vary in size, at a minimum they will include family physicians and nurse practitioners or nurses. Depending on the needs of the community being served, other team members might include pharmacists, midwives, psychologists, social workers, dietitians, physiotherapists and mental health workers. In addition to diagnosing and treating illness, interdisciplinary teams will focus on health promotion, illness and injury prevention, and chronic disease management. Thus, interdisciplinary teams will help ensure that Canadians receive the most appropriate care, by the most appropriate provider and in the most appropriate setting. The benefits are expected to be substantial, including enhanced health outcomes, improved access and increased satisfaction for patients, better working conditions for providers and a more efficient use of resources.

Change is Under Way

Although not widespread, different team-based models have been in existence across the country since the early 1970s. However, the current impetus for primary health care change began with the September 2000 Ministers' Health Accord, and was reconfirmed in the 2003 Accord on Health Care Renewal. As a result, the provinces and territories are currently implementing a variety of interdisciplinary team models.

Implications for HHR

Primary health care teams cannot be established if health professionals are not available, willing and equipped to work in the “new” system. Ensuring an adequate supply of health professionals from various disciplines who are educated to work together in interdisciplinary teams will require appropriate national planning (including forecasting), specific recruitment and retention activities, and a change in pre- and post-licensure curriculum and clinical practice settings. Health care professionals will need to understand the role of interdisciplinary teams within the primary health care sector and the contribution that different professions can bring, as well as the potential for creating better work environments.

The team approach will not only change where primary health care professionals work but also how they work. It will involve a redistribution of tasks across team members. Over time, roles within respective practice areas will evolve as the system becomes more adept at developing interdisciplinary teams. Since this new approach is still unfolding and the extent of its impacts are unknown, it is difficult to forecast how it will affect future HHR supply and demand.

It is clear, however, that the availability of health professionals equipped to work in the new system will be a key determinant of the success of primary health care renewal. If health professionals are to put the new vision into practice, they will need the necessary knowledge, training and tools. Meeting these HHR challenges will require a collective effort on the part of governments and stakeholders. 🌐

The benefits are expected to be substantial, including enhanced health outcomes, improved access and increased satisfaction for patients, and better working conditions for providers.

Meeting the Growing Demand for Nurses

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Steven Simoens, Organization for Economic
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The flow of nursing services depends on more than just the number of nurses. For example, it also depends on how many of those nurses are at work, their experience with their particular place of employment and their level of morale. While practice environments may at first appear to be the responsibility of individual employers, working conditions for many nurses have deteriorated to the point where national attention and solutions are required. Enhancing working conditions can help reduce the current shortage of nursing services by increasing retention and work force productivity. Moreover, the terms and conditions of work are a key factor in recruitment efforts to meet the growing demand for nursing services.

Beyond Head Counts

As indicated in previous articles, Canada is currently experiencing a nursing shortage and there is evidence to suggest that this shortage will increase significantly over the next 15 years. Among the contributing factors are an aging work force (see article on page 17), as well as high rates of attrition in some nursing programs and during the first few years after graduation.

As Table 1 illustrates, the nursing profession has a high participation rate, with most qualified nurses actually working in nursing positions. For this reason, it is not likely that the participation rate can be readily increased. However, there is ample evidence to suggest that the nursing work force can be used more efficiently, in particular by improving the terms and conditions of work.

Employment Status

During the 1990s, the percentage of nurses working full time decreased significantly. Although that proportion has begun to rise, only 54.1 percent of Canada's Registered Nurses (RNs) and 42.2 percent of Licensed Practical Nurses (LPNs) are currently employed in full-time positions.^{1,2} Although nurses work part time for many reasons, including personal choice, only about ►

Table 1: **Number of Registered Nurses (RNs), Licensed Practical Nurses (LPNs) and Registered Psychiatric Nurses (RPNs), by Employment Status in Canada, 2002¹⁻³**

Employment Status	RNs	LPNs	RPNs*
Employed in nursing	230,957	60,123	5,132
Employed in other than nursing	5,392	2,661	n/a**
Not employed	7,803	2,493	n/a**
Not stated	10,600	4,097	n/a**
Proportion of qualified nurses working in their professions	90.7%	86.7%	97.0%

*RPNs are regulated in the four western provinces. The total number of non-duplicate RPN records for 2002 was 5,285.

**RPNs who were employed in other than nursing or unemployed were aggregated into one category and were not reported at all by one province. One province did not report RPNs who did not state their status.

35 percent of nurses who do so actually prefer part-time work.⁴ In fact, many part-time nurses work for multiple employers to achieve the equivalent of full-time work.

It appears, then, that employer budgets, the nursing labour market and labour policies have been unable to match the required supply of nursing services with nurses' demands for full-time and part-time work,⁵ creating an apparent incongruity of reported under-employment in areas experiencing nursing shortages. Part-time and casual work may be demand driven, allowing employers to adjust for fluctuating volume and intensity. In some cases, however, part-time work and casual or temporary work has been the only entry point, making nursing less attractive as a career choice. Additionally, it may result in lower productivity, and lower quality and continuity of care.⁶

Allowing for the fact that some part-time nurses already work at full-time equivalency through a multiple employer approach, research commissioned for the Canadian Nursing Advisory Committee suggests that converting interested part-time nurses to full-time status would gain an additional 2,500 full-time positions across the system.⁷ Thus, increasing the proportion of full-time work across the country would help meet the demand for nursing services in the short term.

Reducing the number of nurses working across multiple employers may also improve work force efficiency, increase quality and continuity of care for patients and reduce risks such as disease transmission

between workplaces. As well, the trade-off between pay and benefits considerably lowers the net cost of increasing the number of full-time positions because many part-time nurses are already doing the equivalent of full-time work across multiple employers. Although full-time nurses receive benefits not available to part-time nurses — worth an estimated 18 to 22 percent of their income — part-time nurses receive additional salary in lieu of vacation pay and other benefits.

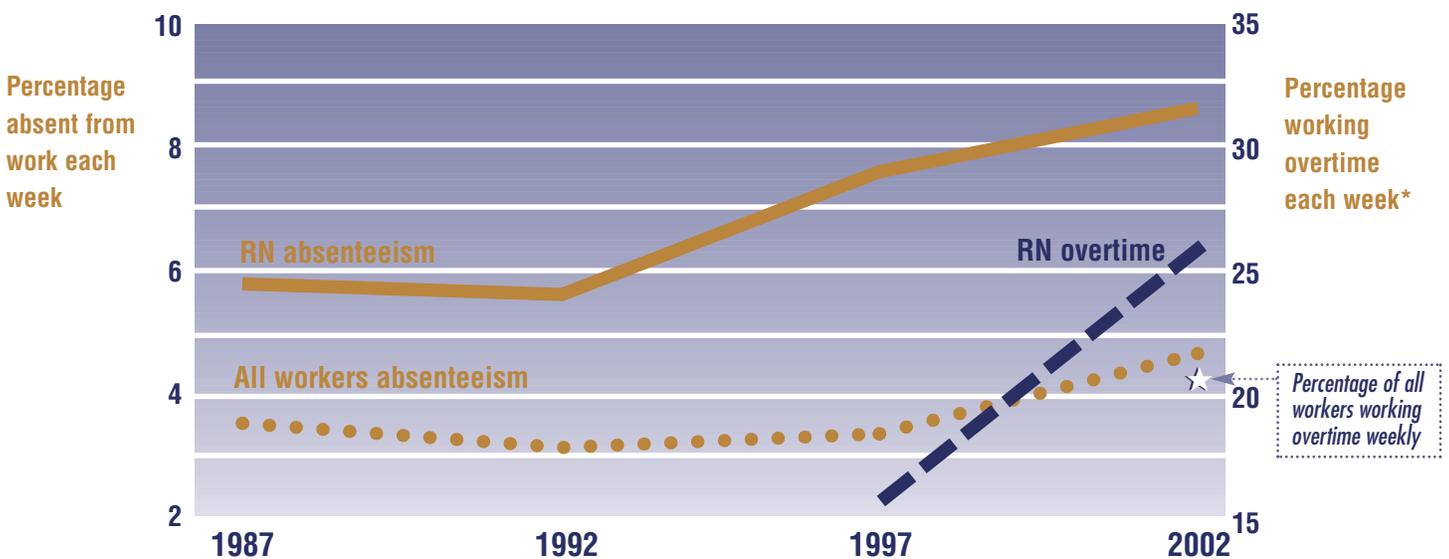
Working Conditions

For several years, it has been apparent that the environments in which nurses practise are having a negative impact on work force efficiency. Some of the major contributors to poor working conditions are increasing workloads, loss of management and other supports, high rates of overtime and deteriorated employment relationships. However, many aspects of working conditions are amenable to manipulation in both the short and long term. Key areas include the interplay between workload, overtime and absenteeism, as well as between job satisfaction, retention and turnover.

Workload, Overtime and Absenteeism

Nursing workload increased significantly as a result of cuts to nursing and support staff in the early to mid-1990s.⁸⁻¹⁰ Nurses have also been affected by hospital downsizing. For example, as a result of downsizing in Ontario, the number of patients per bed has increased.¹¹ Subsequent decreases in the average length

Figure 1: Registered Nurse (RN) Absenteeism and Overtime, Canada, 1987 to 2002



*RN overtime data were not captured prior to 1997.

Source: Office of Nursing Policy, Health Canada.

of patient stay mean that, on average, patients are “sicker” during their hospital stay, resulting in a more intensive workday for nurses. When the severity of the patients is considered, there has been a 26 percent increase in severity-adjusted cases. The demands on nurses and other caregivers have increased, as has the pace of work. After adjusting for severity, there was a 20 percent reduction in beds per patient case and a 3.7 percent reduction in nurses per patient case.¹¹

Evidence suggests that workload — an important factor in job satisfaction — is also rising due to increasing administrative responsibilities,^{12,13} while clinical aspects of care are left undone.⁸ Both trends are important determinants of turnover among nurses as they can contribute to feelings of failure when patient needs or their own personal standards are not met.¹⁴

Working overtime to fill shortages has been shown to affect nurses’ health by increasing the risk of injury — a problem compounded by the advancing average age of nurses. Canadian RNs worked 15.7 million overtime hours in 2002 (equal to 8,643 full-time positions), with 26 percent of RNs working overtime every week. This is considerably higher than the 1997 rate for RNs (15.3 percent) and higher than the average of 22.5 percent reported among other workers in 2002 (see Figure 1).

Overtime is highly predictive of increased lost-day injury claim rates among nurses.^{10,15} In 2002, the rate of RN illness- and injury-related absenteeism (including “sick leave”) stood at 8.6 percent — significantly higher than the 1987 rate for RNs (5.9 percent) and the 2002 rate for all workers (4.7 percent) (see Figure 1). Between 1997 and 2002, the absenteeism rate for RNs increased by 16.2 percent and, each year, the rate among full-time workers was about 50 percent higher than among part-time workers. Moreover, the 2002 absenteeism rate for RNs working full time was 83 percent higher than it was in the general labour force. That year, a total of 19.6 million hours were lost to absenteeism — the equivalent of 10,808 full-time positions.^{7,16} Reducing absenteeism among RNs to the Canadian average in 2001 would have put the equivalent of 3,500 full-time positions back into the system.⁷

One of the most obvious ways to reduce overtime and absenteeism is to increase the number of nurses educated and employed across Canada, as this will help offset cuts made to the nursing work force during the 1990s.

The fiscal costs of overtime, absenteeism wages and replacement wages for RNs were estimated to be between \$962 million and \$1.5 billion in 2001. Clearly, decreasing the rates of overtime and absenteeism has the potential to reduce the toll on nurses, significantly increase the productivity of the nursing work force and reduce fiscal costs for employers and taxpayers. Healthier nurses may also enjoy greater career longevity — an important consideration as the nursing work force ages. One of the most obvious ways to reduce overtime and absenteeism is to increase the number of nurses educated and employed across Canada, as this will help offset cuts made to the nursing work force during the 1990s.

Job Satisfaction, Retention and Turnover

The degree of turnover (changing jobs within nursing as opposed to leaving the profession) can affect the ability of nurses to deliver services and has been linked with decreased productivity and poor quality of care.¹⁷ Turnover may also impose a higher workload on remaining staff, thereby reducing morale and increasing the potential for injuries. The associated financial costs include expenditures to recruit new nurses, hire agency nurses and/or pay overtime to remaining nurses. In 2002, 17 percent of RNs planned to leave their present job within the next year and it is known that nurses who intend to leave generally follow through with actual turnover.¹⁸ Early evidence from an international study suggests an average turnover rate of 9.5 percent for the five countries studied. The study also identifies direct costs to Canadian organizations of about \$5,700 and indirect costs of \$4,400, for a total of \$10,100 for each nurse leaving the job.¹⁹ Other research suggests that substantial savings can be achieved by implementing effective retention strategies.^{17,20-22}

Job dissatisfaction seems to be the dominant reason that nurses leave their jobs,²³ more important than other employment opportunities or remuneration.^{17,18} A study of 43,000 RNs from more than 700 hospitals in Canada, England, Germany, Scotland and the United States reported high levels of nurse dissatisfaction and job-related strain, which were attributed to negative perceptions of staffing and work force

management policies.⁸ Repeated studies indicate that workload, lack of autonomy and professional latitude, autocratic leadership, non-involvement in decision making, lack of managerial support, role conflict, routinization of work and lack of career advancement opportunities were related to poor job satisfaction, often culminating in turnover.^{18,24,25}

Although turnover within nursing is significant in some settings, overall attrition from the nursing profession appears to be low. While this phenomenon is not well understood, nurses may like their profession but not their particular jobs, moving from job to job in search of better working conditions.

Some 5,500 RN management jobs were lost between 1994 and 2002.³ Nurses believe that the erosion of the head nurse role and the elimination of many nurse leaders at corporate levels have reduced their input into policy and allocation decisions. This trend reinforces nurses' feelings of being undervalued and may affect employers' abilities to retain nurses.¹⁶ It may also influence the image of nursing held by potential recruits who face competing career choices.¹⁶ A broad body of evidence shows that enhancing perceptions of empowerment in the workplace can be a highly effective way of preventing burnout among nurses. For instance, a key characteristic of "magnet hospitals" in the United States is the presence of influential nurse executives. These facilities report higher levels of job satisfaction, lower rates of burnout, lower rates of injuries and increased perceptions of productivity and quality of care.²⁶

Decreasing turnover can considerably reduce related costs for individual employers. While this would appear to be an incentive to improve working conditions, high turnover rates persist. Thus, there is a need for a

more macro-level solution that would benefit the health care system as a whole, lower overall costs and increase productivity. One national level initiative involves the recent inclusion of quality of worklife indicators in the Canadian Council on Health Services Accreditation program, which now requires employers, unions and nursing staff to reflect on issues related to retention and job satisfaction. As well, the Quality Practice programs of the Registered Nurses Association of British Columbia, the College of Nurses of Ontario and the American Magnet Recognition Program (American Nurses Credentialing Center) have been shown to improve retention and quality while reducing costs, and offer best practice models that employers might consider in their efforts to improve productivity.



Improved working conditions are essential to attracting an adequate supply of new nurses to meet future requirements. Time is of the essence and Canada needs to make a concerted and collaborative effort to put in place the infrastructure to ensure that it will have the required nursing work force 10 and 20 years in the future.

Reducing the Current Shortage

Current working conditions are taking a significant toll on the health and job satisfaction of nurses and the evidence linking nursing care to patient outcomes raises concerns. This article has presented evidence that addressing these challenges can offer clear benefits, including higher quality care and higher productivity. For instance, better terms and conditions of work could effectively reduce the estimated national nursing shortage of approximately 16,000 RNs⁷ by over 35 percent. Specifically, converting interested part-time nurses to full-time positions and reducing

absenteeism to the Canadian average would add the equivalent of 6,000 full-time positions to the system from within the current stock of nurses.

The Challenges Ahead

Much of the evidence on the benefits of improving working conditions and the strategies for doing so is not new. Yet, only a limited number of strategies have

been successfully implemented. The reasons for this lack of overall progress are not well understood. It is possible that employers perceive suggested solutions as too expensive, or that inertia is blocking effective change. Perhaps, however, the most critical incentive for improving working conditions for nurses lies at the macro level.

Why Increasing Wages Doesn't Work

Reviews from the United Kingdom and the United States indicate that wage increases only play a weak role in encouraging nurses to work more hours.^{27,28} In Canada, where participation rates are already high, increased wages would not likely generate more nursing services. However, higher wages have been shown to reduce the level of nursing turnover,^{29,30} although wages seem to be less important than working conditions and job satisfaction.¹⁸ Furthermore, starting salaries for jobs with similar educational requirements to nursing are also key factors for those selecting nursing as a profession. Evidence from the United States suggests that higher wages therefore are effective in attracting candidates to first degree nursing programs.³¹

Inadequate terms and conditions of work will negatively affect Canada's ability to attract and retain nurses during the looming nursing shortage. Canadians still want to enter the nursing profession — in fact, schools of nursing are oversubscribed and the nursing participation rate is high. However, later graduation from nursing schools, an aging work force and earlier retirements have led to mounting concern that the nursing supply is set to decline.

Nursing schools will need to increase enrolments to keep up with future exits from the work force and escalating demand for nursing services as the baby boom generation ages. Yet, the pool of potential recruits will continue to shrink, due to low population growth and lucrative, competing career choices. Nursing shortages are a global problem, at least among OECD countries. Potential recruits can choose from a wide selection of health professions and countries in which to train and practise. In such a competitive market, wages will only be one consideration (see box on this page); for many potential recruits, decisions will hinge on other factors, especially the terms and conditions of work. If current working conditions persist, qualified applicants may not be so eager to fill an increasing number of seats available in nursing schools across Canada.

Although enhanced working conditions can significantly reduce the *current* nursing shortage, they cannot increase the productivity of the existing work force enough to meet the estimated *future* shortage of 113,000 RNs in 2016.³² Nevertheless, improved working conditions are essential to attracting an adequate supply of new nurses to meet future requirements. Time is of the essence and Canada needs to make a concerted and collaborative effort to put in place the infrastructure to ensure that it will have the required nursing work force 10 and 20 years in the future. For policy makers grappling with the growing demand for nursing services, all the evidence suggests that improving working conditions is key — in both the short and long term — to maximizing productivity and meeting the growing demand for nursing services. 🌐

@ [Click here for references.](#)

International Medical Graduates:

A Case Study

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Governments typically address imbalances in physician supply by controlling medical school enrolments and integrating international medical graduates (IMGs) into the health care system. Given the lengthy training period for physicians, it takes many years to translate increasing medical school enrolments into an expanded physician work force. As a result, Canada has traditionally used IMGs to meet immediate physician needs. This article explores how an accumulating evidence base is helping policy makers overcome the challenges currently limiting the effectiveness of this policy response.

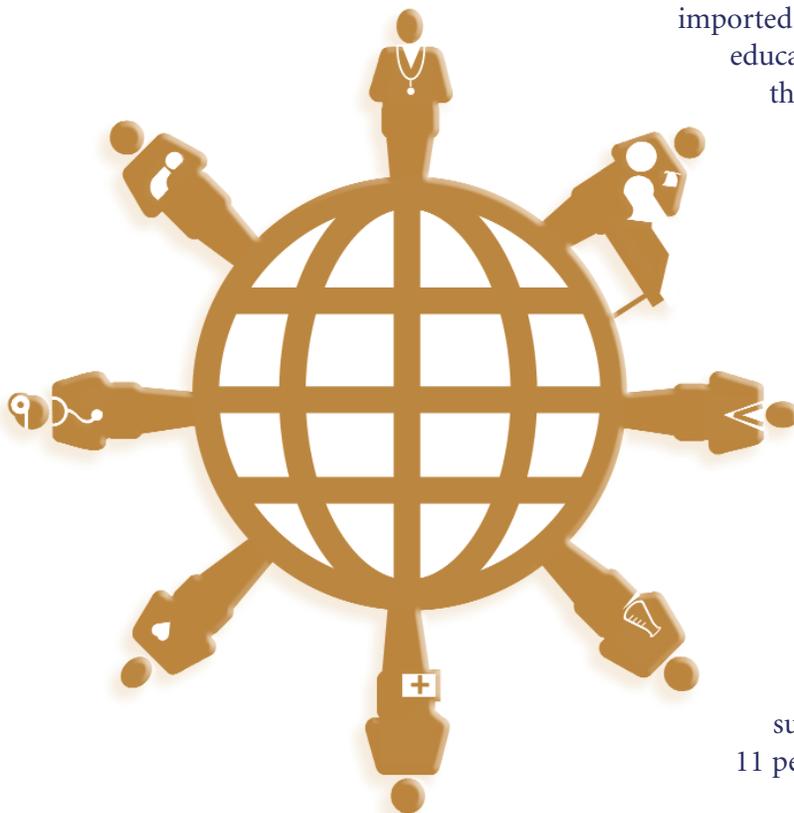
Supply and Demand: Increasing Enrolment

Faced with growing physician shortages, Canadian medical schools have recently increased the number of available training positions. In 1998, first-year enrolment in Canadian medical schools was approximately 1,574;¹ by 2003, that number had grown to 1,974.² It is estimated that annual medical school enrolments will have to increase to 2,500 by 2007 simply to maintain the current physician-to-population ratio at 1.9/1,000.³ Moreover, an injection of 500 IMGs is also needed each year to sustain the current physician-to-population ratio.²

IMGs: Meeting Short-Term Needs

Due to the lengthy training period for physicians, Canada has often relied on IMGs, or foreign-trained physicians, to meet short-term physician needs. In the late 1960s, Canada imported more physicians on a yearly basis than it educated.⁴ The expansion of medical schools in the late 1960s and early 1970s changed this trend somewhat. As Figure 1 shows, IMGs comprised between 20 and 30 percent of Canada's physician work force between 1969 and 1999.³

Currently, IMGs constitute approximately 23 percent of Canada's physician work force. However, as Figure 2 illustrates, this percentage varies significantly from province to province. For example, in 2002, 37 percent of the physician supply in Newfoundland and Labrador and 52 percent of the supply in Saskatchewan were IMGs. By contrast, this group made up only 16 percent of the physician supply in Prince Edward Island and 11 percent in Québec.



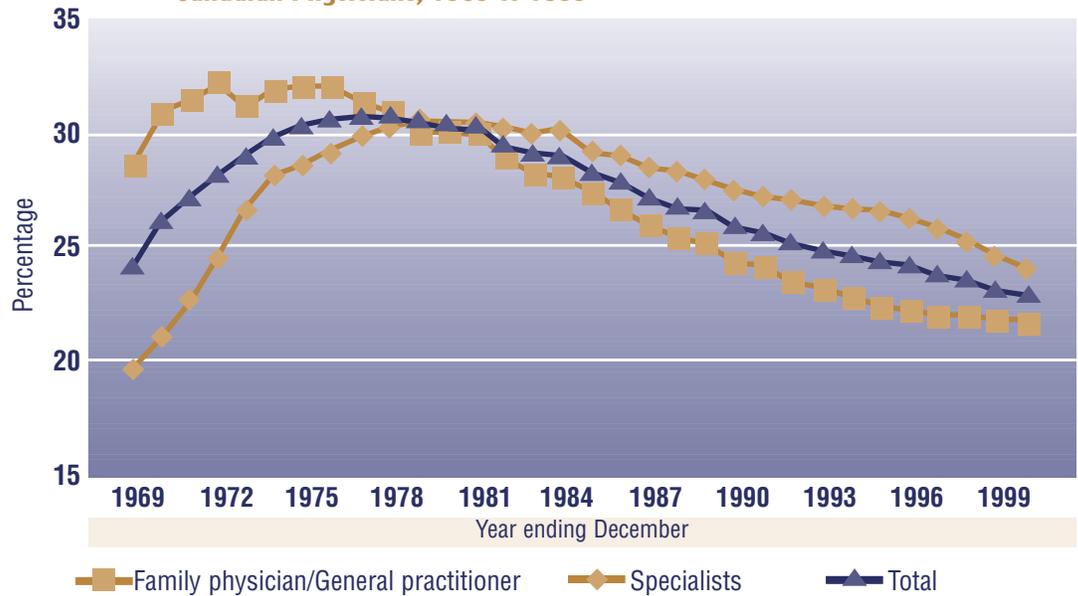
Immigration and Practice Trends

Over the last 25 years, the origin of IMGs has changed from primarily Commonwealth countries and Ireland to countries in the Middle East, Asia and Eastern Europe.⁴ Although the nature of post-graduate training in Commonwealth countries is well known, this is not the case in newer source countries. Consequently, an increasing number of landed immigrants intending to practise medicine require in-depth assessment and additional training.

Until recently, Canadian immigration legislation was based on an “occupation needs” approach. Since physicians were not on Canada’s list of needed occupations, they were not given preference for immigration. For this reason, many physicians came to Canada through family sponsorship programs or by declaring another intended occupation. However, provincial employers and licensing authorities have also used work permits as a method for recruiting

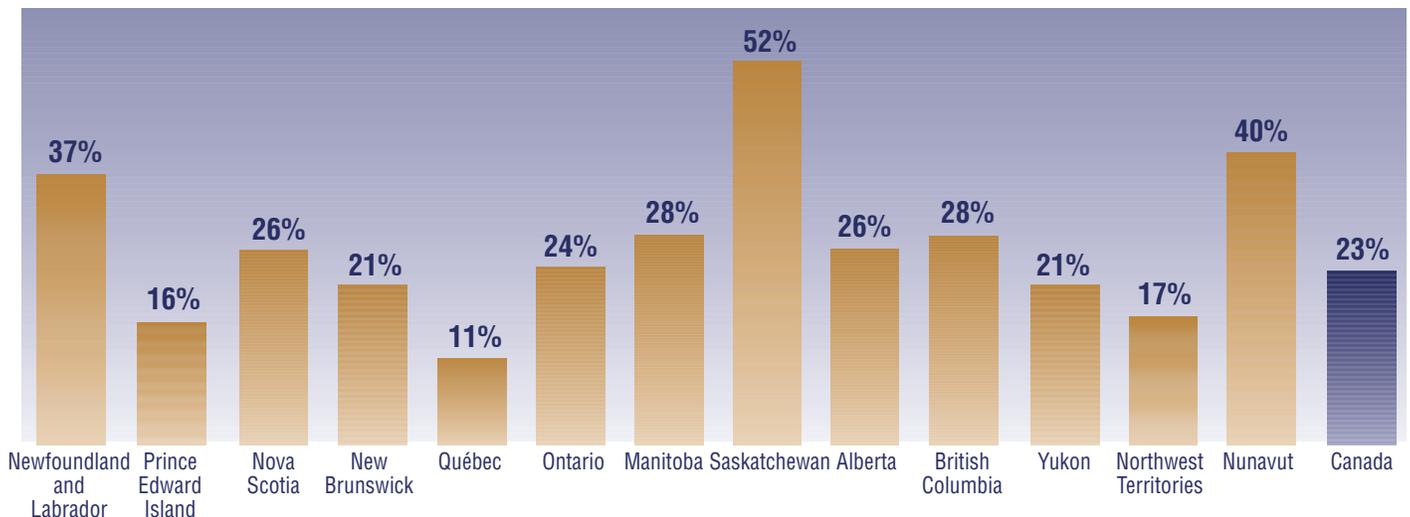
physicians for under-served areas. As a result, physicians arriving with work permits tended to locate in smaller communities, while landed immigrants generally settled in provinces with large urban centres. For instance, Figure 3 shows that the vast majority of IMGs in Saskatchewan and Newfoundland and Labrador came to Canada with arranged employment and work permits. ▶

Figure 1: International Medical Graduates (IMGs) as a Percentage of Active Canadian Physicians, 1969 to 1999



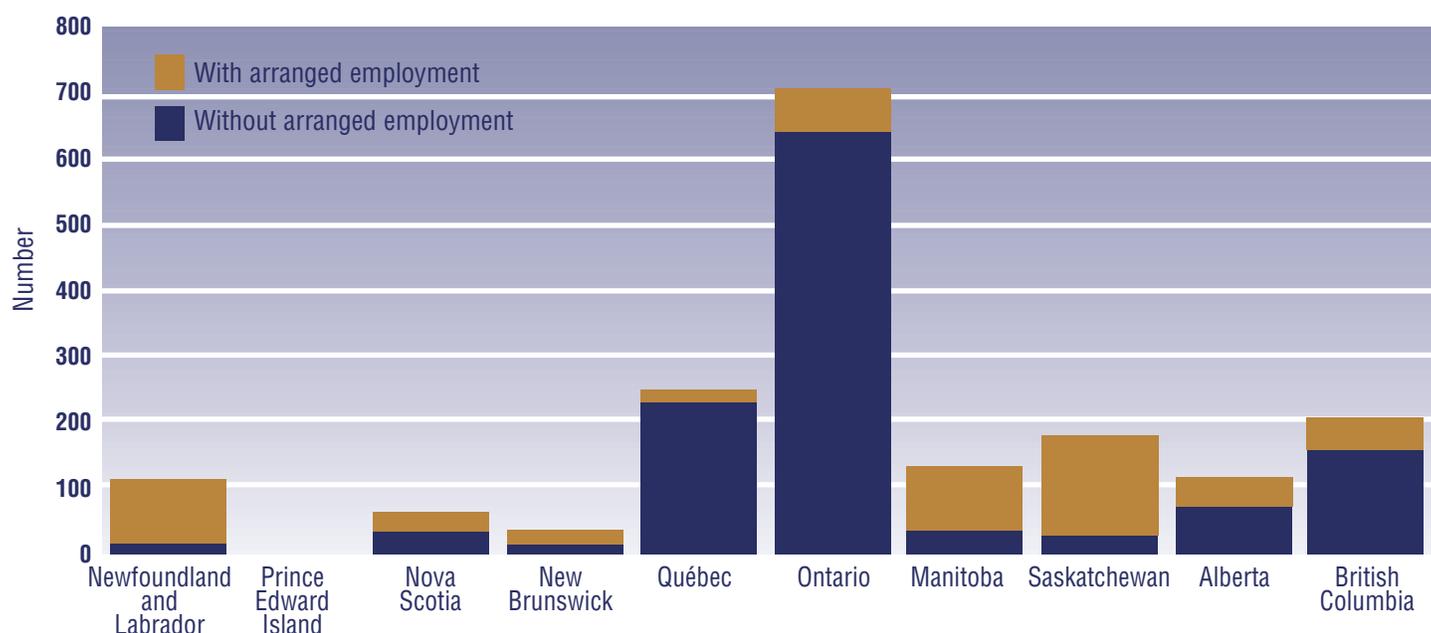
Source: Dr. Mamoru Watanabe, *Canadian Physician Workforce: The Role of IMGs*, International Medical Graduates National Symposium Proceedings, 2002. Data from Southam Medical Database, Canadian Institute for Health Information.

Figure 2: International Medical Graduates (IMGs) as a Percentage of Active Canadian Physicians, by Province/Territory, 2002



Source: Canadian Institute for Health Information, *Supply, Distribution and Migration of Canadian Physicians, 2002*. Adapted from *Physicians by Gender, Province/Territory and Age Group, Canada, 2002*, Table 1.0, p. 39, and *Physicians, Foreign MD Graduates, by Specialty and Province/Territory, Canada, 2002*, Table 4.1, p. 62.

Figure 3: Landed Immigrants with Medicine as Their Intended Occupation, by Province, 1995–2000



Source: Dr. Mamoru Watanabe, *Canadian Physician Workforce: The Role of IMGs*, International Medical Graduates National Symposium Proceedings, 2002. Data from Southam Medical Database, Canadian Institute for Health Information.

An Untapped Resource

A recent survey of medical licensing bodies indicates that most provinces are licensing a higher percentage of IMGs with work permits than those with landed immigrant status, perhaps because licensing authorities do not have a reliable means for identifying potentially qualified physicians.⁴ While data are available on the number of landed immigrants who intend to practise as physicians, these data do not identify those who have not had relevant experience in the last five years. As the latter group would require retraining, they would not be included among those who could be licensed for practice in the short term. Various provinces are known to have a considerable pool of unlicensed IMGs. For example, it is estimated that there are more than 160 unlicensed IMGs in Alberta⁵ and more than a thousand in Ontario.

Recently, Canada's immigration legislation has changed from an "occupation needs" approach to a "skills-based" approach that focuses on selection factors such as education, work experience and knowledge of Canada's official languages. Since physicians generally have high levels of education and some work experience, the number of physicians entering Canada in the future will likely increase, adding to the potential pool of licensable candidates.⁶

An Ethical Dilemma

Using IMGs to address short-term physician shortages raises a number of issues. As discussed on page 4, a key concern is the ethical dilemma of recruiting health care providers from abroad at a time when many countries are experiencing similar work force shortages. To address this, Commonwealth countries have signed a Code of Ethics agreeing not to recruit health care providers from developing countries known to be experiencing shortages.⁷

However, a distinction needs to be made between actively recruiting IMGs and tapping into the pool of IMGs who have come to Canada of their own volition and who want to work in their field of study. The latter group is a source of untapped skilled workers and if not integrated into the Canadian labour force, represents a loss of human capital. With this in mind, the Government of Canada recently launched a foreign credential recognition initiative identifying physicians, nurses and engineers as a top priority.

Overcoming Licensing Challenges

A number of concerns must be addressed if integrating IMGs is to be a viable solution to the current shortage of physicians. Foremost among these is protecting public safety by ensuring that IMGs meet identified

standards of practice and competence. Effective mechanisms for assessment and licensing are also required so that qualified IMGs can be integrated into the system in a timely manner. As Table 1 illustrates, a number of challenges currently limit the establishment of such mechanisms. For example, a patchwork of policies and programs exists across the country, ranging from residency positions dedicated for IMG remedial training to almost immediate entry into practice — albeit under supervision — for physicians from countries with reputable training systems. Some of these provincial policies and programs may provide “best practice” models as Canadian policy makers develop a more effective approach for integrating IMGs.

Table 1: Licensing IMGs – What Do We Need?

Sufficient resources for assessment and training:

Insufficient resources, together with the continuing influx of IMGs, have created a backlog of IMGs awaiting assessment and remediation.

A coordinated system for verifying credentials:

Each time IMGs apply for licensure in a different province, their credentials must be verified. This places additional demands on the licensing body and causes delays for IMGs.

A database on licensable IMGs: Without a database, it is difficult to determine the pool of licensable IMGs as there is no means to locate and track IMGs who are landed immigrants.

A centralized information system: Without one point of contact, IMGs have difficulty accessing information about the licensing process in different provinces.

Adequate language assessment tools: The Test of English as a Foreign Language (TOEFL) and the Test of English as a Second Language (TESL) are currently used to assess English language proficiency. However, these tests lack the capacity to assess the use of English in a medical practice environment.

An integrated assessment strategy: There have been cases where IMGs have been deemed eligible for licensure in one jurisdiction and ineligible in others.

Table 2: Task Force Recommendations

The Canadian Task Force on Licensure of International Medical Graduates made the following recommendations for improving licensing procedures for IMGs to the Conference of Deputy Ministers of Health, which were approved on December 9, 2003:

Integrate IMGs into physician resource plans by ensuring there is adequate capacity and funding for their assessment and training.

Work toward standardized evaluation leading to licensure.

Expand or develop supports/programs to assist IMGs with the licensure process and requirements in Canada.

Develop programs to support faculty and physicians working with IMGs.

Develop capacity to track and recruit IMGs.

Establish a national IMG research agenda that would include evaluation of the IMG licensure recommendations and the impact of the strategy on physician supply.

Moving Forward: Canadian Task Force on IMG Licensure

In May 2002, the Federal/Provincial/Territorial Advisory Committee on Health Delivery and Human Resources established a task force to address challenges restricting IMG licensing. Assisted by a growing body of evidence, the task force made a number of recommendations (see Table 2) to the Conference of Deputy Ministers of Health in December 2003. The multisectoral approach suggested by the task force recognizes that no single policy tool or level of government alone can address the unique challenges presented by IMG licensure. If adopted, the task force’s recommendations can help Canada address physician requirements by facilitating integration of IMGs into the health care system. 🌐

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Who's Doing What?

Who's Doing What? is a regular column of the Health Policy Research Bulletin that looks at the key players involved in policy research in the issue's theme area. Because of the importance of quality data for health human resource (HHR) planning, this column profiles the major players in HHR data collection and identifies some of the challenges associated with current HHR data collection activities.

Marie-Gloriose Ingabire, Health Human Resource Strategies Division, Health Policy and Communications Branch, Health Canada, and Brent Barber, Canadian Institute for Health Information

HHR Data Collectors

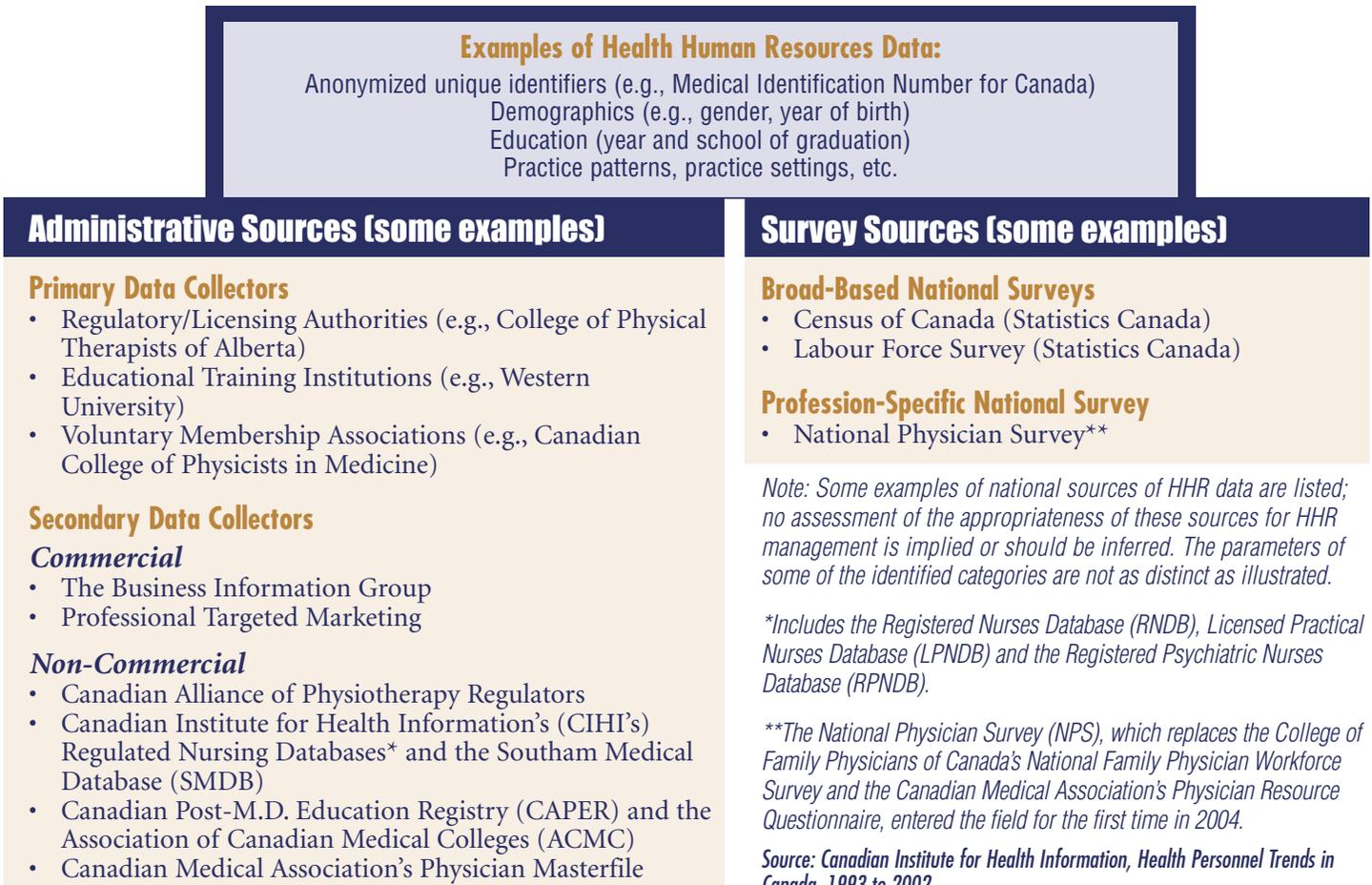
Typically, data on health personnel are not collected for the purposes of HHR management. For this reason, data collected for other purposes must often be used to address the information-based functions of HHR management: planning, policy research, and monitoring and evaluation.¹ Figure 1 illustrates some

of the different sources of health personnel data available in Canada. In general, there are two types of HHR data sources — administrative sources and survey sources.

Administrative Sources

Data from administrative sources are collected as a function of administrative processes, such as collecting membership fees and issuing licences to registrants. Administrative sources are comprised of primary and secondary data collectors, both of which may collect data for commercial or non-commercial purposes. Primary data collectors include organizations that collect data directly from health personnel, typically for administrative reasons (e.g., the College of Physiotherapists of Ontario <<http://www.collegept.org>>). Secondary data collectors obtain data from primary data collection sources; an example of a non-commercial

Figure 1: Some Sources of Health Personnel Data Available in Canada



secondary collector is the Canadian Post-M.D. Education Registry (CAPER <<http://www.caper.ca>>). It collects data from primary data collectors across Canada in order to provide accurate information for national medical human resources planning. Other organizations, such as the Business Information Group <<http://www.mdselect.com>>, collect publicly available data from primary collectors for commercial uses.

In some instances, secondary data collectors obtain data from other secondary data collectors and use the data for entirely different purposes. The Southam Medical Database (SMDB) at the Canadian Institute for Health Information (CIHI <<http://www.cihi.ca>>) is one such example. CIHI purchases the Business Information Group's dynamic² physician database annually to add year-specific physician data to the SMDB.³ SMDB data are used to generate summary statistics on physician demographics and practice, to provide up-to-date information on the supply, distribution and migration (interprovincial and international) patterns of Canadian physicians and to support related analysis and research.

Survey Sources

Health personnel survey data are collected via ongoing or one-time survey instruments for commercial and/or non-commercial purposes. In Canada, the most comprehensive survey efforts are primarily by non-commercial organizations. In general, surveys of health personnel are either directed at a specific personnel group (e.g., physicians) or capture health personnel information as a by-product of surveying a subset of the general population. The most comprehensive national surveys that collect data on health personnel are the Labour Force Survey (LFS) and the Census, both from Statistics Canada <<http://www.statcan.ca>>.

Unfortunately, neither survey is specifically designed to address the data and information needs of HHR management (national surveys rarely are). Issues concerning the categorization of health professionals (LFS and Census) and sample size (LFS) also limit the utility of the available data on health professionals. Despite these challenges, and in the absence of a comprehensive administrative HHR information system in Canada, these two surveys are the only window available into the entire health work force in Canada.

The 2004 National Physician Survey (NPS) is one example of a group-specific survey. The NPS, which

replaces the College of Family Physicians of Canada's National Family Physician Workforce Survey and the Canadian Medical Association's Physician Resource Questionnaire, entered the field for the first time early this year. The NPS will collect data from all Canadian physicians, describing practice patterns, practice settings, care shared with other health care providers and use of technology (contact <npdb@cihi.ca> for more information).

National HHR Data

The interdependencies associated with the education and training of health personnel in Canada, as well as the mobility of the Canadian health labour force (interprovincially and internationally), mean that data collection activities need to be grounded in national health information standards. Such standards are required to guide new data development away from the patchwork of "data silos" that currently exist and direct efforts toward cross-jurisdictional comparability and a vision for an integrated health information system for Canada. Numerous reports, ministers and deputy ministers of health, the former Federal/Provincial/Territorial Advisory Committee in Health Human Resources and several stakeholder groups have identified significant information gaps on health personnel and have called for data development at the national level.

Data Collection — Meeting the Challenges

There are a variety of challenges associated with collecting quality data on health care providers, including data availability, comparability, accessibility, comprehensiveness and timeliness. As a result, only a few regulated health professional groups are currently able to collect standardized data that are comparable across the country. Data for unregulated workers (i.e., providers not subject to provincial/territorial regulations) are even more limited and do not exist for most occupations. Over the past several years, stakeholders at all levels have begun focusing on how to build a foundation of better HHR data on which to make informed decisions.

The Roadmap Initiative was a four-year action plan to modernize Canada's health information system. Led by CIHI, it was a collaborative effort involving Statistics

Who's Doing What? Continued on page 41 ►



Did You Know?

Did You Know? is a regular column of the Health Policy Research Bulletin that explores commonly held misconceptions about health data and information. This issue uses currently available Canadian data to support — or refute — common perceptions about health human resources (HHR).

Some Propositions About Health Human Resources

Cliff Halliwell, formerly with the Applied Research and Analysis Directorate, Information, Analysis and Connectivity Branch, Health Canada, Gordon Hawley and Teklay Messele, Microsimulation Modelling and Data Analysis Division, Applied Research and Analysis Directorate, Information, Analysis and Connectivity Branch, Health Canada

Proposition

?

Assessment

1

The health sector is more labour intensive than other sectors of the economy.

True

The health services sector is labour intensive because it focuses on patients who, by definition, require considerable personal attention. It is estimated that health care spending accounted for 9.8 percent of Canada's economy in 2002; much of this spending was on wages, salaries and benefits.¹ One indicator of labour intensity is the percentage of total spending devoted to earnings, which was 62 percent for the health sector,² compared to 52 percent for the Canadian economy.³

2

Looking ahead, the growth in Canada's labour market will slow substantially.

True

The period of rapid growth in the labour force is over. From 1991 to 2001, labour force growth was 9.5 percent.⁴ Economic projections call for very little net growth in the labour force by the second decade of this century. Baby boomers, aged 37 to 55, made up 47 percent of the labour force in 2001.⁵ Ten years from now, one half of this group will be aged 55 or older and 18 percent will be aged 60 or more.¹ As the baby boom generation ages, its members will be retiring. Even if they continue working, many will reduce their work hours. However, it is not clear how this trend will play out in the health care sector.

3

Regions vary considerably in how they use the mix of nursing skills available.

True

The mix of Registered Nurses (RNs), Licensed Practical Nurses (LPNs), Registered Psychiatric Nurses (RPNs), unregulated aides and others who provide nursing services to patients varies by region. For example, the Canada-wide ratio of RNs to LPNs working in nursing was 3.84:1 in 2002.⁶⁻⁸ However, the RN to LPN ratio varied considerably across the country: 2.61:1 in Atlantic Canada; 4.07:1 in Québec; 3.30:1 in Ontario; 4.78:1 in the Prairies; and 6.57:1 in British Columbia and the Northwest Territories.⁹ (RPNs are only regulated in the four western provinces.)

4

When students currently enrolled in nursing school graduate, their numbers will be sufficient to increase the overall nursing population.

False

There were approximately 4,500 Canadian nursing graduates in 2001 and another 1,500 foreign-trained nurses passed the RN exam,¹⁰ for a total potential inflow to nursing of 6,000. Although this suggests that the overall number of RNs would have increased from 2000 to 2001, the number of RNs actually decreased by 1,054 (from 232,566 to 231,512).¹¹ That is, the number of nurses entering the work force in 2001 were not enough to offset net exits from the profession. Furthermore, it is expected that the shortfall will increase as a large proportion of nurses approach retirement.¹²

5

There is a higher proportion of part-time work in nursing than in the general work force.

True

Even in the 1980s, around 35 percent of nurses worked on a part-time basis,¹³ well above the average for the overall labour force (14.4 percent).¹⁴ In 2002, 46 percent of nurses worked part time (including 11.8 percent in casual work) and 54 percent of nurses worked full time.¹⁵ The number of RNs working full time increased just 1.2 percent over the period from 1985 to 2002, compared to a 19 percent increase in the total number of nurses.¹⁶

Proposition

?

Assessment

6

Most physicians are in a “fee-for-service” practice.

True

In 2000–2001, fully 71.9 percent of physicians billed under the fee-for-service (FFS) schedules and 28.1 percent of physicians received payments under alternative payment systems (e.g., salary, sessional, capitation).¹⁷

7

The return on an investment in a medical specialization is greater than the return on an investment in family medicine.

True

It takes two to three years of post-Medical Doctor (MD) training to become a family physician, and five to seven years to become a specialist. However, the rate of return on training increases significantly for a specialist. In 1999–2000, specialists earned about 50 percent more net income from FFS payments than did family physicians¹⁸ (much of the difference may be attributed to the number of hours worked¹⁹). Income also varies by age, sex and type of specialty.²⁰

8

The number of medical residency spaces is sufficient to meet Canada’s current physician needs.

False

In 2004, there are 1,334 residency positions available,²¹ exactly equal to the number of expected MD graduates. However, some of these spots will be purchased by overseas students who will not practise in Canada.²² As a result, there will be more medical graduates than available spaces. Furthermore, there are few positions available for licensed physicians to upgrade or change specialties, or for international medical graduates to retrain for practising in Canada.

9

It is an ongoing challenge to find enough physicians to work in rural and remote communities.

True

Physician vacancy rates are higher in rural areas and specialists are particularly hard to find. For example, in mid-2003, there were 593 vacancies for general practitioners (GPs) in Ontario’s rural and remote communities.²³ Similar areas in British Columbia, Alberta and Saskatchewan had vacancies for 62,²⁴ 56²⁵ and 27²⁶ physicians, respectively, while Manitoba and Nova Scotia had vacancies for 11²⁷ and 19²⁸ GPs, respectively. Many provinces have created programs to draw physicians away from cities, offering incentives such as signing bonuses, loan forgiveness and differential pay structures. However, these incentive programs have had limited success.^{29,30}

10

Many physicians emigrated to other countries in the 1990s, particularly to the U.S.

False

The “brain drain” is small, although not insignificant. Between 1980 and 1992, 0.8 percent of the Canadian stock of active physicians moved abroad each year on average.³¹ When cuts in provincial health care expenditures were at their peak from 1993 to 1998,^{32–34} the average rate of outflow increased to 1.4 percent.³¹ However, the rate fell to about 0.9 percent between 1999 and 2002.^{31,35} In fact, the number of physicians moving abroad declined from a peak of 777 in 1993 to 500 in 2002.³⁵ Moreover, the number of physician returnees increased substantially after 1997. Professional factors such as professional/clinical autonomy, availability of medical facilities, job availability and remuneration are the key factors in emigration.^{36,37}

@ [Click here for references.](#)



Using Canada's Health Data is a regular column of the Health Policy Research Bulletin highlighting some of the methodologies commonly used in analyzing health data. This issue focuses on building a demographically rich physician supply model using time-series data.

Building a Supply Model for Physicians

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As the previous articles have shown, developing informed health human resources (HHR) policy responses requires looking into the future. This means developing forecasting/planning models that can help quantify future HHR demand and supply and test which policy levers may be most effective in balancing the two. This article sets out some of the data requirements for projecting physician supply, partially based on a physician supply model developed at Health Canada's Microsimulation Modelling and Data Analysis Division (MSDAD) in the Applied Research and Analysis Directorate (ARAD).

Stock/Flow Model: Key Concepts

Health services are delivered by a stock of HHR working at a certain level of intensity over the course of a year. This stock of physicians and other health professionals is best modelled using a stock/flow approach, a common and well-accepted form of modelling.

Stocks represent quantities at a point in time; in this case, the stock is the number of employed physicians at the end of a calendar year. Flows, on the other hand, represent quantities that change over a period of time. Comparing two points in time shows changes in the stock. That change in stock, or net flow, is usually a consequence of a series of contributing flows. For example, the stock of physicians at the end of a particular year, such as 2004, is equal to the stock of physicians

at the end of 2003 plus the net flow of physicians entering and exiting employment during 2004. Outflows break down into retirements, emigration and deaths,¹ while inflows include immigrants, Canadian physicians returning from abroad and new entrants from Canadian medical schools. The key advantage of disaggregating flows is that they can be broken down into more and more detail — data permitting, of course — to “drill down” to the various policy levers that affect the flow of HHR.

Capturing Lags and Leakages

Models are especially useful in capturing both lags and leakages from flows. A critical lag is how long it takes a new medical school student to graduate and start to work. Leakages are other forms of flows, for instance, the number of school entrants who do not complete their training.

The **Health Human Resources Supply Model (HHRSM)** for physicians illustrates how models can account for these lags and leakages. The model starts with the number of new entrants to Canadian medical schools. It takes four years of education to obtain the title of Medical Doctor (MD) and 3 percent of students drop out before finishing medical school (this is a default value based on recent experiences that can be changed by model users). Following graduation, MDs choose a specialty. Currently, 39 percent of MDs enter family residency, 43 percent enter medical residency and the remaining 18 percent enter surgical residency.

These proportions have remained steady over the last three years; however, in the model they are parameters that can be changed to reflect assessments of either student preferences or policies on where to stream new graduates.

There are also leakages during residency and initial practice. The model uses two default values for these drop-out rates, which are also based on recent data. First, a drop-out-rate of 1 percent is assumed during the residency training, which is presumed to be completed after two years for family physicians, after four years for medical physicians and after six years for surgical physicians. Second, a 3 percent drop-out

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rate is assumed within the first five years of entering practice. In other words, of every 100 new entrants to medical school, 93 will be practising physicians five years after they enter into practice.

Data Sources

In general, Canada does not have comprehensive data on HHR. However, high quality data are available for physicians and these data can serve as a model for other health professions. The main data sources are the **Southam Medical Database (SMDB)** and the **Canadian Post-M.D. Education Registry (CAPER)**. Information on medical students is available on CAPER, while the SMDB contains annually updated information on most physicians in Canada, including a unique scrambled physician's ID, gender, year of birth, province of residence, postal code, activity status, specialty, location and year of graduation from medical school. Analysts can use the SMDB to track career paths over time, specifically, transitions into practice (first entry in the database) and different specialties, periods of illness, temporary absences from active practice, emigration and retirement.

Finally, a model also requires data on how intensively physicians practise, as that is the unit of measure for delivered services. This can be measured in terms of full-time equivalents (FTEs), as derived from the **National Physician Database (NPDB)**. Several part-time physicians may be needed to equal an FTE.

Historically Rich Models

The SMDB has over 25 years of data. This time-series characteristic is essential to building a model where projections are based on the historical tendencies of all the variables that are components of the stock/flow model, such as the death rate, retirement rate and emigration rate. Such models also enable researchers to test the sensitivity of projections to each of the components — some components are important, while others hardly matter at all.

Demographically Rich Models

SMDB and CAPER allow a demographically rich model — that is, one that represents both sexes, all ages and location.* A demographically rich model is especially important when looking at the quantity of health services supplied by a physician. Some physicians work quite intensively, others less so. This is captured by measuring supply (the stocks) in terms of FTEs. The number of FTEs represented by a given number of doctors is a function of the age, specialty and sex of the physicians. For example, NPDB data show that, on average for all specialty groups, a male physician supplies 25 percent more FTEs than a female physician. This will have an impact on overall capacity because the proportion of female physicians has been increasing, especially at the entry level. A demographically rich model incorporates changes such as these.

Emigration rates, retirement rates and mortality rates are all functions of a physician's age, sex and specialty. For instance, 37-year-old physicians rarely retire. As a result, the overall retirement/death/emigration rates for today's physician stock will be different from those of two decades ago, when baby boom physicians were much younger. In particular, the overall retirement rate will increase considerably over the next two decades, even though the actual retirement rates by age have been relatively stable for the last 25 years. ►

**The location variable will allow MSDAD to estimate the interprovincial migration essential to build a provincial level physician supply model, which is currently under way.*

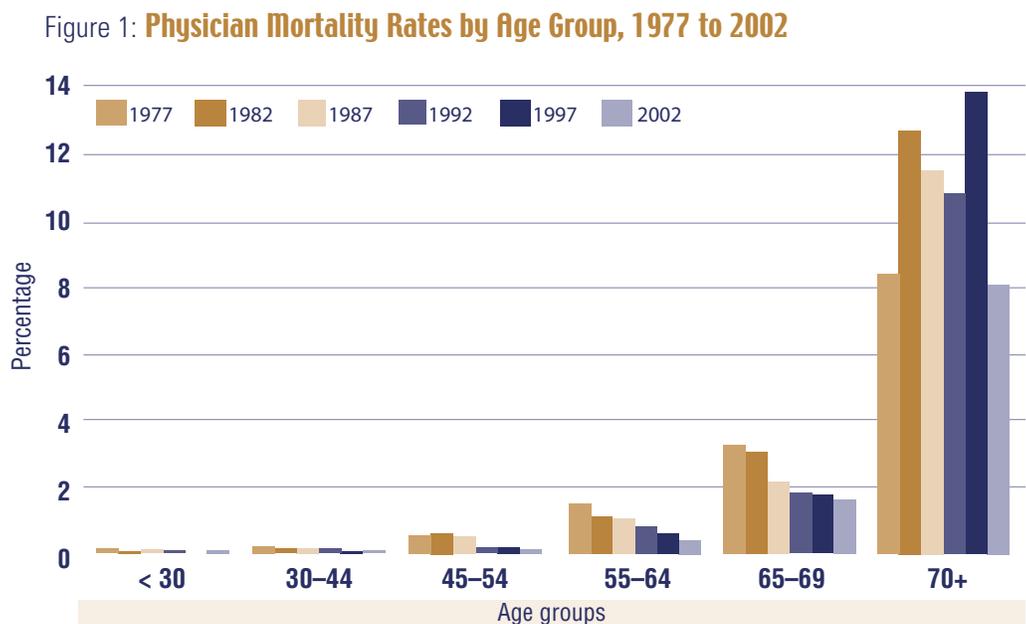
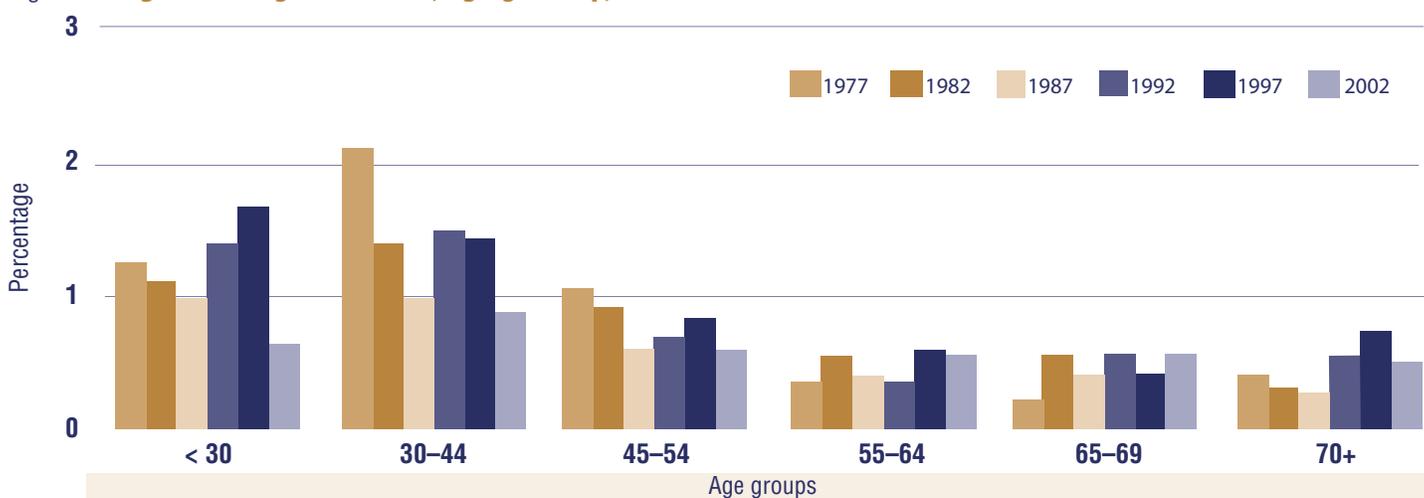


Figure 2: **Physician Emigration Rates, by Age Group, 1977 to 2002**

Analysis of the model provides information on which assumptions actually matter for projections. Figure 1 shows the historical age distribution of the physician mortality rate. At first glance, it might seem that the higher mortality rates for physicians aged 65 and over would be important parameters in any projection. They are not, however, because most physicians aged 65 and over have already retired, and those who still practise are not practising intensively. Surprisingly, the assumption about mortality rates for physicians aged 45 to 64 *does* matter. Every year, 0.20 percent of this group dies and there are five times more physicians between age 45 and 64 than there are over age 64. Furthermore, the younger age group supplies an average of 42 percent more FTEs. Therefore, an over- or underestimation of the mortality rate in the 45 to 64 age group will have a considerably greater impact on the total supply of FTEs than it will in the group of physicians aged 65 or more.

Emigration trends are even more important. Figure 2 shows the historical distribution of physicians' emigration rate by age. Emigration is the biggest source of outflow from the physician stock up to age 54, though a downward trend in emigration is evident in this cohort over time. However, the emigration rate for physicians over age 55 has been more stable for the past 25 years.

Conclusion

The model described above is complex only in the sense that it is demographically rich in details on sex and age. Because the SMDB time series data cover a

lengthy time period, analysts can tell a great deal about the propensities of physicians of different ages and sexes to practise, emigrate, retire and die. The model also shows how those tendencies are evolving over time — crucial information for making projections about the effective supply of physicians over the next two decades.

Unfortunately, comparable data is not available for other components of HHR, such as nurses. As a result, modelling these components is constrained by the need to construct a portrait of the stock in one base or starting year and then estimating those flow relationships for the next two decades without understanding the group's tendencies to, for example, practise, emigrate and move to other professions over the previous decades. Additional data makes analysis easier, not more difficult. 🍷

Acknowledgements

We gratefully acknowledge the insightful comments of Cliff Halliwell and the work done by Jaime Caceres, Teklay Messele, Ronald Wall and Lori Brazeau on an earlier version of the model. Thanks also to Jeremy Karn and Aakarsh Nair for outstanding research assistance, and to Stéphane L. Paré and Timothy Liszak.

Note: The conceptual underpinnings for the ARAD physician supply model can be found at <<http://www.hc-sc.gc.ca/arad-draa>>.

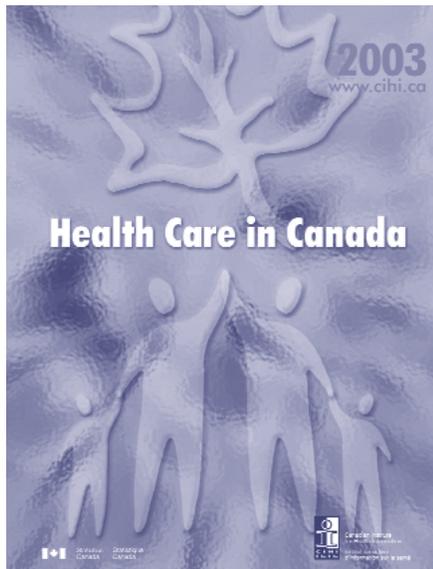
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New and Noteworthy is a regular column of the Health Policy Research Bulletin highlighting “up and coming” policy research in the health field.

Health Care in Canada 2003

The Canadian Institute for Health Information (CIHI) recently released its fourth annual report on Canada’s health care system. *Health Care in Canada 2003* focuses on primary health care, health human resources, expenditures, public health and outcomes of hospital care. A companion report, *Health Indicators 2003*, provides new and updated information on 27 key measures of health and health services for 77 regions across Canada (representing approximately 95 percent of the population). For more information on these reports, visit: <<http://www.cihi.ca>> or contact: <kleebe@cihi.ca>.



Climate Change and Health Assessment 2005

According to the University of Ottawa Expert Panel on Climate Change held in April 2002, climate change will result in significant costs to Canadian society, including increased health care costs and loss of productivity and well-being. To better understand these impacts, Health Canada’s Climate Change and Health Office has launched the National Climate Change and Health Assessment. It is part of the 2005 National Climate Change Impact Assessment, which is designed to help experts understand more about Canadians’ vulnerability to climate change and gauge the capacity of Canadians and their institutions to adapt to risks and variability. For more information, visit: <http://www.hc-sc.gc.ca/hecs-sesc/ccho/policy_development.htm> or contact: <climatinfo@hc-sc.gc.ca>.

International Focus on Vulnerable Populations

An International Think Tank on Reducing Health Disparities and Promoting Equity for Vulnerable Populations was held September 21–23, 2003, in Ottawa. Hosted by the Canadian Institutes of Health Research in partnership with Health Canada and other stakeholders, the event produced a series of synthesis papers on issues related to gender, the health of immigrants and refugees, disabilities, homelessness, Aboriginal peoples and literacy. To obtain copies, contact: <igah@cihr-irsc.gc.ca>.

A Risk Assessment Tool for Blood Screening

A risk assessment conducted by Health Canada’s Enhanced Hepatitis Strain Surveillance System (EHSSS) was used to develop policy recommendations on hepatitis B screening of new entrants for Customs and Immigration Canada (CIC). For more information about the assessment, which is entitled *Decision Analysis: Effective Hepatitis B Screening of New Entrants to Canada, Based on a*

One-Year Cohort of Immigrants, or for English hard copies of the document, contact: Susan ElSaadany at (613) 952-6925.

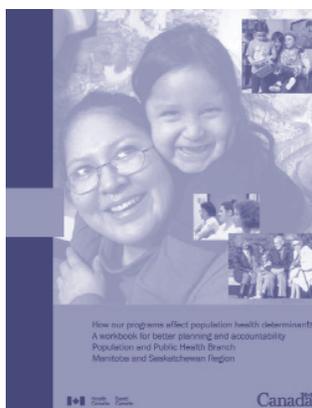
Tracking Transfusion-Transmitted Injuries

Health Canada’s Blood Safety Surveillance and Health Care Acquired Infections Division is supporting the development of a national Transfusion-Transmitted Injuries Surveillance System (TTISS). The system was set up in 1999 as a pilot project in four provinces to assess the risks associated with blood transfusion in Canada. The provinces worked with Health Canada, Canadian Blood Services and HÉMA-QUÉBEC to

establish standard definitions, a reporting form, data elements and conditions for reporting national data. Following completion of the pilot project in 2002, the TTISS was expanded into a national surveillance system. Plans to make the system more comprehensive include integrating additional data on errors occurring during blood transfusion and developing data linkages between public health databases. The 2001–2002 project progress report is available at: <<http://www.hc-sc.gc.ca/pphb-dgsp/hcai-iamss/ttiit>>.

Linking Health Promotion and Population Health

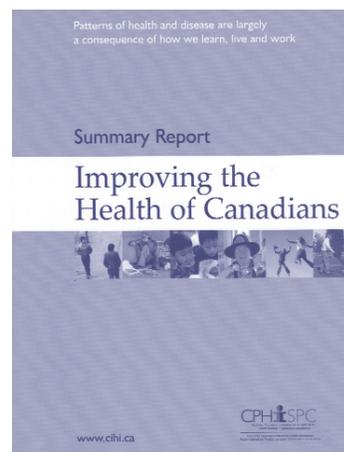
Health Canada's Population and Public Health Branch, Manitoba and Saskatchewan Region, has released a workbook entitled *How Programs Affect Population Health Determinants: A Workbook for Better Planning and Accountability*. The workbook helps stakeholders understand how health promotion activities can contribute to changes in population health determinants. It can be used for developing and improving future programs, accounting for existing programs and demonstrating the long-term impacts of health promotion on the determinants of health. The workbook is available at: <<http://www.hc-sc.gc.ca/hppb/phdd>>.



Improving the Health of Canadians

The Canadian Population Health Initiative (CPHI) has released the inaugural issue of *Improving the Health of Canadians 2004*, which synthesizes evidence on the determinants of health, including previously unpublished research. It highlights four different perspectives on population health: income and health; early childhood development; Aboriginal peoples'

health; and obesity. The report will be published biannually and will address a variety of themes. To access the report go to: <http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=PG_39_E&cw_topic=39&cw_rel=AR_322_E>.



Support for Health Policy Research

Health Canada's Health Policy Research Program (HPRP) funds extramural, peer-reviewed research that contributes to the evidence base for the department's policy decisions. HPRP supports a range of initiatives including: primary, secondary and synthesis research, and policy research workshops. Twenty-two initiatives have been funded since the program's inception in 2001. Four recently completed projects are described briefly below. For more information on these projects, visit: <<http://www.hc-sc.gc.ca/iacob-dgiac/arad-draa/english/rmdd/finalreport/reportindex.html>>.

Health Care Services for Children and Youth (Dr. Terry Klassen, University of Alberta)

In this initiative, researchers from the University of Alberta systematically reviewed studies to determine how a volume-outcome relationship affected patient outcomes and utilization of health services. This type of relationship assumes that the more often a procedure is performed or a type of patient is treated, the more proficiency and expertise the physician and hospital will have in the treatment. The findings show that a volume-outcome relationship exists in most child and youth health care settings, but may depend on the procedure or the particular pediatric specialty involved.

Conceptualizing and Measuring Community Capacity (Dr. James Frankish, University of British Columbia)

This study reviewed and assessed the current evidence base on the conceptualization and measurement of community capacity. A framework for community capacity organizes the characteristics of community capacity into three levels (individual, organizational and community) and across four dimensions (context, resources, activities and outcomes). Despite a lack of consensus in the literature on issues of measurement, the study showed that a broad range of different types of indicators had been proposed or used to measure community capacity.

Measuring Community Capacity: Research Agenda (Neale Smith, David Thompson Health Region, Alberta)

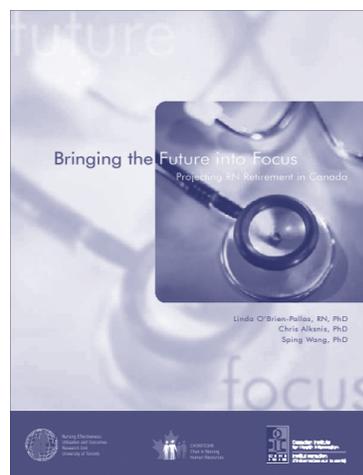
The increasing emphasis on community capacity in health promotion was the impetus for a comprehensive review of literature in the area. Entitled *Measuring Community Capacity: State of the Field Review and Recommendations for Future Research*, the review identifies 11 key themes and four main gaps in the literature and proposes an agenda for future research.

Workshop on Early Intervention Services for Children with Special Needs (Dr. Mary Lyon, Mount Saint Vincent University)

The Task Force on Early Intervention, which is part of the Centre of Excellence for Children and Adolescents with Special Needs, hosted a two-day workshop on early intervention services for young children with special needs. Workshop participants reviewed current provincial and territorial policies and practices, identified priorities for future research and made recommendations for improving early intervention conditions. Following through on the recommendations will require collecting baseline data on children and families in need of early intervention services, establishing a databank of assessment tools and training programs for professionals involved in intervention services, and developing a set of common definitions and communication networks for distributing information. 🌐

► Who's Doing What? *Continued from page 33*

Canada, Health Canada and many other groups at the national, regional and local levels. Roadmap projects were designed to complement and build on initiatives already under way, or under development, at all levels. For example, one gap identified in HHR was comprehensive supply and distribution information for regulated nursing professions. Working in partnership with the nursing regulatory authorities, CIHI led the development of the Licensed Practical Nurses Database (LPNDB) and the Registered Psychiatric Nurses Database (RPNDB). In 2003, CIHI released the first publications from both LPNDB and RPNDB. These two new publications complement CIHI's annual publication from the Registered Nurses Database (RNDB). Developed on a foundation of national information standards, the RNDB system provides a basis for policy relevant



outputs such as the report *Bringing the Future into Focus: Projecting RN Retirement in Canada*.

Looking Ahead

In the year ahead, activities at the national level will focus on data development for a broader range of health personnel. With support from Health Canada and the Advisory Committee on Health Delivery and Human Resources, CIHI recently began the HHR Minimum Data Set Project, which will support the development of a comprehensive, national minimum data set to guide HHR data development activities in Canada. 🌐

@ [Click here for references.](#)

Mark Your Calendar



What	When	Theme
7th World Conference on Injury Prevention and Safety Promotion	Vienna, Austria June 6–9, 2004 < http://www.safety2004.info >	Examination of aspects of prevention, control and research related to violence, suicide, unintentional injury and safety
Canadian Public Health Association 95th Annual Conference	St. John's, Newfoundland June 13–16, 2004 < http://www.cpha.ca/english/conf/95thAnl/95conf.htm >	Creating and enhancing linkages between research, policy and practice
5th International Heart Health Conference	Milan, Italy June 13–16, 2004 < http://www.g8cardio.org/5IHH >	Positioning technology for global heart health
2004 Conference on Antimicrobial Resistance	Bethesda, Maryland June 28–30, 2004 < http://nfid.org/conferences/resistance04/ >	Discussion of the science, prevention and control of antimicrobial resistance
6th World Congress on Aging and Physical Activity	London, Ontario August 3–7, 2004 < http://www.uwo.ca/actage/wcapa >	Sharing of latest research findings in the area of aging and physical activity, and introduction of leading edge methods on developing, implementing and evaluating physical activity programs for older adults
Genetics and Population Health	Perth, Western Australia August 8–10, 2004 < http://www.geneticsandpopulationhealth.com >	Examination of how sharing and targeted collection of genetic information can improve health in developing nations
Promoting Resilient Development in Children Receiving Care: 6th International Looking After Children Conference and 5th National Child Welfare Symposium	Ottawa, Ontario August 16–19, 2004 < http://www.cwlc.ca >	Examination of resilience theory and its application for working with vulnerable children, families and communities
Reproductive Health 2004	Washington, DC September 8–11, 2004 < http://www.arhp.org/rh2004/index.cfm >	Exploration of new research in the field of reproductive health, including abortion, contraception, menopause and sexually transmitted diseases
North American Conference on Shaken Baby Syndrome	Montréal, Québec September 12–15, 2004 < http://www.dontshake.com >	Program contains topics and research applicable to all stakeholders and opportunities for dialogue and networking
9th International Conference on Family Violence	San Diego, California September 19–22 < http://www.fvsai.org/ >	Family violence prevention, intervention and research in the areas of child maltreatment, intimate partner violence and elder abuse

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