



Summary Report: Distribution and Internal Migration of Canada's Health Care Workforce

H e a l t h H u m a n R e s o u r c e s



Canadian Institute
for Health Information

Institut canadien
d'information sur la santé

Summary Report:

**Distribution and Internal Migration of
Canada's Health Care Workforce**

Prepared by:
J. Roger Pitblado, PhD
Laurentian University, Sudbury, Ontario

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Canadian Institute for Health Information
495 Richmond Road
Suite 600
Ottawa, Ontario
K2A 4H6

Phone: 613-241-7860

Fax: 613-241-8120

www.cihi.ca

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The analyses of the distribution and internal migration patterns of physicians are based on data from Scott's Medical Database.

Introduction

Health care is a complex enterprise, relying heavily on the skills and efforts of many individuals. While this workforce is relatively large in Canada, it is not evenly distributed geographically in relation to the distribution of the general population. This distribution of health care providers is constantly changing and is influenced by both internal and external migration. This summary focuses on internal migration—the movement of health care workers within provinces or territories or from one province or territory to another.

Analysis of the migration of our health human resources (HHR) is important because, among other things, it influences some of the critical issues of HHR planning in Canada: recruitment, retention and accessibility of health care services.

Very few studies have been undertaken that examine the geographical distribution or mobility of a wide variety of health care providers in Canada. To explore some of these HHR components, the Canadian Institute for Health Information (CIHI) produced the *Distribution and Internal Migration* series of publications with groups of health care workers based on the occupational classification system¹ used by Statistics Canada. The health care workers examined include the major groups in that system that fall under the major category *D—Health Occupations*.

The present publication provides an introduction and overview to the results of these analyses. Full reports were prepared for 15 health professional groups and data tables for an additional 10. Reportsⁱ in this series cover the following occupations:

- Registered nurses (including registered psychiatric nurses, head nurses and supervisors);
- Licensed practical nurses;
- Medical laboratory technologists and pathologists' assistants;
- Medical laboratory technicians;
- Respiratory therapists, clinical perfusionists and cardio-pulmonary technologists;
- Medical radiation technologists;
- Medical sonographers;
- Audiologists and speech-language pathologists;
- Physiotherapists;
- Occupational therapists;
- Dentists;
- Dental hygienists and dental therapists;
- Dental assistants;
- Pharmacists; and
- Physicians (specialist physicians and family medicine physicians).

i. All but one of these reports is entirely based on data from Statistics Canada's Census of Population. The physicians publication uses data from Scott's Medical Database (formerly the Southam Medical Database) and the Census of Population.

The individual reports provide:

- Preliminary empirical analysis of the numbers of people in the occupation and selected demographic characteristics;
- An examination of provincial/territorial and summary subprovincial geographical distributions;
- Initial analyses of internal (interprovincial and intraprovincial)ⁱⁱ mobility patterns; and
- For each of the selected health professions, temporal comparisons using census data from 1991, 1996 and 2001, in addition to descriptive characteristics and internal migration patterns of the physician workforce, are examined over the period from 1986 to 2004.

In addition to the 15 reports prepared for the CIHI *Distribution and Internal Migration* series of publications, 10 chart books have been prepared. Using Census of Population data from 1991, 1996 and 2001, these reports briefly outline the geographical distribution and internal migration characteristics, for the following occupational groups:

- Nurse aides, orderlies and patient service associates;
- Cardiology technologists;
- Electroencephalographic and other diagnostic technologists;
- Denturists;
- Dental technologists, technicians and laboratory bench workers;
- Optometrists;
- Opticians;
- Chiropractors;
- Dietitians and nutritionists; and
- Ambulance attendants and other paramedical occupations.

ii. Intraprovincial migrants include individuals who lived in the same province or territory, but in a different city, town, village, township, municipality or Indian reserve five-years prior to the census year. Interprovincial migrants include those who lived in a different province or territory five-years prior to the census year.

Highlights

Workforce Characteristics

- **Supply:** Over the period from 1991 to 2001, the number of health care providers in Canada increased from 692,595 to 746,631, an 8% increase. Increases ranged from 11% for the physician workforce to 80% for medical sonographers. Decreases occurred with nursing (-3% registered nurses; -12% licensed practical nurses) and technology health occupations (for example, -2% medical radiation technologists; -19% medical laboratory technicians).
- **Sex:** In the 10-year study period the male–female composition of individual health care occupations experienced little change, in the range of $\pm 2\%$. Larger changes, expressed as the differences in the proportions of female workers, ranged from -5% for physiotherapists to +12% for dentists.
- **Age:** The health care workforce is aging at a faster rate than the general Canadian workforce.
- **Health care provider-to-population ratios:** Between 1991 and 2001, the ratio of health providers per 100,000 population decreased for 5 groups and increased for 10. Similar to the supply patterns, the decreases occurred in both the nursing and technology health occupations.
- **Urban–rural distribution:** Health care providers are predominantly located in urban areas of the country. On average, decreases or increases in rural percentages of these workforces over the 10-year study period were of the order of $\pm 2\%$, with the largest decrease (-5%) occurring with the audiologist and speech-language pathologist workforce.

Internal Migration Patterns

- **Internal migration:** Most health care provider workforces were more mobile than the general workforce during the 1986-to-1991, 1991-to-1996 and 1996-to-2001 migration periods; the majority of movements were from one community to another within the same province or territory (intraprovincial migration).
- **Interprovincial migration rates:** Overall Canadian interprovincial migration rates decreased; rates for health care workforces tended to be higher than those of the general Canadian workforce. Most provinces and territories experienced net losses of health care workers but continuous losses (or gains) did not always occur for all provinces for all occupational groups for all migration periods.
- **Interprovincial migration destinations:** The principal destinations of interprovincial migrants tended to be, in order, larger magnet provinces (Ontario, Alberta and British Columbia) and neighbouring provinces. Of the magnet provinces, in 1996 to 2001, Alberta supplanted B.C. as the prime destination for the majority of interprovincial migrants in general, as well as for Canada's health care workforces.
- **Urban–rural migration:** For the general population and most health care occupational groups, rural in-migration occurred in 1991 to 1996, but out-migration was more the norm in 1986 to 1991 and 1996 to 2001.

Workforce Numbers

In 2001, the combination of the Statistics Canada Census of Population and Scott's Medical Database recorded a total of close to 750,000 people in the category of health occupations.ⁱⁱⁱ This represents an increase of 8% in this broad occupational classification since 1991. As indicated in Table 1, not all occupational groups experienced that same rate of growth.

Health occupations with increases over the 10-year period under study ranged from 11% for physicians to 80% for medical sonographers. Health occupations which experienced decreases ranged from approximately 2% for medical radiation technologists to 19% for medical laboratory technicians.

As a general rule, large percentage increases or decreases from 1991 to 2001 were associated with those health occupations with relatively small overall numbers. In these groups, the addition or loss of a few individuals had a comparatively large impact on the proportional changes over this decade.

The individual reports that have been prepared for each of the occupational groups included in Table 1 provide workforce numbers for 1991, 1996 and 2001, per census availability. They also examine provincial and territorial figures for each of these years.

Changes in provincial and territorial numbers in the supply of health care providers often followed the national pattern, but not always. For example, over the period from 1991 to 2001, there was an overall decrease of 12% in the number of licensed practical nurses in Canada. While most provinces and territories also had decreases, the 1991-to-2001 supply of licensed practical nurses increased in New Brunswick (14%), Prince Edward Island (20%) and B.C. (63%).

iii. In the *Distribution and Internal Migration* series of reports, "health occupations" are only those that are included under that heading in the *National Occupational Classification for Statistics*.¹ These are often referred to as the so-called "D" occupations. Health professions not examined in the study are those that do not fall under that category; for example, psychologists and social workers.

Table 1. Number of Health Care Professionals by Selected Occupational Groups, Canada, 2001 and 1991-to-2001 Percentage Change

Health Occupations	Number in 2001	1991 to 2001 Percentage Change
Registered nurses and registered psychiatric nurses	254,845	-3
Licensed practical nurses	49,970	-12
Medical laboratory technologists	19,550	-6
Medical laboratory technicians	20,405	-19
Respiratory therapists	6,715	43
Medical radiation technologists	14,870	-2
Medical sonographers	2,685	80
Audiologists/Speech-language pathologists	6,220	56
Physiotherapists	16,440	43
Occupational therapists	10,040	68
Dentists	18,590	36
Dental hygienists and therapists	14,875	50
Dental assistants	26,845	14
Pharmacists	24,865	34
Physicians	58,546	11
All other health occupations	201,295	20
Total of all health occupations	746,631	8

Notes:

Health occupations as defined in the *National Occupational Classification for Statistics*.

Principal data source: Census of Population, Statistics Canada.

Physician data source: Scott's Medical Database, CIHI.

Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Demographic Trends

Sex

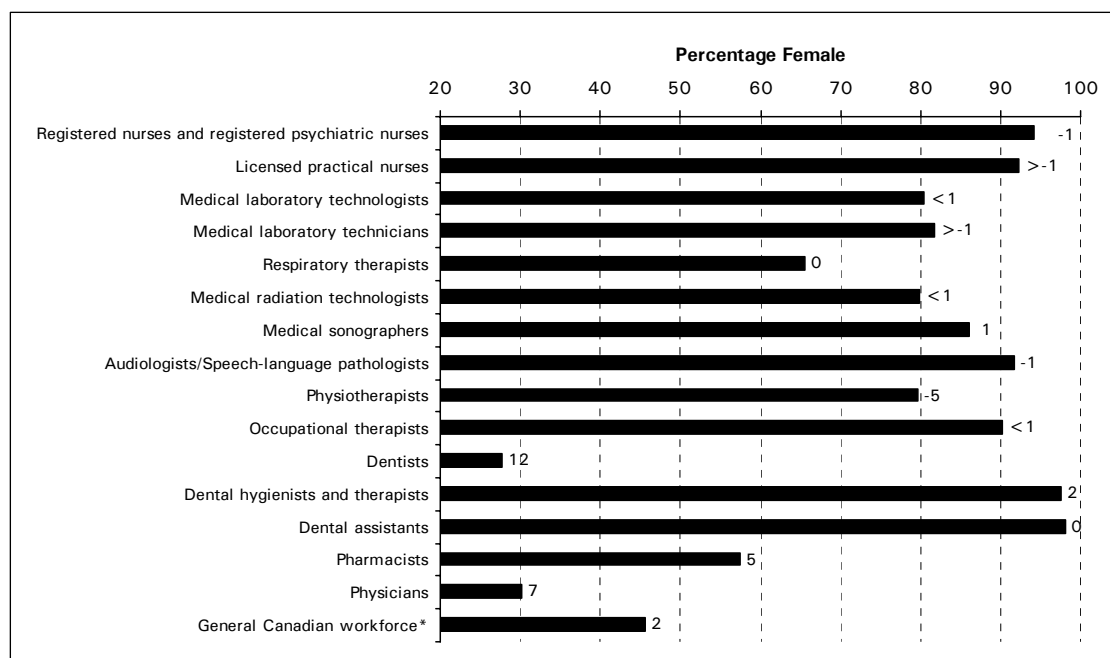
Many health care professions in Canada are made up predominantly of either males or females, particularly the latter. Changes in workforce male–female mix, increasingly included in HHR discussions as the processes of “masculinization”² and “feminization,”³ may have significant impacts on the supply of health care providers and on professional practice patterns.⁴ Figure 1 shows the 2001 percentages of female workers in selected health care occupational groups and the changes in the percentages since 1991.

Generally, there was little change in the male–female proportional composition of most health occupational groups. Percentage changes from 1991 to 2001 were in the order of 2% or less. Of the occupations included in Figure 1, the largest decrease (5%) was experienced by the physiotherapist workforce. Traditionally male-dominated professions remained so. However, there were increases in the proportions of females in the following occupations over this 10-year period: approximately 5% for the pharmacist workforce and 7% and 12% for the physician and dentist workforces, respectively.

Provincial/territorial male–female compositional makeup and proportional changes are included in the individual reports of each of the occupational groups included in Figure 1. Those reports also provide information for 1991, 1996 and 2001, per census availability.

Although provincial and territorial numbers, proportions and proportional changes are often similar to the national pattern, there were variations. For example, from 1991 to 2001 there was no change in the proportion of females in the respiratory therapist workforce (which includes clinical perfusionists and cardio-pulmonary technologists) in Canada as a whole. But this was as a result of a balancing of increases in four provinces in combination with decreases in six. To illustrate, over this 10-year period, increases in the proportions of female respiratory therapists ranged from 6% in Quebec to 25% in Newfoundland and Labrador; while decreases ranged from 3% in Ontario to 33% in P.E.I.

Figure 1. Percentage of Females by Selected Health Care Occupational Groups and the General Canadian Workforce, Canada, 2001 and 1991-to-2001 Percentage Point Change



Notes:

Value axis does not start at zero.

* General Canadian workforce includes all workers 20 years of age and older.

Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Age

Based on numerous observations and various analytical scenarios, Canada's population is known to be aging and it is expected to age more rapidly in the coming years with decreasing proportions of children, increasing proportions of seniors and climbing median and average ages.⁵ Along with the overall population, the health care workforce is also aging.

An introduction to the aging of Canada's health care workforces can be observed by examining average ages (Figure 2). Of the health care occupations included in the reports in the CIHI *Distribution and Internal Migration* series of publications, average ages in 2001 ranged from 35 years for dental assistants to 48 years for physicians. The average age for all of these health care workers increased since 1991, with increases of just less than two years for pharmacists and five years for medical laboratory technologists.

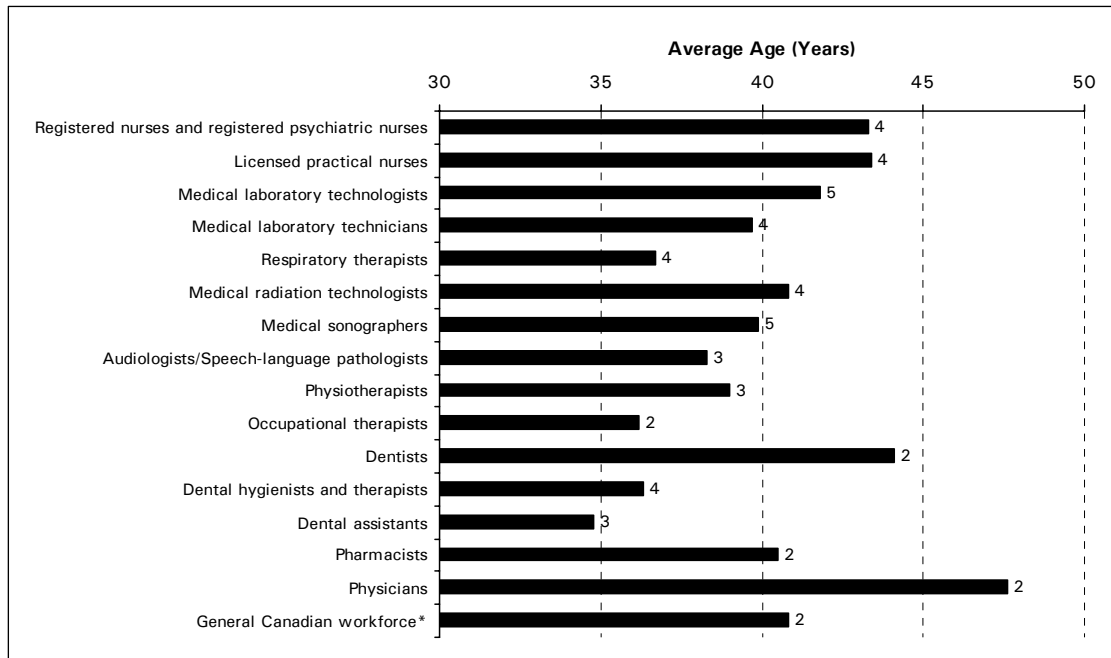
Figure 2 also includes the average age of the general Canadian workforce in Canada in 2001. This allows for comparisons with the individual health care provider groups. In making these comparisons, one must recognize that there are many factors that influence the average age of a workforce. These involve, for example, the length of time in training, age at entry to practice that may be independent of the time in training and the occupation-specific patterns of age of retirement.

Eight of the 15 occupations included in Figure 2 are, on average, younger than the general workforce. The 2001 average age of dental assistants was six years lower than that of the general workforce, while pharmacists were less than a year younger. The remainder of the occupations included in that graph were older. Medical radiation technologists and technicians were approximately the same age or just less than one year older than the general workforce, on average, while physicians were almost seven years older.

Whether their average age was lower or higher than that of the general Canadian workforce, all of the occupational groups examined in Figure 2 aged faster than the general Canadian workforce over the 10-year study period. With the exceptions of chiropractors and denturists, this was also the case for all of the health care occupational groups examined in this study.

Provincial/territorial average ages are included in the individual reports of each of the occupational groups. Those reports also provide comparisons with the average ages of the general workforce in each of the provinces and territories and information for 1991, 1996 and 2001, per the availability of census data summarized in that figure.

Figure 2. Average Age (Years) of Selected Health Care Occupational Groups and the General Canadian Workforce, Canada, 2001 and 1991-to-2001 Difference (Years)



Notes:

Value axis does not start at zero.

* General Canadian workforce includes all workers 20 years of age and older.

Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Geographical Distribution

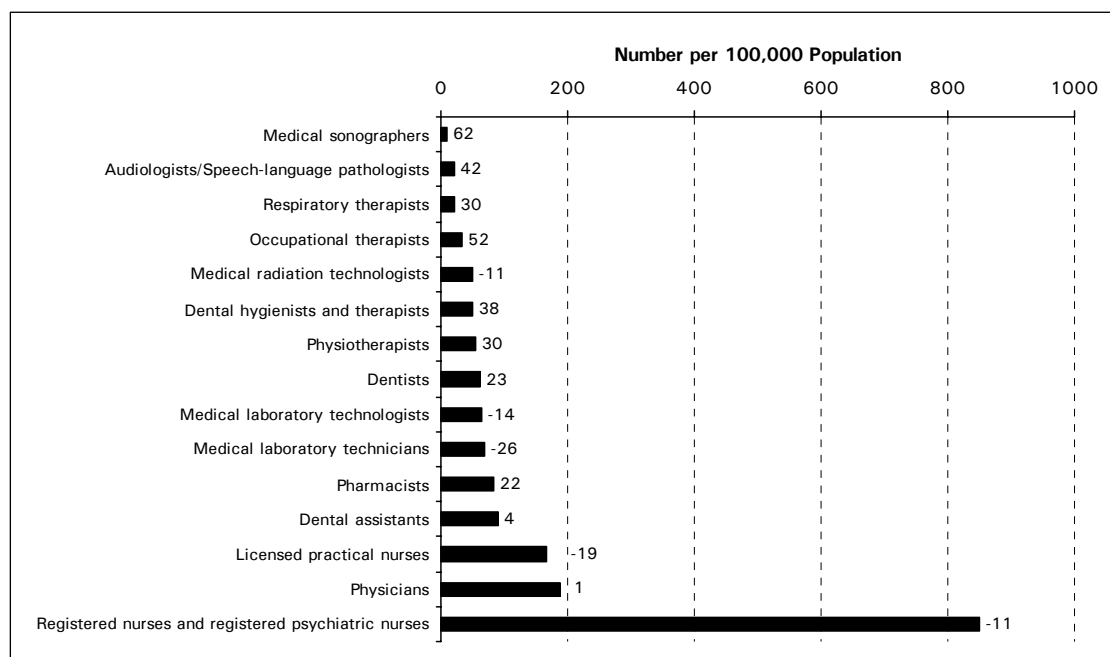
Health Care Provider-to-Population Ratios

Associations between the geographical distribution of Canada's health care providers and the geographical distribution of its population have been examined in this study using ratios, the number of health care providers per 100,000 population. In spite of known limitations,⁶ these ratios can be used to examine both temporal and spatial trends in these professions.

The range in health care provider-to-population ratios by occupational group is shown in Figure 3 for Canada using 2001 data. More importantly, that figure also indicates the percentage change in these ratios since 1991. This graph is instructive in itself, but should also be read along with Table 1, which shows the 1991-to-2001 percentage changes in the overall supply of each of these health care provider groups.

The ratios increased for 10 occupational groups and decreased for 5 occupational groups. Medical sonographers experienced the largest (62%) increase in numbers per 100,000 population, while medical laboratory technicians experienced the largest decrease (-26%). Dental assistants and physicians were the only two professions listed in Figure 3 not to experience double digit increases or decreases in numbers per 100,000 population between 1991 and 2001.

Figure 3. Number of Health Care Providers per 100,000 Population by Selected Occupational Groups, Canada, 2001 and 1991-to-2001 Percentage Change



Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Reports in the CIHI *Distribution and Internal Migration* series provide provincial and territorial health care provider-to-population ratios for individual occupational groups. To provide overall summaries, ratios were aggregated by workforce categories by province, territory and Canada for 1991 (Figure 4) and for 2001 (Figure 5), illustrated below.

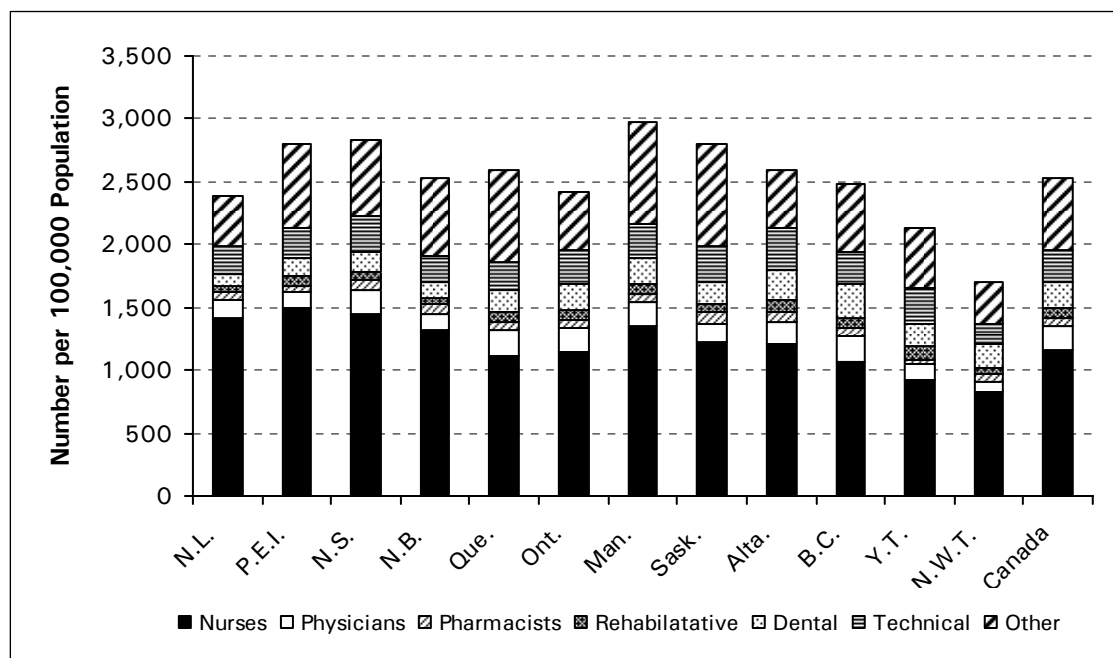
The workforce categories include the following occupations:

- *Nurses*: Licensed practical nurses, registered nurses (including head nurses and supervisors) and registered psychiatric nurses;
- *Physicians*: General practitioners/family physicians and specialist physicians;
- *Pharmacists*: Pharmacists;
- *Rehabilitative*: Audiologists and speech-language pathologists, occupational therapists and physiotherapists;
- *Dental*: Dentists, dental assistants, dental hygienists and dental therapists, denturists, dental technologists and technicians and laboratory bench workers;
- *Technical*: Medical laboratory technicians, medical laboratory technologists and pathologists' assistants, medical radiation technologists, medical sonographers, respiratory therapists, clinical perfusionists and cardiopulmonary technologists, cardiology technologists and electroencephalographic and other diagnostic technologists;
- *Other*: Chiropractors, nurse aides, orderlies and patient service associates, optometrists, opticians, dieticians and nutritionists and ambulance attendants and other paramedical occupations.

These diagrams show that there is little variation in the proportional composition of the workforce categories from province to province. Differences do occur, however, in the total numbers of health care providers as expressed per 100,000 population. The territories and Newfoundland and Labrador have the lowest totals and the highest can be found in Manitoba and Saskatchewan. From 1991 to 2001 in Canada, the overall number of health care provider-to-population ratio decreased by 2%. This was related with marginal decreases of less than 1% in P.E.I. and Nova Scotia, but fairly large decreases of 6% and 5% in Ontario and Alberta, respectively.

Figures 4 and 5 show the overall changes in the ratios of total number of health care providers to population. Decreases or increases in the occupational categories are generally seen in all provinces and territories. For example, nurses (licensed practical nurses, registered nurses and registered psychiatric nurses) made up almost 46% of the health care provider workforce in 1991. By 2001, the percentage of nurses had decreased to 40%. Decreases of nurses as a proportion of a province's or territory's total health workforce occurred in all provinces and territories from 1991 to 2001. There was a similar pattern of decreases in the technical professions, while all other health workforce categories experienced increases.

Figure 4. Total Number of Health Care Providers per 100,000 Population Aggregated by Workforce Categories by Province/Territory and Canada, 1991

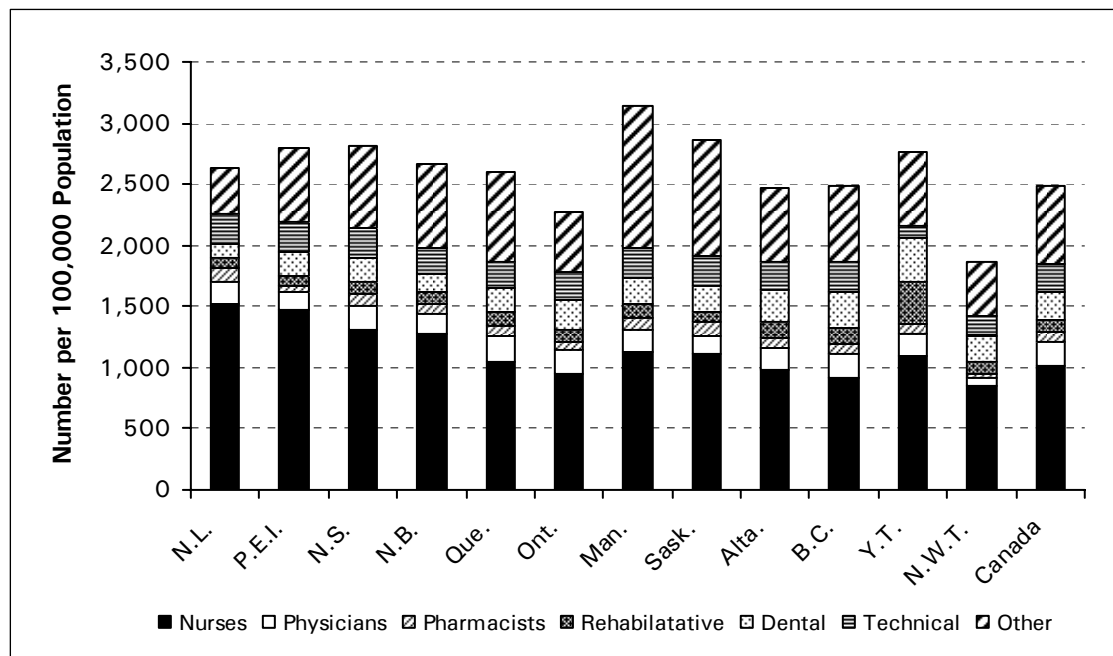


Notes:

The workforce categories include the following occupations: *Nurses*: Licensed practical nurses, registered nurses (including head nurses and supervisors) and registered psychiatric nurses; *Physicians*: General practitioners/family physicians and specialist physicians; *Pharmacists*: Pharmacists; *Rehabilitative*: Audiologists and speech-language pathologists, occupational therapists and physiotherapists; *Dental*: Dentists, dental assistants, dental hygienists and dental therapists, denturists, dental technologists and technicians and laboratory bench workers; *Technical*: Medical laboratory technicians, medical laboratory technologists and pathologists' assistants, medical radiation technologists, medical sonographers, respiratory therapists, clinical perfusionists and cardiopulmonary technologists, cardiology technologists and electroencephalographic and other diagnostic technologists; *Other*: Chiropractors, nurse aides, orderlies and patient service associates, optometrists, opticians, dieticians and nutritionists and ambulance attendants and other paramedical occupations.

Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Figure 5. Total Number of Health Care Providers per 100,000 Population Aggregated by Workforce Categories by Province/Territory and Canada, 2001



Notes:

The workforce categories include the following occupations: *Nurses*: Licensed practical nurses, registered nurses (including head nurses and supervisors) and registered psychiatric nurses; *Physicians*: General practitioners/family physicians and specialist physicians; *Pharmacists*: Pharmacists; *Rehabilitative*: Audiologists and speech-language pathologists, occupational therapists and physiotherapists; *Dental*: Dentists, dental assistants, dental hygienists and dental therapists, denturists, dental technologists and technicians and laboratory bench workers; *Technical*: Medical laboratory technicians, medical laboratory technologists and pathologists' assistants, medical radiation technologists, medical sonographers, respiratory therapists, clinical perfusionists and cardiopulmonary technologists, cardiology technologists and electroencephalographic and other diagnostic technologists; *Other*: Chiropractors, nurse aides, orderlies and patient service associates, optometrists, opticians, dieticians and nutritionists and ambulance attendants and other paramedical occupations.

Sources: Census of Population, Statistics Canada; SMDB, CIHI.

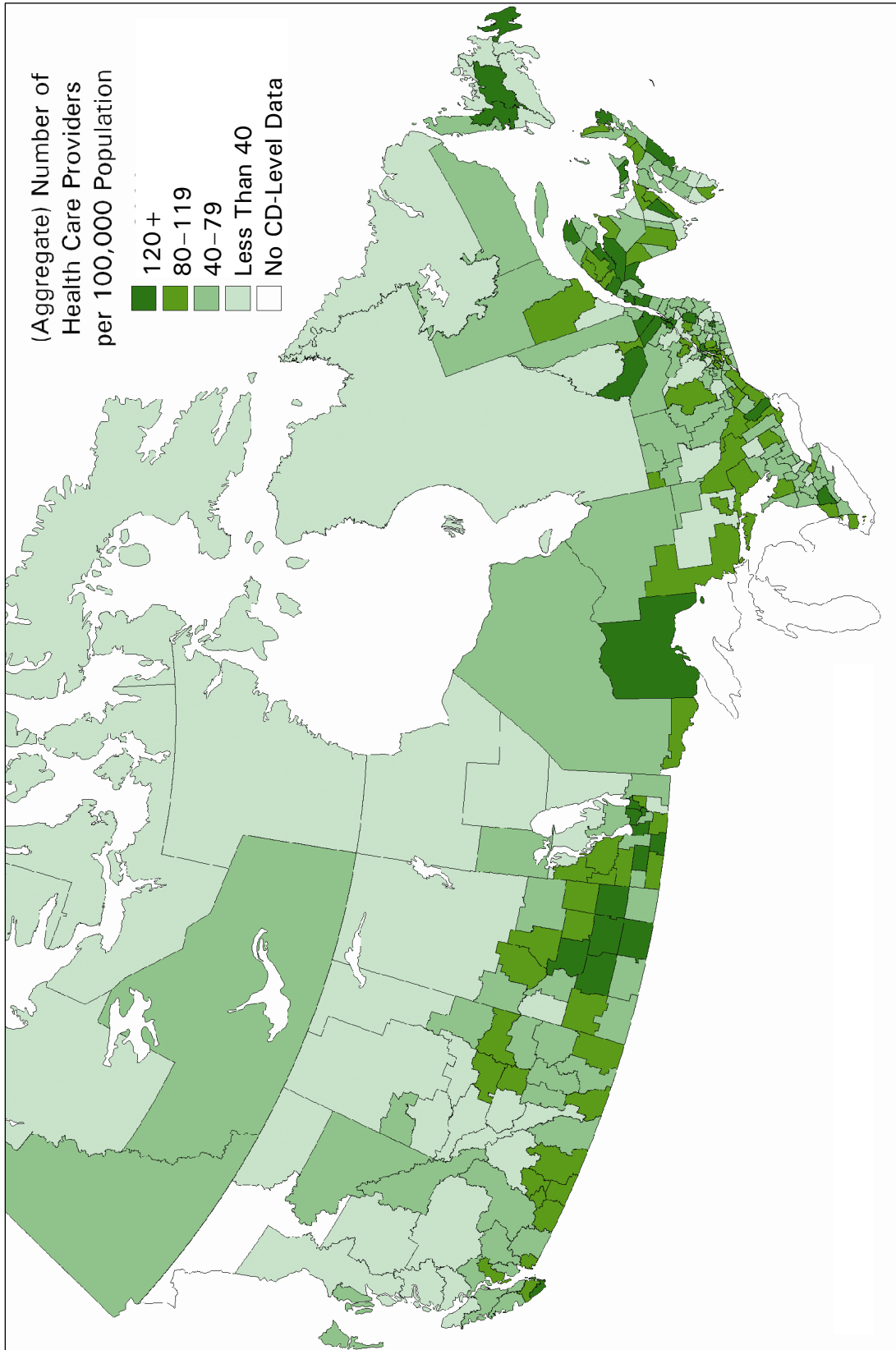
While nation-wide health care provider-to-population ratios mask provincial and territorial variations in these ratios, provincial and territorial numbers often do not capture the wide variations that occur from region to region. To illustrate, sub-provincial/territorial ratios have been mapped (Figure 6) using census divisions (CDs) as the geographical unit of analysis.

In 2001, there were 288 CDs in Canada. As illustrated in Figure 6, health care providers lived in all but one of the CDs.^{iv} However, only two of the occupational groups examined in this study were widely distributed in a large number of CDs: registered nurses (including RPNs) and physicians. Licensed practical nurses, present in 265 census divisions, are almost as widely distributed. All of the other occupational groups lived in significantly fewer CDs.^v For example, medical sonographers are the most concentrated geographically, found in only 45 (approximately 16%) of the census divisions.

The distribution of the health care workforce is strongly linked to health service delivery. One should not assume that all health occupations should exist in all CDs. For example, many of the health care provider groups examined in this study require the use of specialized equipment or services that are primarily found in clinics or hospitals located in cities. This is emphasized in Figure 6, which shows that the highest concentrations of health care providers lived in CDs that contain or are in close proximity to larger urban centres. The urban concentration of Canada's health care workforces is further emphasized in Figure 7, which shows the proportions of the individuals in these occupational groups who lived in rural areas of the country.

-
- iv. The census division that is mapped in Figure 6 as having "No CD-Level Data" is Stikine Region. This remote area in northwestern B.C. had a population of less than 1,400 people in 2001 and had a 16% decrease from 2001 to 2006 (*Community Profiles*, Statistics Canada website www.statcan.ca, accessed April 4, 2007). No health occupation-specific individuals were enumerated in this location in the 2001 Census of Population.
- v. To ensure confidentiality and to protect privacy, Statistics Canada employs processes of random rounding and area suppression prior to releasing data. Consequently, some of the census divisions that have been mapped in this study as "No CD-Level Data" actually may have contained members of the health care workforce. However, their numbers were too small to report.

Figure 6. Total Number of Health Care Providers per 100,000 Population Mapped by Census Division, Canada, 2001



Source: Census of Population, Statistics Canada.

Rural Distribution

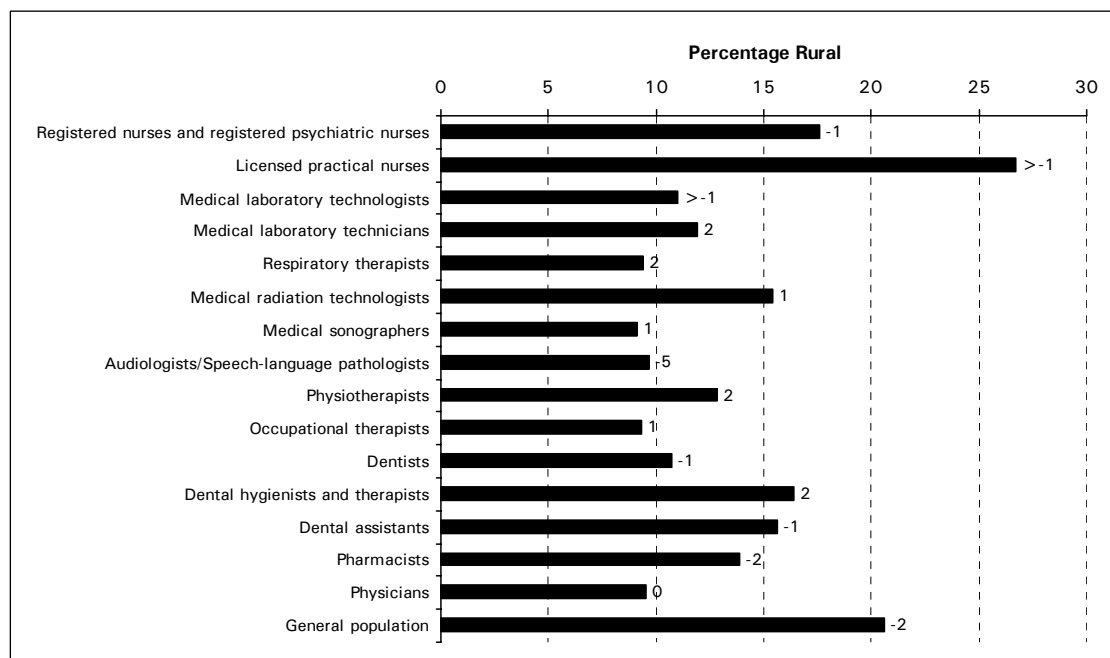
Regional studies often separate Canada into one of the following categories: large urban centre (LUC) areas or rural and small-town (RST) areas. Urban, or LUC, areas include: census metropolitan areas (CMAs) with core populations of at least 100,000 people; and census agglomerations (CAs) with core populations that range from 10,000 to just under 100,000 people. Rural, or RST, areas of the country have core populations of less than 10,000 people and are located outside the boundaries of CMAs and CAs.⁷

In 2001, approximately 21% of the Canadian population lived in rural and small-town areas of the country, a decrease of two percentage points from 1991. These percentages can be compared with the rural distribution of Canada's health care workforces (Figure 7).

Of the 15 occupational groups included in that diagram, rural percentages decreased for seven of the health care provider workforces and increased for seven, and one experienced almost no change in its rural proportions from 1991 to 2001. Most of the decreases or increases in rural percentages for these workforces were within the range of -2% to 2%. The largest difference over this 10-year period was with audiologists and speech-language pathologists, with a decrease of almost 5% in the numbers of this workforce located in rural Canada.

Whether there were decreases or increases, Figure 7 highlights the fact that the licensed practical nurse workforce is the only occupational group with a rural percentage that was greater than that of the general population.

Figure 7. Percentage Distribution of Selected Health Care Occupational Groups and the General Canadian Population Located in Rural Areas, Canada, 2001 and 1991-to-2001 Percentage Point Difference



Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Internal Migration Patterns

The mobility pattern of Canada's health care workforce that is the focus of the reports in the CIHI *Distribution and Internal Migration* series is *internal* migration. This includes movements from one community to another within the same province or territory (*intraprovincial migration*) and movements from one province or territory to another (*interprovincial migration*). Analyses in this study also include discussions of movements of health care workers to and from rural and urban areas of the country.

The majority of the mobility patterns examined are based on the census long-form questionnaire, which asks where all individuals in a household, 15 years of age and older, lived five years ago. As three censuses were used, the study includes the analyses of three migration periods: 1986 to 1991, 1991 to 1996 and 1996 to 2001. In addition to these five-year migration periods, one-year migration characteristics were assessed for physicians using 1986-to-2004 information from Scott's Medical Database.

Migration Composition

Migration composition identifies, for any point in time, the numbers or proportions of people in an area who can be classified as:

- Non-movers: lived in the same community five years before;
- Intraprovincial migrants: lived in the same province/territory, but in a different community, five years before;
- Interprovincial migrants: lived in a different province/territory five years before; and
- International migrants^{vi}: lived in another country five years before.

Reports in the CIHI *Distribution and Internal Migration* series provide national and provincial/territorial migration composition percentages for individual occupational groups. As a summary, the national percentages for selected health occupations are illustrated here for 1991 (Figure 8) and 2001 (Figure 9). These figures show the internal migrant (interprovincial and intraprovincial) percentages as proportions of the total numbers in the respective workforces. For ease of comparison, the value axes (percentage of the workforces) of the two diagrams have been set to a common value.

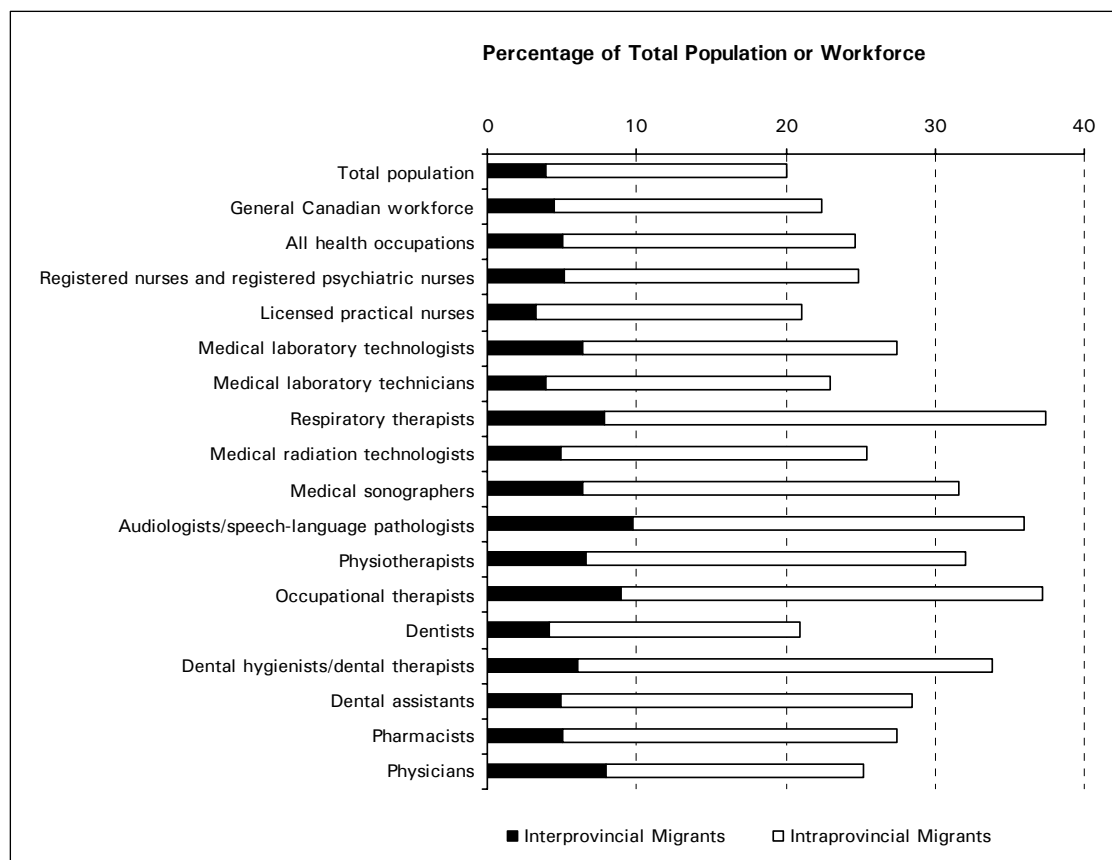
Some of the principal features of these diagrams are noted below:

- The general Canadian workforce was more mobile than the overall total population in both years shown, in turn.
- Most health care provider workforces were more mobile than the general Canadian workforce.
- The health occupations that were less mobile than the general Canadian workforce in 1991 were licensed practical nurses and dentists, with the addition of medical laboratory technologists and technicians in 2001.
- Internal migration primarily involves movements from one community to another within the same province or territory (intraprovincial migration).

vi. Statistics Canada labels this category as "external" migrants.

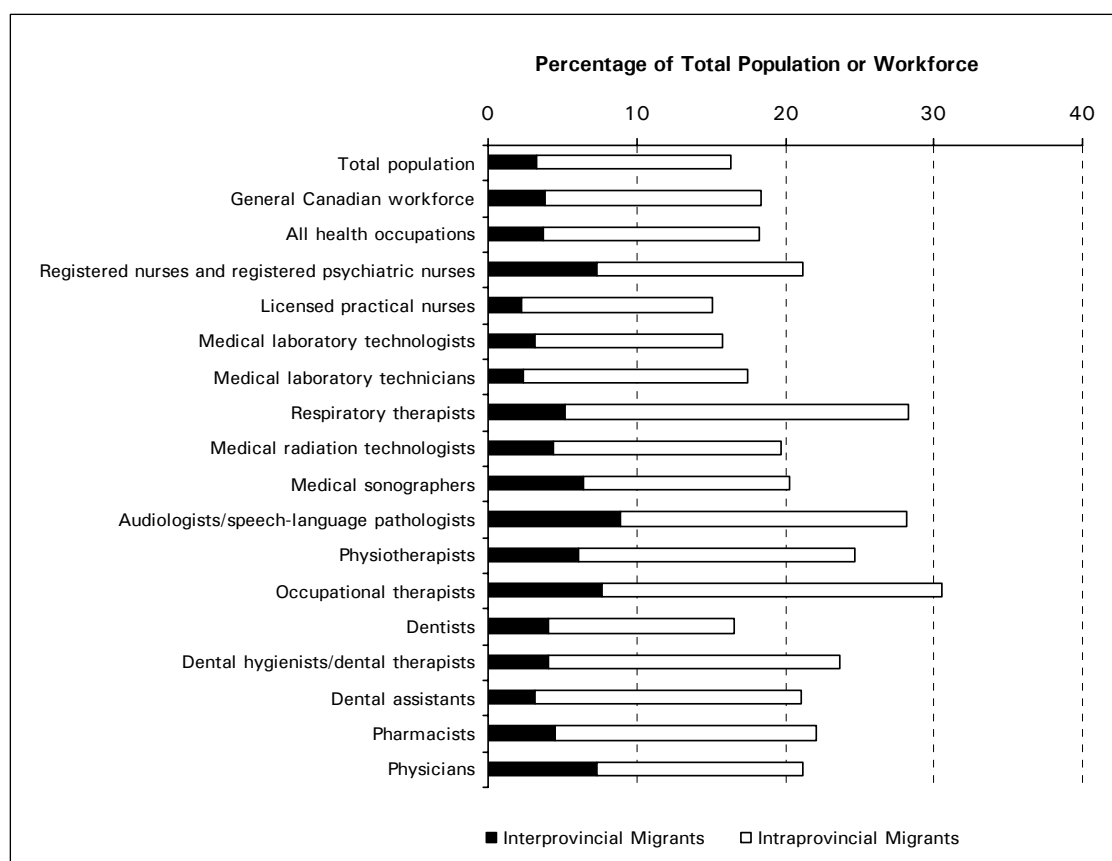
- As described elsewhere for the general population,⁸ the proportions of health care providers who moved interprovincially also decreased (also, see Figure 10). The exceptions to this pattern are the increasing proportions for registered nurses and no change for medical sonographers and dentists.
- The proportions for intraprovincial movers also decreased from 1991 to 2001 for the overall population and all of the workforces shown.

Figure 8. Migrants as a Percentage of Total Population or Workforce (Based on Place of Residence Five Years Ago) for the Total Population, General Canadian Workforce and Selected Health Care Occupational Groups, Canada, 1991



Source: Census of Population, Statistics Canada.

Figure 9. Migrants as Percentage of Total Population or Workforce (Based on Place of Residence Five Years Ago) for the Total Population, General Canadian Workforce and Selected Health Care Occupational Groups, Canada, 2001



Source: Census of Population, Statistics Canada.

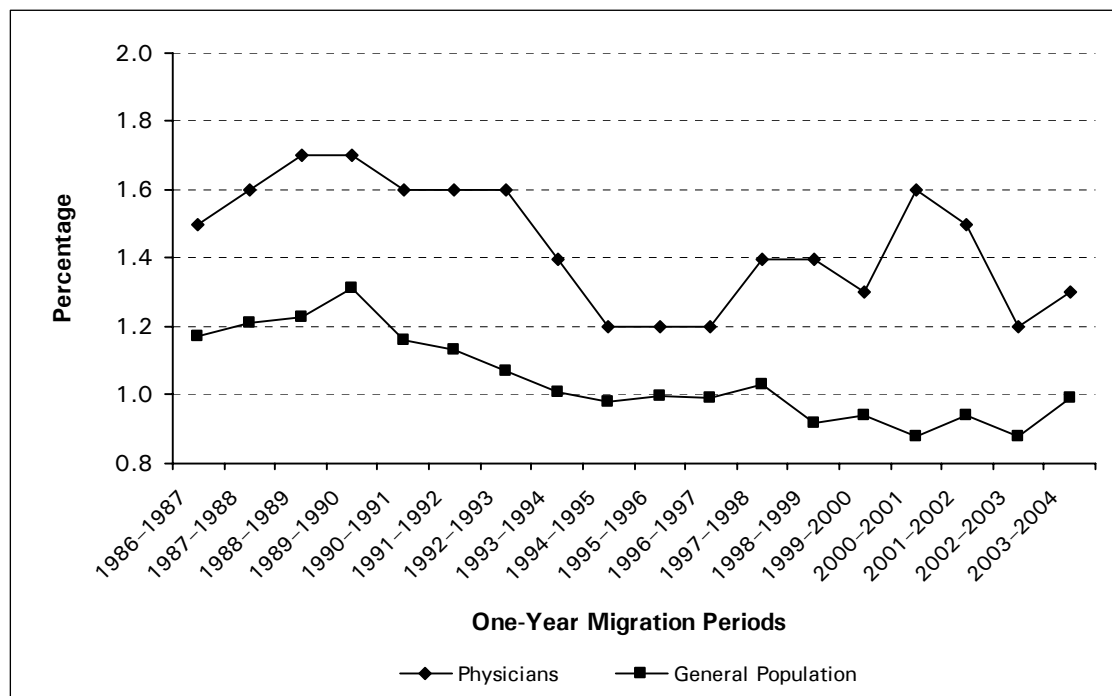
Interprovincial Migration

Figures 8 and 9 highlight the fact that interprovincial migration by the general Canadian population decreased. Using data from the *Annual Demographic Statistics 2004*,⁹ the decreasing proportions of the general population who moved interprovincially have been plotted in Figure 10. These proportions are based on one-year migration periods from 1986–1987 to 2003–2004.

Figure 10 also includes the annual proportions of physicians who moved from one province or territory to another. These figures are consistent with the observation that “Each year between 1 and 2% of active civilian physicians in Canada (excluding residents) migrate to another province or territory.”¹⁰ As seen in Figure 10, the provincial physician migration pattern does not exactly follow that of the general population. The interprovincial migration rates for physicians were relatively high during the 1980s and decreased until the mid-1990s. Unlike the general population, however, the proportions of interprovincial physician migrants rose again in the late-1990s and early 2000s.

Throughout the period from 1986 to 2004, the proportions of physicians who moved from one province or territory to another were higher than those of the general population. This was also the case for most health care workforces.

Figure 10. Percentages of the General Canadian Population and Physicians Who Were Interprovincial Migrants by One-Year Migration Periods, Canada, 1986–1987 to 2003–2004



Note: Value axis does not start at zero.

Sources: SMDB, CIHI; Annual Demographic Statistics 2004, Statistics Canada.

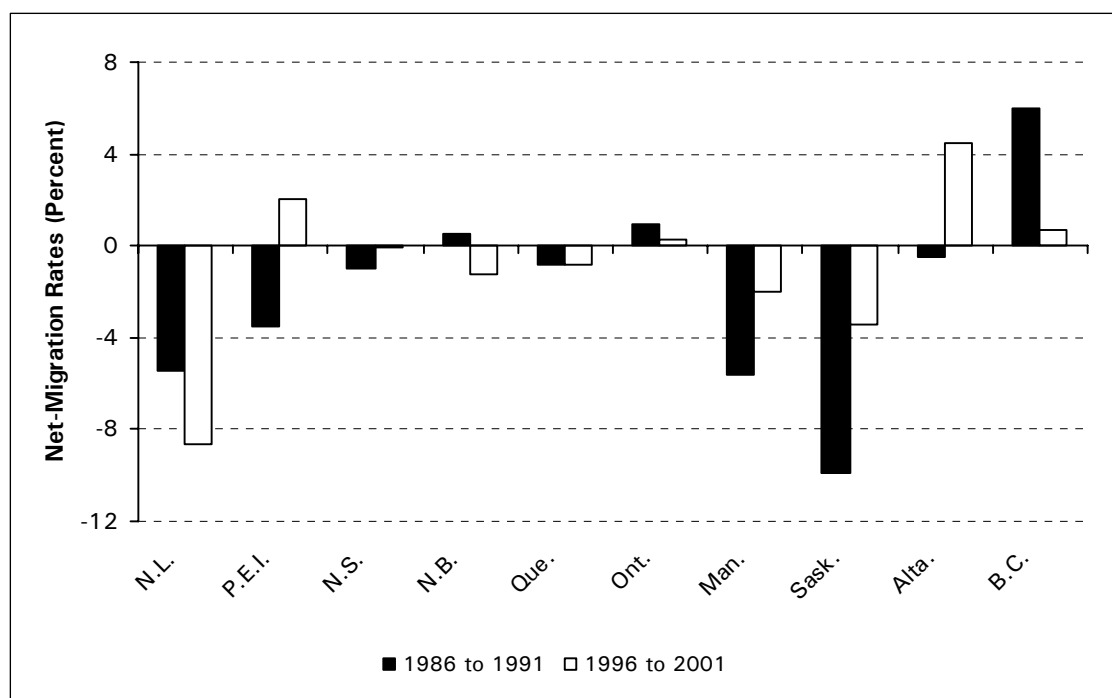
The difference between the number of persons who move into a region and the number of persons who move out of that same region is referred to as “net migration.” Many provinces have experienced negative net migration of health care providers as more move away from rather than move to those provinces. Figure 11 provides a summary of the provincial net migration rates for the aggregate health care workforce during the 1986-to-1991 and 1996-to-2001 migration periods.

Overall losses (negative net migration) associated with interprovincial migration in both 1986 to 1991 and 1996 to 2001 are highlighted for the provinces of Newfoundland and Labrador, Nova Scotia, Quebec, Manitoba and Saskatchewan. When comparing rates from the two migration periods, the net losses decreased in Manitoba and Saskatchewan but increased in Newfoundland and Labrador. Quebec’s net losses remained constant throughout the study period.

Overall gains (positive net migration) in both 1986 to 1991 and 1996 to 2001 were experienced only in Ontario and B.C. However, although more health care workers moved to these provinces than moved away, their net-migration rates decreased. The most dramatic decrease was experienced in B.C., where the net-migration rate decreased from 6% over the 1986-to-1991 migration period to less than 1% in 1996 to 2001.

Provinces in which the net-migration rates went in different directions during the two migration periods shown are P.E.I., New Brunswick and Alberta. For New Brunswick, the switch was from a net gain to a net loss of health care providers through interprovincial migration. The change in net-migration rates for P.E.I. and Alberta was in the opposite direction. In particular, Alberta became the principal destination for a large proportion of the individuals in the health care workforces who were interprovincial migrants in the 1996-to-2001 migration period. The importance of Alberta as a principal destination for interprovincial migrant health care providers is highlighted again in Table 2.

Figure 11. All Health Care Occupational Groups: Net Interprovincial Migration Rates (Percent) by Province for the 1986-to-1991 and 1996-to-2001 Migration Periods



Note: Data from the territories have been suppressed due to small cell size.

Source: Census of Population, Statistics Canada.

In general, interprovincial migrants tend to relocate primarily in larger, magnet provinces (Ontario, Alberta and B.C.) or, secondly, neighbouring provinces. The three most important provincial or territorial destinations for interprovincial migrants are identified in Table 2 for the three migration periods examined in this study. The principal destinations have been identified based on the magnitude of net interprovincial migration counts.

The dentist workforce is used to illustrate how that table was constructed. For the 1986-to-1991 migration period, B.C. was the province or territory with the largest net gain (number of in-migrants from other provinces and territories minus the out-migrants from B.C.) of dentists. The provinces with the second- and third-largest net interprovincial migration counts during that same time frame were, in order, Ontario and Alberta. During the 1996-to-2001 migration period, as it happens, the order was reversed. Then, Alberta had the largest net gain of interprovincial migrant dentists. B.C. was still an important destination, but during 1996 to 2001, only had the third-highest net gain of dentists through interprovincial migration.

In one of the headings of an analysis of the mobility status of Canadians, based on the 2001 Census of Population, Statistics Canada proclaimed "We're still heading west, but stopping at the Rockies."¹¹ Over the period of time from 1996 to 2001, Alberta replaced B.C. as the destination of choice for many of Canada's interprovincial migrants.

The majority of health care workforces followed this same pattern. However, a number of exceptions can be identified (Table 2). During the 1986-to-1991 migration period, B.C. only ranked as the second most important destination for medical laboratory technicians, third for pharmacists, and was not included in the first three principal destinations for dental assistants who moved from one province or territory to another. Similarly, Alberta was not the first-choice interprovincial destination for five of the health care workforces during the 1996-to-2001 migration period. On the other hand, Alberta was certainly included as one of the top three destinations during that period of time.

Table 2. Provinces With Highest Positive Net Interprovincial Migration Counts for the 1986-to-1991, 1991-to-1996 and 1996-to-2001 Migration Periods, Canada

	1986 to 1991			1991 to 1996			1996 to 2001		
	Province Count			Province Count			Province Count		
General population	B.C. 108,875	Ont. 36,795	Y.T. 810	B.C. 131,250	Alta. 4,965	P.E.I. 1,320	Alta. 103,030	Ont. 41,535	P.E.I. 55
General Canadian workforce	B.C. 80,895	Ont. 39,345	Y.T. 1,005	B.C. 102,325	Alta. 9,975	Y.T. 980	Alta. 93,310	Ont. 38,170	†
All health occupations	B.C. 4,940	Ont. 2,320	N.B. 100	B.C. 4,935	N.W.T. 120	Y.T. 110	Alta. 3,340	B.C. 695	Ont. 630
Registered nurses and registered psychiatric nurses	B.C. 2,275	Ont. 575	N.S. 110	B.C. 1,620	N.S. 205	Y.T. 80	Alta. 945	Ont. 220	N.S. 115
Licensed practical nurses	B.C. 200	Ont. 155	N.B. 20	B.C. 120	N.B. 40	N.S. 10	Alta. 170	B.C. 110	N.S. 55
Medical laboratory technologists	B.C. 205	Ont. 50	N.W.T. 20	B.C. 100	N.B. 15	P.E.I. 10	Alta. 85	N.S. 25	Sask. 25
Medical laboratory technicians	Ont. 180	B.C. 150	..	B.C. 175	Ont. 30	N.B. 20	Alta. 70	Que. 20	B.C. 5
Respiratory therapists	B.C. 70	N.L. 25	Ont. 15	Sask. 65	B.C. 30	N.L. 10	Alta. 65	N.S. 20	P.E.I. 10
Medical radiation technologists	B.C. 130	Ont. 80	N.S. 35	B.C. 130	N.B. 30	N.W.T. 10	Alta. 190	Ont. 30	Sask. 20
Medical sonographers	B.C. 25	..	..	..	..	..	Alta. 90	Ont. 25	..
Audiologists/ Speech-language pathologists	B.C. 90	Ont. 50	N.B. 10	B.C. 80	N.B. 20	Alta. 20	Ont. 60	Alta. 60	B.C. 20
Physiotherapists	B.C. 95	N.S. 55	Ont. 40	B.C. 175	P.E.I. 10	Sask. 10	B.C. 105	Alta. 95	Man. 30
Occupational therapists	B.C. 95	N.B. 10	Ont. 10	Ont. 50	B.C. 40	N.B. 30	B.C. 65	Alta. 50	Sask. 30
Dentists	B.C. 140	Ont. 75	Alta. 35	B.C. 195	Ont. 95	N.L. 10	Alta. 135	Ont. 100	B.C. 95
Dental hygienists and therapists	B.C. 125	Alta. 15	N.B. 10	B.C. 295	Alta. 55	N.B. 15	Alta. 135	B.C. 50	P.E.I. 10
Dental assistants	Alta. 105	Ont. 45	Que. 25	Alta. 130	B.C. 50	Ont. 10	Alta. 200	Ont. 135	N.S. 20
Pharmacists	Ont. 165	Alta. 60	B.C. 40	B.C. 145	Ont. 100	Man. 35	Ont. 165	B.C. 125	Alta. 55
Physicians	B.C. 265	Ont. 206	N.B. 8	B.C. 432	N.B. 11	P.E.I. 9	B.C. 251	Ont. 215	Alta. 152

Notes:

.. Data suppressed due to small cell size.

† The next province had a net interprovincial migration value less than zero.

Sources: Census of Population, Statistics Canada; SMDB, CIHI.

The other side of the interprovincial migration story, net losses, is summarized in Table 3. There, for the general population and selected workforces, provinces have been identified based on the magnitude of negative net interprovincial migration counts.

Quebec, Manitoba and Saskatchewan most commonly appear throughout Table 3 as the provinces with the greatest net losses of health care providers through interprovincial migration. Atlantic provinces are also included, especially Newfoundland and Labrador in the later years of the study period. However, larger provinces also experienced net losses. For example, in the 1991-to-1996 migration period, Alberta was the province with the largest net loss of nurses and many of the technology professions.

Table 3. Provinces With Highest Negative Net Interprovincial Migration Counts for the 1986-to-1991, 1991-to-1996 and 1996-to-2001 Migration Periods

	1986 to 1991			1991 to 1996			1996 to 2001		
	Province Count			Province Count			Province Count		
General population	Sask. -50,770	Man. -29,630	Que. -21,990	Ont. -43,665	Que. -31,105	N.L. -20,800	Que. -46,980	N.L. -27,645	Sask. -22,515
General Canadian workforce	Sask. -42,835	Man. -22,695	Que. -16,390	Ont. -37,150	Que. -20,565	N.L. -19,110	Que. -35,085	N.L. -26,190	B.C. -21,950
All health occupations	Sask. -2,740	Man. -1,830	Que. -1,515	Sask. -1,225	Que. -840	Man. -805	Que. -1,570	N.L. -1,170	Sask. -950
Registered nurses and registered psychiatric nurses	Sask. -1,060	Man. -995	Que. -430	Alta. -500	Sask. -370	Man. -350	Que. -375	N.L. -365	Sask. -250
Licensed practical nurses	Man. -145	Sask. -80	N.L. -60	Alta. -65	Ont. -55	Que. -15	Ont. -190	Que. -70	Man. -40
Medical laboratory technologists	Sask. -180	N.L. -50	N.S. -35	Alta. -55	N.S. -30	Que. -25	Que. -40	N.L. -20	N.B. -20
Medical laboratory technicians	Sask. -140	Que. -60	N.S. -55	Alta. -100	Sask. -50	N.S. -35	N.S. -30	N.L. -20	Man. -20
Respiratory therapists	Alta. -50	Man. -30	N.S. -25	Alta. -40	N.B. -35	Man. -25	N.L. -50	Que. -35	Sask. -15
Medical radiation technologists	Man. -75	Sask. -65	N.B. -55	Alta. -60	Man. -40	Que. -20	Man. -95	N.L. -50	Que. -50
Medical sonographers	..	..	..	..	..	..	Man. -50	N.S. -30	N.L. -20
Audiologists/ Speech-language pathologists	Man. -40	Alta. -40	Sask. -30	Man. -45	Sask. -40	N.S. -30	Man. -60	N.S. -50	N.L. -20
Physiotherapists	Que. -100	N.B. -45	Sask. -35	Que. -60	Ont. -40	Man. -40	N.S. -55	Que. -40	Ont. -40
Occupational therapists	Que. -45	N.S. -40	Alta. -35	Que. -75	Sask. -30	Man. -25	N.S. -90	N.B. -40	Que. -10
Dentists	Que. -90	N.S. -65	Man. -65	N.S. -95	Que. -85	Sask. -70	Que. -145	Sask. -80	N.S. -70
Dental hygienists and therapists	Sask. -85	Man. -25	Que. -20	Ont. -200	Sask. -50	Que. -45	Sask. -55	Que. -45	Man. -45
Dental assistants	Sask. -90	Man. -60	N.L. -35	Sask. -65	N.L. -45	P.E.I. -30	B.C. -125	Man. -70	N.B. -60
Pharmacists	Sask. -155	Man. -80	Que. -35	Sask. -205	N.L. -40	N.S. -30	Sask. -205	Que. -85	N.L. -45
Physicians	N.L. -130	Man. -130	Que. -86	Sask. -132	Man. -119	N.L. -99	Que. -196	Sask. -182	N.L. -134

Note: .. Data suppressed due to small cell size.

Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Rural–Urban Migration^{vii}

In most intercensal periods since 1976, the population of rural and small-town Canada has grown in absolute terms.¹² However, that growth has been at a slower rate than urban Canada. Part of the reason why rural areas of the country have not increased at a greater rate is that they often experienced negative net migration rates. On the other hand, rural out-migration has not been a constant. During the 1986-to-1991 migration period, rural Canada had a net loss of only about 2,000 people aged 15 years and older (Table 4). Rural–urban migration flow swung in the opposite direction in 1991 to 1996 with positive rural net growth (just under 76,000 people) due to migration only, to return to a negative migration state in 1996 to 2001.

Table 4. Migration Between Larger Urban Centres and Rural and Small-Town Canada by the General Population (Aged 15 Years and Over) During the Five-Year Migration Periods, 1986 to 1991, 1991 to 1996 and 1996 to 2001

Migration Counts and Rates	Census Migration Periods		
	1986 to 1991	1991 to 1996	1996 to 2001
Non-Movers (Counts)			
Rural	4,663,105	4,907,775	4,839,030
Urban	16,492,170	17,715,775	19,058,385
Internal Migrants (Counts)			
Rural to urban	554,515	469,990	545,435
Urban to rural	552,465	545,675	498,540
Total net migration to rural	-2,050	75,685	-46,895
Migration Rates (%)			
Rural			
In-migration rate	10.6	10.1	9.3
Out-migration rate	10.6	8.7	10.1
Net migration rate	-0.0	1.4	-0.9
Urban			
In-migration rate	3.3	2.6	2.8
Out-migration rate	3.3	3.0	2.5
Net migration rate	0.0	-0.4	0.2

Source: Census of Population, Statistics Canada.

vii. In this section of the report, the terms “rural” and “rural and small-town” as well as “urban” and “large urban centre” were used interchangeably.

Studies that examine the detailed movements of Canadians to and from urban or rural areas of the country have been limited to date. This is especially the case for the health care workforce. The gap in information for the general Canadian population has been filled, to some extent, by recent work of Statistics Canada analysts.^{13, 14} Table 4 was prepared using their methodology. Similar analyses have been undertaken for individual health care occupational groups and may be found in the CIHI *Distribution and Internal Migration* series of reports.

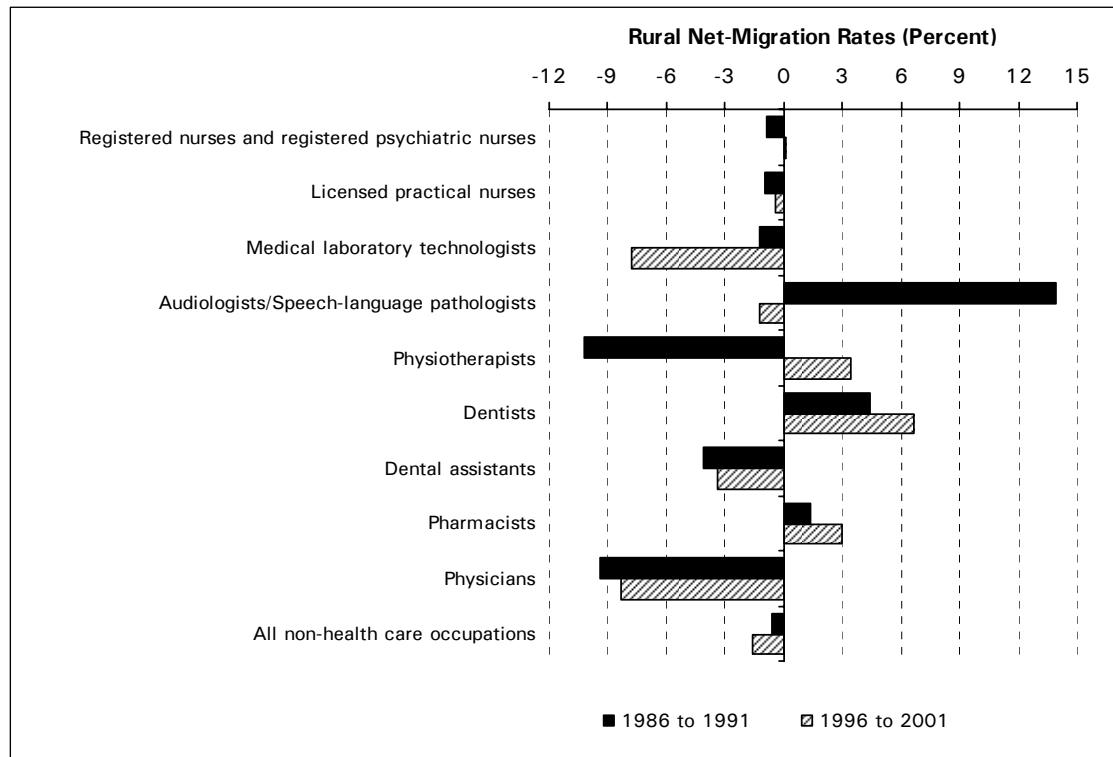
To show some of the variations in rural–urban migration patterns over these two migration periods, the rural net-migration rates have been plotted (Figure 12) for a selected number of the health care occupational groups.

Recall that there was a negative-positive-negative pattern of rural net-migration rates for the general population for the 1986-to-1991, 1991-to-1996 and 1996-to-2001 migration periods, respectively. In summary, of the 15 health care occupational groups reported on in the study:

- Licensed practical nurses, medical laboratory technologists and pathologists' assistants, medical laboratory technicians, respiratory therapists, clinical perfusionists and cardio-pulmonary technologists, occupational therapists and medical radiation technologists followed the pattern of rural migration that was characteristic of the general population;
- Dentists, pharmacists and medical sonographers had positive rural net-migration rates in all three of the migration periods, while dental assistants and physicians had negative rates throughout the entire study period;
- Registered nurses (including RPNs), physiotherapists and dental hygienists and dental therapists had a negative rural net-migration rate in 1986 to 1991, followed by positive rates afterwards;
- Audiologists and speech-language pathologists had the opposite pattern, positive rates in 1986 to 1991 and 1991 to 1996 but negative in the 1996-to-2001 migration period.

Details of these variations in rural–urban migration patterns can be found in the reports included in the CIHI *Distribution and Internal Migration* series. The emphasis in enumerating the different patterns here is to stress the fact that rural and urban net-migration rates for health care providers do not automatically follow those of the general population.

Figure 12. Rural and Small-Town Net-Migration Rates (Percent) for Selected Health Care Occupational Groups and All Non-Health Care Occupations, Canada, 1986-to-1991 and 1996-to-2001 Migration Periods



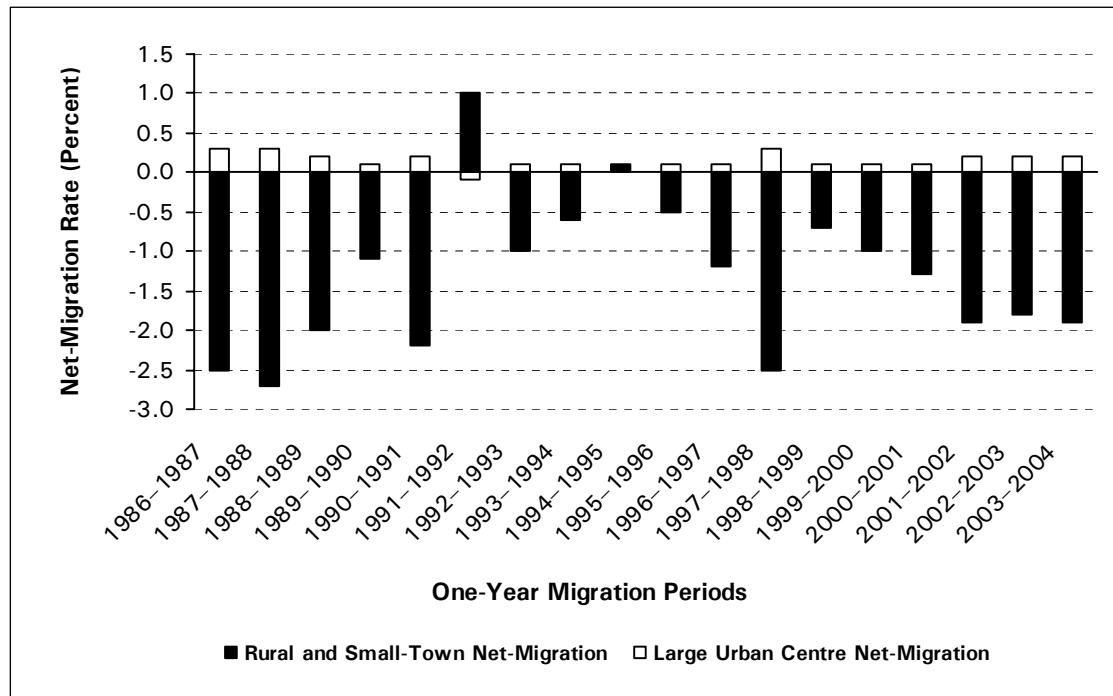
Sources: Census of Population, Statistics Canada; SMDB, CIHI.

The previous summary focused on the rural net-migration rates that were observed using five-year migration periods. Analyses of these rates for physicians were also undertaken using one-year migration periods from 1986 to 1987, 1987 to 1988, etc. through to 2003 to 2004.

Although Figure 12 indicates that negative rural net-migration rates were observed for physicians, the five-year migration periods masked two instances when more physicians moved to rural Canada than moved away. These occurred in the 1991-to-1992 and 1994-to-1995 migration periods (Figure 13). However, these two instances did not balance out the net losses that were the norm. Over the 19-year span from 1986 to 2004, the average annual rural net-migration rate was a negative 1.3%, compared with the positive 0.1% average urban net-migration rate.

The largest proportional losses of physicians from rural Canada occurred in the 1987-to-1988 migration period when the rural net-migration rate was -2.7%. Losses of a similar rate occurred in rural areas of the country in 1986-to-1987 (-2.5%) and again in 1997-to-1998 (-2.5%). In general, the net losses of physicians from rural areas of Canada were relatively high from 1986 to 1991, decreased in the early 1990s, but increased again from 1995 to 1998. Rural net losses also increased from 1998 to 2004. For urban areas of the country, the inverse of these trends would be observed.

Figure 13. Net-Migration Rates for Larger Urban Centres and Rural and Small-Town Areas for Active Physicians for One-Year Migration Periods, Canada, 1986–1987 to 2003–2004



Sources: Census of Population, Statistics Canada; SMDB, CIHI.

Methodological Notes

The principal analyses undertaken in this study are outlined here. More detailed descriptions of the methods employed may be found in the individual reports in the *Distribution and Internal Migration* series of publications.

Data Sources

The geographical distribution and migration patterns of Canada's health care providers were examined using custom tabulations from the Census of Population prepared by Statistics Canada. These data sets, from 1991, 1996 and 2001, were derived from the long-form questionnaires completed by one out of every five households in each of those census years. In addition, for the analyses of physicians, Scott's Medical Database (SMDB), used by Scott's Directories to create the Canadian Medical Directory and mailing lists for commercial purposes, was employed. The study included data from each of the individual years of that database from 1986 to 2004.

Results based on the data sets outlined above for health care workforces were compared with the distribution and mobility patterns of the general population. For these patterns, census data were also used, as well as annual population estimates published by Statistics Canada.

Workforce Numbers and Demographic Characteristics

Census and SMDB data provided information that allowed for both spatial and temporal analyses of the supply or gross numbers of health care workers. The selected items listed below were also employed to compare and contrast the geographical distribution and internal migration patterns of the health care occupational groups based on demographic characteristics:

- Sex: totals, males and females.
- Age groups: totals, 19-and-under, 20-to-29, 30-to-39, 40-to-49, 50-to-59, 60-and-over.

For the majority of the health occupations examined in this study, the 19-and-under age group was not relevant. Consequently, most of the tables and discussions in these reports are based on counts of individuals 20 years of age and older.

Three additional elements were used to describe physician characteristics:

- The SMDB identifies a physician's preferred language for communication with Scott's Directories as either English or French. This descriptor does not necessarily indicate whether a physician works exclusively in English or French. Nor does it necessarily indicate whether his or her patients speak primarily English or French. Recognizing these limitations, this variable has been used as a proxy of whether English or French is a physician's principal language.
- "Graduating Country Indicator" is an SMDB element that identifies whether a physician's medical doctor degree was obtained from a Canadian medical school or from a foreign medical school. If the latter, a physician can be categorized as an international medical graduate (IMG).
- General specialty category: each physician in the SMDB may be characterized as either a family medicine physician or a physician specialist.

Geographical Units of Analysis

Counts, percentages and health care provider-to-population ratios are reported in this study for the country as a whole, as well as for provinces and territories. Population ratios were mapped at the level of census divisions (representing in some provinces geographical units referred to as counties, regional districts or regional municipalities, etc.) to illustrate some of the sub-provincial and sub-territorial variations in the distribution of Canada's health care workforces.

Rural–urban comparisons for both the distribution and mobility characteristics of the health occupational groups were based on the identification of “large urban centres” and “rural and small-town areas.”

Large Urban Centre (LUC) areas include:

- Census metropolitan areas: CMAs are very large urban areas with core populations of at least 100,000 people.
- Census agglomerations: CAs are large urban areas with core populations that range from 10,000 to just under 100,000 people.

Rural and Small-Town (RST) areas include:

- All communities located outside the boundaries of CMAs and CAs.

Internal Migration

In census years that this study is based on, the long-form questionnaires included a question that asked where all individuals in a household, 15 years of age and older, lived five years ago. Based on the results of this question, the five-year mobility status of Canadians can be determined and identified as follows:

Non-Movers:

- a) lived at the same address five years ago

Movers:

- a) Non-migrant: lived at a different address within the same community five years ago;
- b) Intraprovincial Internal Migrant: lived in a different community within the same province/territory five years ago;
- c) Interprovincial Internal Migrant: lived in a different province/territory five years ago; and
- d) International or External Migrant: lived outside of Canada five years ago.

The counts for each of these mobility status categories were provided by Statistics Canada for each of the geographical units previously described and for each health occupational group. Similar mobility categories for five-year and one-year migration periods were derived for physicians using the SMDB. For each of the health occupational groups included in the study, interprovincial, intraprovincial and rural–urban counts or rates were computed for the following migration characteristics:

- Migration composition: non-migrants and migrants by migration category expressed by counts or as a proportion of the total population of the relevant occupational group in specified geographical areas.
- Migration flows: counts and rates of the numbers of individuals moving from one province or territory to another (interprovincial migration); or from one community to another within the same province/territory (intraprovincial migration); or moving to and from RST and LUC locations (rural–urban migration). Additional flow elements that were examined are described below.
- Migration destination: with a focus on interprovincial migration, the identification of the principal provincial or territorial destinations by provincial/territorial origins.
- Net migration: in-migration, out-migration and net-migration counts and rates by province/territory and by RST/LUC areas of the country.
- Physician-to-population ratios: in the analyses of the mobility patterns of Canada's physician workforce, provincial and territorial components of population growth are examined to determine the impact that migration had on physician-to-population ratios over the period from 1986 to 2004.

Determinants of Migration

Numerous “push” and “pull” factors play a part in influencing one's decision to migrate or not. Census tabulations or administrative databases such as the SMDB do not include important influences such as lifestyle or family preferences. However, they do contain a number of characteristics that are associated with migration decisions. The principal determinants that are examined are age and sex. Using counts and rates, migration patterns associated with these demographic characteristics are described for all of the health occupational groups included in the study.

Additional demographic and professional characteristics derived from the SMDB are used to examine some of the determinants of migration for the physician workforce of Canada. The relative importance of these characteristics on the propensity to migrate was determined through a series of multivariate logistic regression models.

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