Distribution and Internal Migration of Canada's Medical Laboratory Technologist and Pathologists' Assistant Workforce

Health Human Resources

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Distribution and Internal Migration of Canada's Medical Laboratory Technologist and Pathologists' Assistant Workforce

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

Distribution and Internal Migration Series

This document is part of a series examining the geographical distribution and internal migration of various groups of health professionals within Canada.

Reports in this series cover the following occupations:

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

Executive Summary

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 being modified by internal migration—the movement of health care workers within provinces or territories or from one province or territory to another.

Very few studies have been undertaken on the geographical distribution and mobility of most health care providers in Canada. This stems primarily from the fact that there are limited sources of data upon which to base such analysis. However, the Canadian Census of Population, in spite of its limitations, can provide some of this information.

The present publication is based primarily on the census and begins an exploration of the geographical distribution and internal migration patterns of more than 20 groups of health care providers in Canada. For each profession in the study, either a report or a series of graphs and tables (available from the website of the Canadian Institute for Health Information, www.cihi.ca) have been prepared. For each health care occupation, the reports provide:

- Preliminary empirical analysis of the numbers of people in the occupation and selected demographic characteristics;
- An examination of provincial and subprovincial geographical distribution;
- Initial analyses of internal (interprovincial and intraprovincial)[i] mobility patterns; and
- For each of the descriptive categories listed above, temporal comparisons using data from 1991, 1996 and 2001.

Highlights

The present report examines the numbers, selected demographic characteristics and geographical distribution and internal migration patterns of Canada's medical laboratory technologist and pathologists' assistant (MLT/PA) workforce.

Workforce Numbers

- In 2001, the census recorded a total of 19,550 MLT/PAs in Canada, a decrease of 6% compared with 1991.
- Decreases in the numbers of workers in this occupational group were typical in many, but not all, provinces and territories.

i. 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.

Demographic Trends

- In 2001, 81% of the MLT/PAs in Canada were female, compared with 80% 10 years earlier.
- As with many occupational groups in Canada, the MLT/PA workforce is aging: the average age in 2001 was 42 years compared with 37 years in 1991.
- The average age of MLT/PAs was three years lower and one year higher than the average age of members of the general Canadian workforce in 1991 and 2001, respectively.

Geographical Distribution

- The number of MLT/PAs per 100,000 population decreased by 14%, from 76 in 1991 to 65 in 2001.
- Over this 10-year period, four provinces (Newfoundland and Labrador, New Brunswick, Quebec and B.C.) did not follow the national pattern of decreases in the numbers of MLT/PAs per 100,000 population.
- There was less than 1% increase in the proportion of MLT/PAs in rural Canada over the period from 1991 to 2001, while there was a 2% decrease in the overall population living in rural and small-town Canada. There was still a significant difference between the two, with only 11% of this workforce, compared with 21% of the population, located in rural areas of the country.

Internal Migration Patterns

- In 1991, 31% of the MLT/PA workforce could be categorized as a migrant (international, interprovincial or intraprovincial), but this proportion decreased to 18% by 2001.
- With interprovincial movement of MLT/PAs, B.C. had the highest positive net-migration in 1991, but it was supplanted by Alberta as the principal overall destination in 2001.
- Rural areas of the country experienced relative gains in the numbers of MLT/PAs in 1996 compared with overall losses in 1991 and 2001. This coincides with the rural net-migration flows of the general population.

Introduction

Health care is a complex enterprise, relying heavily on the skills and efforts of many individuals. In Canada, more than 1 million people, close to 1 in 10 employed Canadians, work in health and social services.[1, 2] And, it is recognized that "none of the pressing challenges facing Canada's health care system can be met without focusing on the people who make the system work."[3] While this workforce is relatively large, it is not evenly distributed geographically in relation to the distribution of Canadians as a whole.[4, 5] As well, the geographical distribution of Canada's health care workforce is constantly being modified by internal migration—the movement of health care workers within provinces or territories or from one province or territory to another.

Professor John Helliwell, an economist at the University of B.C., is quoted as saying that, "the interprovincial flow of physicians is far larger than the flow to the U.S. Maldistribution is as much or more of a problem than migration southward." (This can be found in a short commentary written in 1999 by Charlotte Gray in the *Canadian Medical Association Journal.*[6])

The issue of internal migration of health professionals in Canada has been the subject of some debate in recent years. The following examples of media coverage and public commentary highlight the public interest in this topic.

- "In the midst of one of Nova Scotia's worst health-care labour disputes, disgruntled lab technologists flocked yesterday to the welcoming arms of an Alberta recruiter." (2001 Canadian Press article carried by the *Globe and Mail*)
- "Within Canada, inter-provincial migration is not a big concern, although the urban–rural balance is."[7] On the other hand, it has been observed that "a majority of RNs, whose migration is associated with going to school after their initial nursing education, do not return to the jurisdiction where they were first registered."[8]
- "Recruitment and retention strategies are being pursued by every province as they grapple with chronic shortages of physicians (both GPs and specialists), nurses, radiation technologists and other professionals. Provincial health ministers are openly complaining about bidding wars between provinces over a dwindling resource pool, with everyone trying to outdo the other with signing bonuses and other contractual bells-and-whistles."[9]

The quotations above are based on personal views, with little supporting documentary evidence. The fact is, we have very little information about the relative distribution and migration patterns of most health professionals in Canada. Few studies in Canada provide information about the geographical distribution or internal migration patterns of health care professionals in this country, with the exceptions of physicians and nurses. The present report is part of a series exploring these key issues for Canada's HHR.

The reports in this series provide:

- Preliminary, empirical analysis of the numbers in each profession, as well as selected demographic characteristics;
- Provincial and subprovincial geographical distribution for each profession; and
- Internal (intraprovincial and interprovincial) mobility patterns for 15 of Canada's health care provider groups.

A list of all of the health occupations included in the study may be found in the Methodological Notes (Appendix A).

Of the groups of health care providers included in this study, this report examines the medical laboratory technologist and pathologists' assistant workforce. Current and possible future shortages in the health technology professions have been identified as issues in health human resources (HHR) planning in Canada.[10, 11, 12] And while concerns about mobility, especially interprovincial migration,[13] have been expressed, little detailed information is available that would enable the monitoring of these movements.

Background

On World Health Day in April 2006, the World Health Organization released its annual report and stated that "at the heart of each and every health system, the workforce is central to advancing health."[14] In Canada, the need to pay special attention to HHR issues had already been recognized through numerous commissions and task forces, such as the Commission on the Future of Health Care in Canada *(which published the "Romanow Report"[15])* and the Standing Committee on Social Affairs, Science and Technology (which published the "Kirby Report"[16]). As well, the Health Council of Canada was established to monitor and report on the implementation of the 2003 First Ministers' Accord on Health Care Renewal. The Accord recognized that "appropriate planning and management of HHR is key to ensuring that Canadians have access to the health providers they need."[17]

Simply put, the goal of HHR planning is "having the right people with the right skills in the right place at the right time to provide the right services to the right people."[18]

Unfortunately, there is no single database in Canada that can be used to address all of these points. However, some of the components of HHR planning can be assessed using the Canadian Census of Population.[ii] In this series of reports, the census is used to explore the geographical distribution and internal migration patterns of health care providers relative to the general population of Canada.

ii. The characteristics of the Canadian Census of Population are described on the website (www.statcan.ca) of Statistics Canada.

Professional Counts and Basic Demographic Information

For many of the health professions included in this study, there is very little information about the relative counts of each profession and the basic demographic age and sex information. Simple supply-based information is critical for HHR planning and management of the health system. This fundamental supply-based information is provided in the reports in order to establish a starting point of basic information for all health professions in this series.

Geographical Distribution

The primary interest in geographical distribution for HHR planning is in the spatial distribution of health care providers relative to the distribution of the general population. It is the mismatch between the spatial distribution of the general Canadian public and that of health personnel that captures the attention of the public, mass media, policy-makers, health care administrators and researchers.[19] It is this mismatch that has generated a substantial body of literature dealing with shortages[20, 21, 22, 23, 24] of and imbalances[25, 26] in human resources for health.

However, the geographical distribution of HHR in Canada is only moderately well understood. In *Health Personnel Trends in Canada, 1995 to 2004,*[27] the Canadian Institute for Health Information (CIHI) described the various stages of evolution of its HHR information systems. At one end of the spectrum are the "mature supply-based information systems," which include the National Physician Database, Scott's Medical Database (formerly the Southam Medical Database) and the Registered Nurses Database (RNDB). Based on these sources, the CIHI *Supply and Distribution* and *Work Force Trends* series of reports provide detailed information on the provincial and territorial distribution of physicians and registered nurses. Similar levels of detail are now emerging with the Licensed Practical Nurses Database (LPNDB) and the Registered Psychiatric Nurses Database (RPNDB). At the present time, other HHR databases within CIHI belong to the category of "immature supply-based information systems." For the other health professional groups included in this series, as well as other health care providers that are not included, our knowledge of their geographical distribution is rudimentary.

Publications based on CIHI databases and other administrative databases or surveys such as the census have generally failed to examine the subprovincial distribution of HHR. Exceptions include *Geographic Distribution of Physicians in Canada*[19] and its update *Geographic Distribution of Physicians in Canada: Beyond How Many and Where*,[4] as well as *Supply and Distribution of Registered Nurses in Rural and Small Town Canada, 2000*.[5] Other than these studies of physicians and nurses, no national geographical studies with subprovincial analyses appear to exist for any of the other health care providers in Canada. The present series is designed to address that omission, within the limitations of the data employed.

Migration

One of the questions included in a recent World Health Organization guide to the assessment of human resources for health is, "To what extent does internal migration of staff create distributional imbalance of human resources for health?"[28] In a review of Canada's health care providers, a similar question was posed: "How many regulated and unregulated health care providers move each year and what is the impact of their migration on health care services?"[29]

Migration may be viewed as the dynamic component of geographical distribution as people move from source to destination regions. It is also a reflection of a major HHR planning issue, namely recruitment and retention, with recruitment implying an increase in mobility and retention implying a decrease in mobility. In- or out-migration can affect source and destination regions in many different ways. In the context of remote rural communities in the United Kingdom, for example, it has been argued that "health professionals, working and residing locally, make a valuable contribution to the social structure of remote communities, in addition to health care, social care and economic contributions."[30] Similar comments have been made in the context of the migration of rural nurses in Canada.[8]

There exists a substantial volume of articles and reports dealing with the importance of analysis of interprovincial and, to a lesser extent, intraprovincial migration of the general population in Canada. Examples of this work include the examination of specialized data sets based on tax files[31] as well as census data.[32, 33, 34, 35, 36] A summary of the internal migration of the general Canadian workforce, which excludes all health care providers, is provided in Appendix B. It includes a brief literature review, as well as original computations using some of the data and methods that the present series is based on.

Missing from the list of publications referred to above and even in the bibliographies that these authors provide, are analyses of the migration patterns of Canada's HHR. Searches in both the academic and popular literature for references dealing with HHR migration will yield many citations. But in those results, "migration" tends to refer to immigration or emigration (that is, international migration) and "HHR" tends to focus on physicians or nurses, but rarely dentists, pharmacists, medical laboratory technologists or physiotherapists, etc.

In many information sources specific to Canada, the overall impression when dealing with HHR is that migration means "brain drain to the United States." While international migration is not an inconsequential issue, the volumes of internal HHR migrants are far larger, especially for some provinces, territories and regions of the country. But internal migration patterns are submerged within general migration studies of the Canadian population. That is not to say that there are no Canadian HHR migration studies. There are academic journal articles that deal with both physicians[37, 38, 39, 40] and nurses.[41, iii] For all other groups of health care personnel, internal migration (and even international migration) is considered important, but so far has merited very little in-depth analysis.[42, 43, 44]

iii. CIHI published the following reports on nurses in 2005: *Supply and Distribution of Registered Nurses in Canada, Workforce Trends of Registered Nurses, Workforce Trends of Registered Psychiatric Nurses* and *Workforce Trends of Licensed Practical Nurses*.

Essentially, almost all internal migration studies of HHR in Canada have been concerned with interprovincial movement. None provide details with respect to intraprovincial migration patterns or on focused themes such as rural–urban movement of health personnel.

Perhaps it is the case that "migration is often the most difficult component of population change to accurately model and forecast."[45] But there is little opportunity for accurate modelling or forecasting of Canadian HHR migration at the present time because so little work has been done to date. This is partially due to data inadequacies. Several HHR models in Canada do include migration, but the mobility details are rarely made public.[46, 47] HHR modelling overall appears to be in some difficulty in Canada. In a recent general review of the country's modelling capacity, it was concluded that, "given the breadth of HHR research in universities, research institutes, professional associations and other organizations across Canada and the fact that health human resources planning is a high priority, component activity of ministries of health in each jurisdiction of Canada's federal system, the number of robust HHR models identified and discussed in this report can be described as meagre."[48]

Our understanding of the patterns and significances of HHR movement will not advance unless we fully exploit the databases that are already available to us and include in our analyses all groups of health care professionals, not just physicians and nurses. This project is designed to contribute to that understanding by using the Canadian Census of Population.

Structure of the Report

The purpose of this study is to provide an empirical analysis of the distribution and internal migration of selected health care providers of Canada. The Introduction, Appendix A (Methodological Notes), Appendix B (A Summary of Internal Migration in Canada) and Appendix D (National Occupational Classification Definitions) are common to all of the reports in the present series. The main section of this report examines the geographical distribution and the internal migration patterns of the selected health occupation. The features of this health occupation are compared with the spatial and temporal patterns of the aggregate of all non-health occupations or the general population. As indicated in Appendix A, occupations and migration patterns identified through the census apply only to persons 15 years of age and older. However, the present series of publications deals primarily with health care providers who are 20 years of age or older.

Demographic Characteristics

Many of the traditionally one-gender dominated health occupations are now seeing shifts in gender profiles. For example, there are increasing numbers of male nurses and female physicians. Another distribution that is of concern to HHR planners is that of aging—aging of the general population, aging of the overall workforce and aging of the HHR workforce. This form of distribution is discussed in the present report using broad age categories that are enumerated in Appendix A. A temporal element is included in the present analyses by examining data from two or more of the three censuses (1991, 1996 and 2001) that form the focus for these reports.

Geographical Distribution

The geography of a health occupation is examined in terms of absolute numbers and as ratios of the general population. These are expressed in terms of provincial counts and ratios, as well as by urban–rural categories. The objective is to determine whether the distribution of a health occupation reflects the geographical distribution of the general population. Spatial features of each occupation by sex and age category are also illustrated.

Internal Migration

The aggregate statistics available for the present study allow for an overall discussion of migration composition and migration flows. These are five-year migration patterns for three points in time: 1991, 1996 and 2001.

For Canada and each province and territory, **migration composition** identifies the makeup of the selected geographical units in terms of the numbers and proportions of people who fall into the following categories and subcategories:

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** five years ago;
c) Interprovincial internal migrant: lived in a **different province** five years ago; and
d) International migrant: lived **outside of Canada** five years ago.

For each geographical unit examined, the sections of the report dealing with migration composition identify the proportions of all movers and non-movers from five years ago. The data sets that are employed for this study do not indicate which country the external migrants emigrated from. As with the analyses of geographical distribution, the examination of migration composition includes both temporal and spatial analyses.

Migration flows identify source and destination areas of migrants. In this report, flows are generalized at the level of interprovincial flows as well as urban–rural flows, which include both interprovincial and intraprovincial mobility numbers and rates. As a component of this part of the analysis, in-, out- and net-migration rates are computed for the aggregate of Canada's urban and rural areas.

Distribution and Internal Migration of Canada's Medical Laboratory Technologist and Pathologists' Assistant Workforce

Medical Laboratory Technologists and Pathologists' Assistants are grouped together by the Standard Occupational Classification 1991 and the National Occupational Classification—Statistics 2001 under the classification code D211. A summary definition of this occupational group is provided in Appendix D.

Demographic Characteristics

Workforce Numbers

In 2001, the census estimated a total of 19,550 medical laboratory technologists and pathologists' assistants (MLT/PA) in Canada (see Table 1). Over the 10-year period from 1991 to 2001, the total number of MLT/PAs in Canada decreased by 6%.

Decreases in the number of workers in this occupational group occurred in many, but not all, provinces. In the provinces that had fewer MLT/PAs in 2001 compared with 1991, the percentage decreases ranged from 1% in Manitoba to 31% in Alberta. For Manitoba, the change from 1,115 MLT/PAs in 1991 to 1,105 in 2001 could be explained simply by the rounding procedures for data releases used by Statistics Canada. If that is the case, then there was no actual change for Manitoba.

Four provinces shown in Table 1 experienced increases in the numbers of MLT/PAs over the 10-year period from 1991 to 2001. The percentage increases ranged from a low of 8% in New Brunswick to a high of 34% in Newfoundland and Labrador.

Decreases or increases in the numbers of MLT/PAs were not steady from census year to census year. For Canada as a whole, the total numbers in this occupational group decreased from 1991 to 1996 but increased again by 2001. However, the total number of MLT/PAs in 2001 was not as high as in 1991. Nova Scotia and Quebec had similar decreases in the numbers of MLT/PAs from 1991 to 1996. In the case of Quebec, however, the 2001 numbers surpassed those of 1991.

The numbers of MLT/PAs increased from 1991 to 1996 in Newfoundland and Labrador, New Brunswick and B.C. Except for New Brunswick, the number of people in this occupational group continued to increase by 2001.

Table 1. Medical Laboratory Technologist and Pathologists' Assistant Workforce by Province/Territory and Canada, 1991, 1996 and 2001

	1991	1996	2001	Percentage Change 1991–2001
N.L.	395	480	530	(+34)
P.E.I.	110	95	90	(-18)
N.S.	975	770	875	(-10)
N.B.	545	600	590	(+8)
Que.	2,115	2,025	2,510	(+19)
Ont.	8,750	8,125	7,845	(-10)
Man.	1,115	1,115	1,105	(-1)
Sask.	1,100	840	845	(-23)
Alta.	2,850	2,320	1,955	(-31)
B.C.	2,735	2,800	3,260	(+19)
Y.T.	30	0	20	(-33)
N.W.T.	25	30	30	(+20)
Canada	20,685	19,145	19,550	(-6)

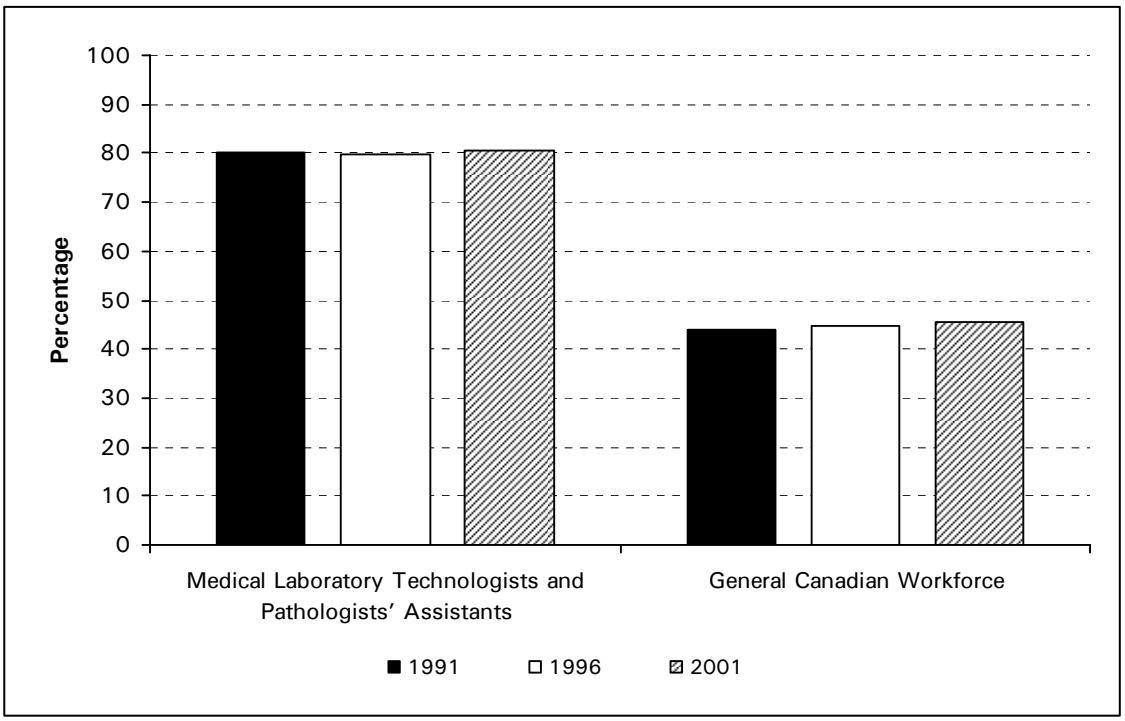
Note: 2001 Northwest Territories data include Nunavut.

Source: Statistics Canada, Census of Population.

Sex Distribution

While the MLT/PA workforce is predominantly female, the general Canadian workforce (all non-health occupations) is predominantly male. In 2001, 81% of MLT/PAs in Canada were female (see Figure 1). Over the 10-year period from 1991 to 2001 the percentage of female MLT/PAs changed little, increasing less than 1%. This slightly increasing difference did not match that of the general Canadian workforce, which over the same 10-year period experienced an increase of 2% in the proportion of females.

Figure 1. Percentage of Females in the Medical Laboratory Technologists and Pathologists' Assistants and General Canadian Workforce, Canada, 1991, 1996 and 2001



Source: Statistics Canada, Census of Population.

The little overall change in the proportion of female MLT/PAs in Canada was created over this time period because the increases in half of the country's provinces were more or less matched by the decreases in the other half of Canada's provinces (see Appendix C, Table C1). Increases in the proportion of females in the MLT/PA workforce ranged from less than 1% in Nova Scotia to 7% in Newfoundland and Labrador. Decreases in these proportions ranged from 1% in New Brunswick to 9% in Manitoba.

Even though Newfoundland and Labrador increased its proportions throughout the study period, it had the lowest proportions of female MLT/Pas, varying from 65% to 71% in 1991 and 2001, respectively. The province with the highest proportions of female MLT/PAs differed in each of the three census years examined: Saskatchewan—90% in 1991; New Brunswick—87% in 1996; and Alberta—89% in 2001. Data available for this study indicates that all MLT/PAs in the territories were female throughout the study period (see Appendix C, Table C1).

Age Distribution

According to census data, the MLT/PA workforce overall is increasingly older (see Appendix C, Table C2). In 2001, the average age of MLT/PAs in Canada was 42 years compared with 37 years in 1991. Relative to the average age of the general Canadian workforce, MLT/PAs have changed from being younger in 1991 to being older in 2001. Over the decade, on average, MLT/PAs were three and one years younger and then one

year older than the general workforce for the years 1991, 1996 and 2001, respectively. As illustrated in Table C2, the 1991 average ages for MLT/PAs were lower than those of the general workforce in all provinces. By 2001, the average ages of MLT/PAs were higher than those of the general workforce in all but two provinces.

Among the provinces in 2001, on average the youngest MLT/PAs (39 years) were located in Quebec. This was the only province where the average age of this occupational group was less than 40 years. In this same year and on average, the oldest MLT/PAs (43 years) were located in B.C. With the small number of MLT/PAs located in the territories, average ages must be treated with caution. However, the data employed in this study would indicate that those jurisdictions had the youngest MLT/PAs throughout the period of study.

Comparisons of figures 2 to 4 further highlight the age distribution patterns of the MLT/PA workforce in Canada. These graphs illustrate the age distribution of this occupational group compared with the general Canadian workforce (20 years of age and older) for the years 1991, 1996 and 2001.

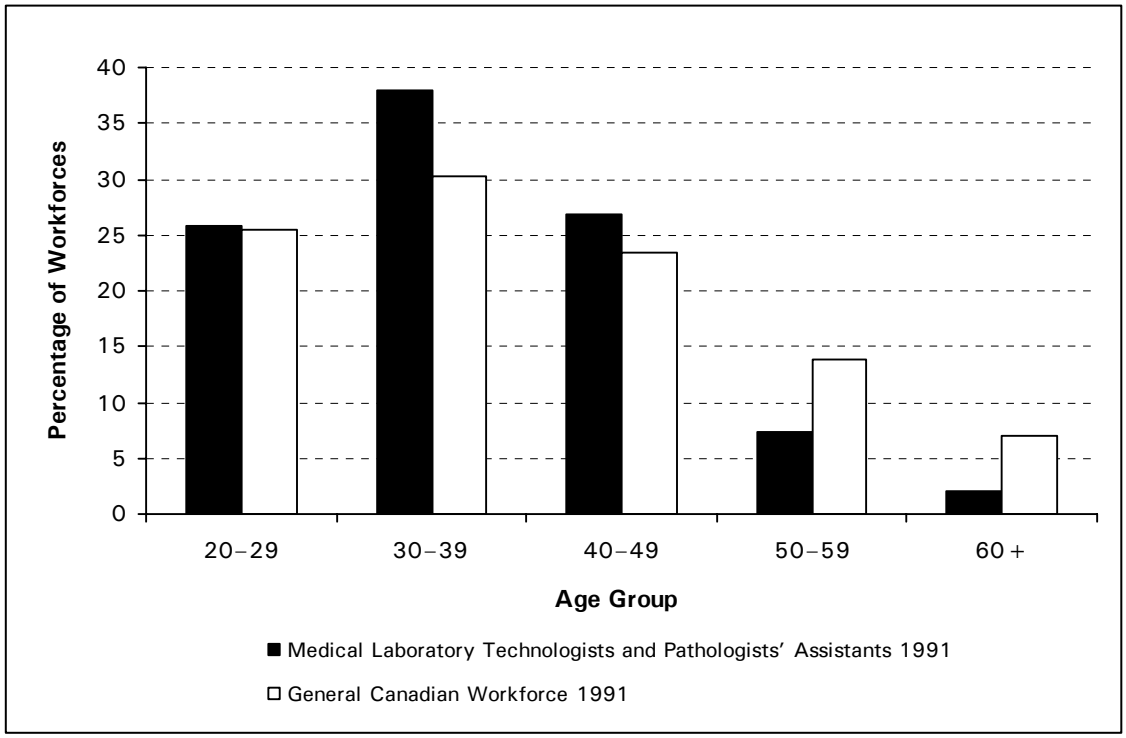
In 1991, the proportion of MLT/PAs in the youngest age group (20-to-29 years) was identical to that of the general workforce (26%). By 2001, both groups had experienced a decrease in the percentage of workers in this age range. MLT/PAs aged 20-to-29 made up only 14% of that workforce compared with 23% in the general workforce.

At the other end of the age spectrum and during the 10-year period under analysis, the proportion of those 60 years of age and older was higher in the general Canadian workforce compared with the MLT/PA workforce. In 2001, 7% of the general workforce was in the 60-and-over age group compared with only 3% of MLT/PAs.

The progressive aging of the MLT/PA workforce is particularly noticeable using these graphs, which show increasing proportions of this workforce in the 30 to 39 and 40 to 49 year age groups from 1991 to 1996, as well as increases in the 40 to 49 and 50 to 59 year age groups. In 1991, only 7% of MLT/PAs were 50 to 59 years of age. By 2001, the percentage of MLT/PAs in this age group had risen to 21%.

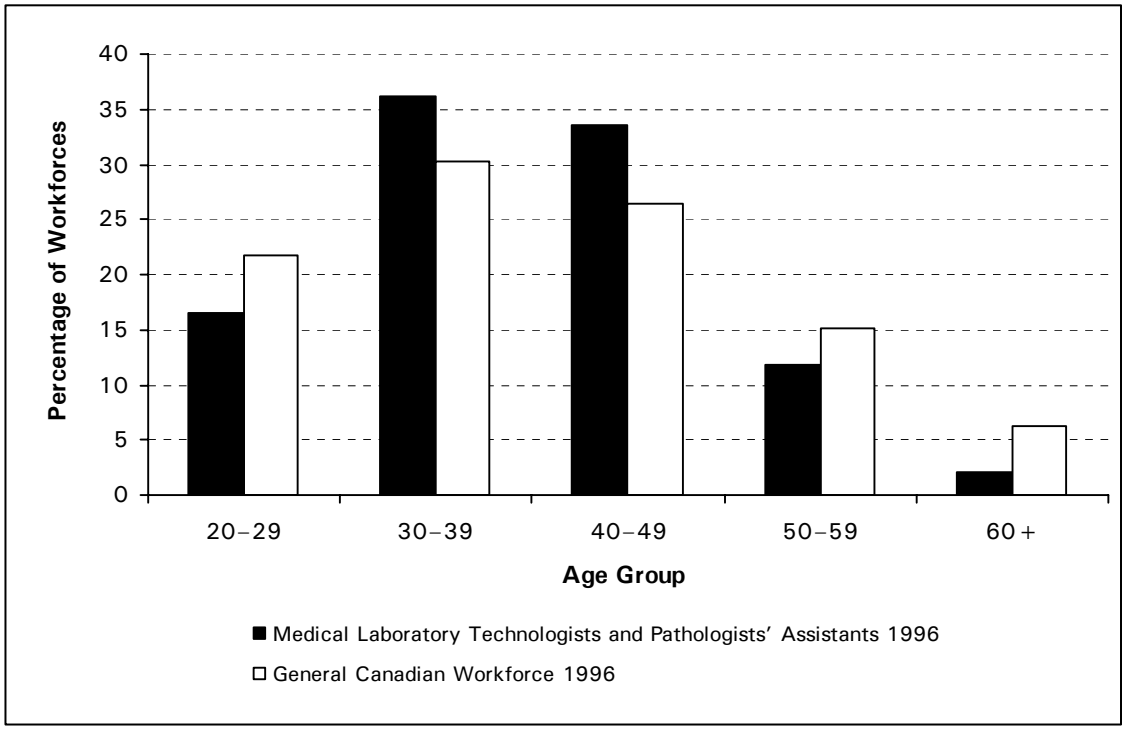
Additional age distribution profiles by province/territory and Canada are provided in Appendix C—Table C3 (1991), Table C4 (1996) and Table C5 (2001).

Figure 2. Age Distribution for Medical Laboratory Technologists and Pathologists' Assistants Compared With the General Canadian Workforce, Canada, 1991



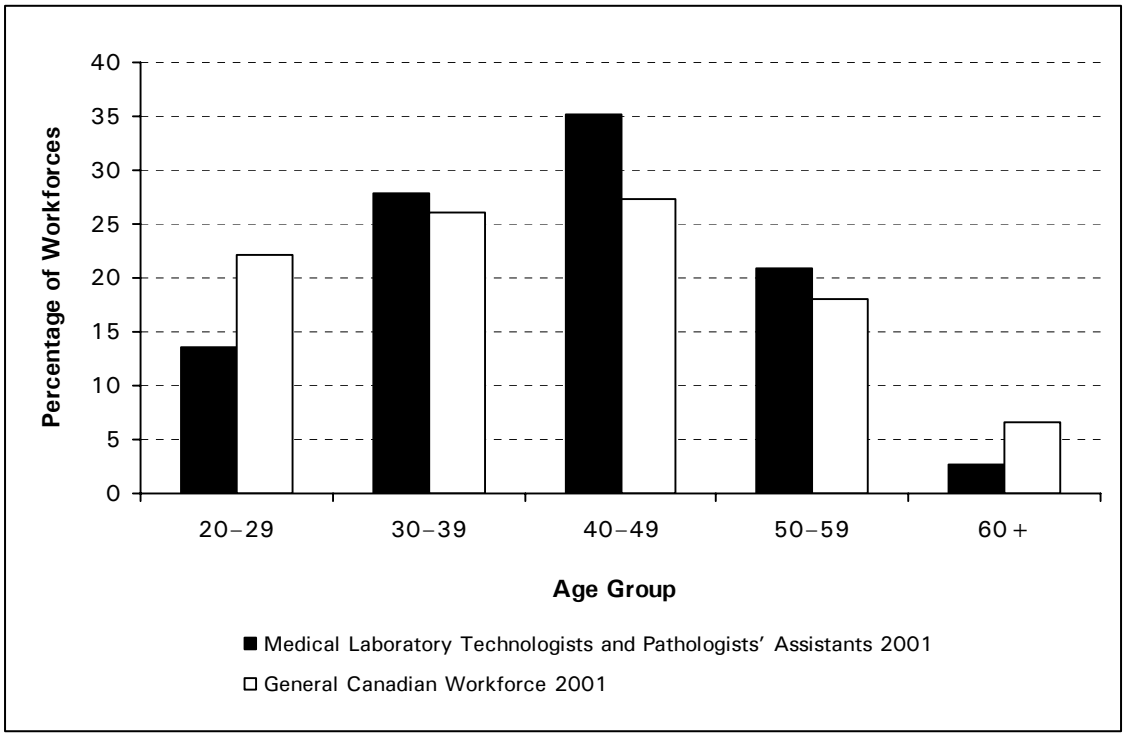
Source: Statistics Canada, Census of Population.

Figure 3. Age Distribution for Medical Laboratory Technologists and Pathologists' Assistants Compared With the General Canadian Workforce, Canada, 1996



Source: Statistics Canada, Census of Population.

Figure 4. Age Distribution for Medical Laboratory Technologists and Pathologists' Assistants Compared With the General Canadian Workforce, Canada, 2001



Source: Statistics Canada, Census of Population.

Geographical Distribution

Provincial and territorial variations in the numbers of MLT/PAs are illustrated in Table 1 on page 8. In this section of the report, the associations between the numbers of MLT/PAs relative to the numbers of people in the general population are examined across various geographical areas. Geographical distribution is further discussed by looking at urban–rural distribution of MLT/PAs compared with the general Canadian population.

Population Ratios

Based on census data, the association between the number of MLT/PAs and the general population can also be explored by examining occupation-to-population ratios.[iv]

In Canada, the number of MLT/PAs per 100,000 population decreased by 14% between 1991 and 2001. The ratios for this occupational group decreased from 76 MLT/PAs per 100,000 population in 1991, to 66 and 65 in 1996 and 2001, respectively.

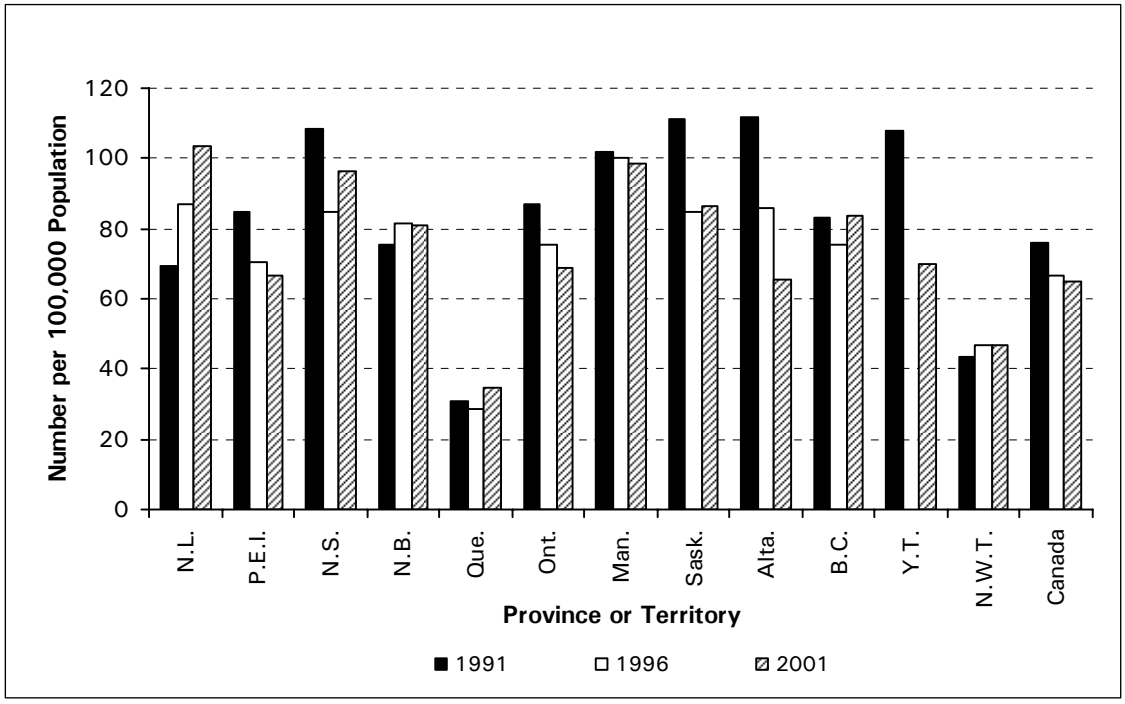
iv. In this report, as a shorthand, occupation-to-population ratios (such as the number of medical laboratory technologists and pathologists' assistants per 100,000 population) are referred to simply as "ratios" or "the ratios."

Figure 5 and Table C6 in Appendix C show that provincial and territorial patterns in the population ratios for MLT/PAs generally followed the decreases experienced for Canada overall. And these decreasing ratios reflect the overall decrease in the total numbers of MLT/PAs described in Table 1. The 1991-to-2001 percentage changes in the numbers of MLT/PAs per 100,000 population ranged from 3% in Manitoba to 41% in Alberta.

Four provinces (Newfoundland and Labrador, New Brunswick, Quebec and B.C.) increased their population ratios from 1991 to 2001. Increases ranged from less than 1% in B.C. to a high of 49% in Newfoundland and Labrador. For B.C., the number of MLT/PAs per 100,000 population increased only marginally between 1991 and 2001. In Newfoundland and Labrador, the 1991-to-2001 ratios changed from 70 to 103 MLT/PAs per 100,000 population.

Newfoundland and Labrador, with 103, was the province with the highest ratio.The province with the lowest number of MLT/PAs per 100,000 in 2001, as well as in 1991 and 1996, was Quebec; there, the ratio was 35 in 2001, up from 31 in 1991.

Figure 5. Number of Medical Laboratory Technologists and Pathologists' Assistants per 100,000 Population by Province/Territory and in Canada, 1991, 1996 and 2001



Note: 2001 Northwest Territories data include Nunavut.

Source: Statistics Canada, Census of Population.

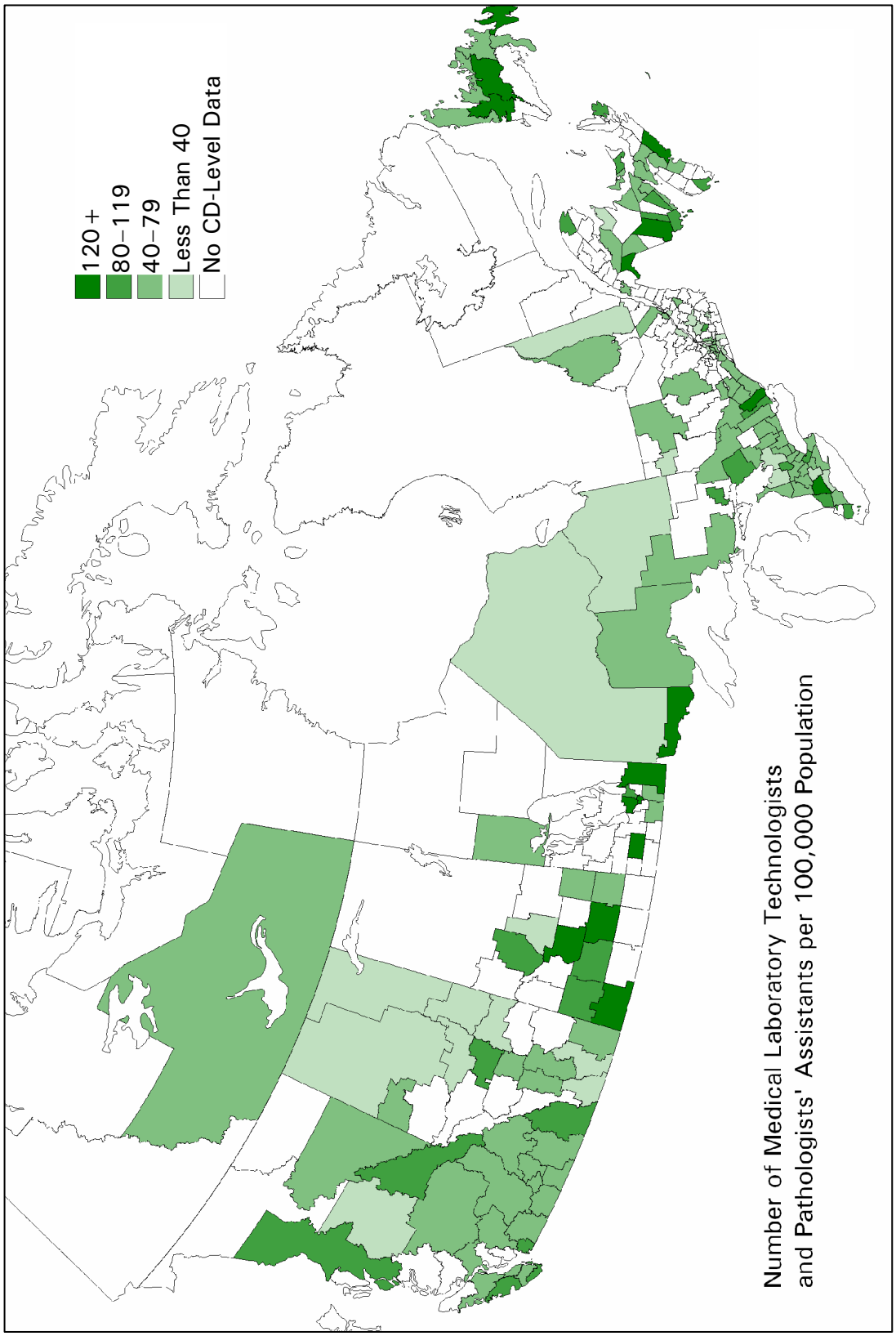
While these provincial/territorial ratios are useful, they considerably mask the local variations that can be illustrated by mapping (Figure 6) the ratios by census division (CD). For this map, the range of the numbers of MLT/PAs per 100,000 population by CD have been grouped into the following classes: 120 or more, 80 to 119, 40 to 79 and less

than 40 (but greater than 0). The mapping category labelled as "No CD-level data" identifies those CDs where there are actually no MLT/PAs, or where the number of people in this occupational group is low and has been suppressed by the random rounding or area suppression procedures for the release of data from Statistics Canada.

Some of the features of this map are noted below:

- Just over half (54%) of the 288 CDs in Canada in 2001 had reportable numbers of MLT/PAs.
- A total of 81 CDs (28% of the 288 CDs in 2001) are mapped in Figure 6 with a ratio of the number of MLT/PAs per 100,000 population between 40 and 79. The majority of these CDs contain relatively large urban centres, with 52% of the overall Canadian population.
- In most provinces, the relatively few MLT/PAs located in rural Canada (see Figure 7) may be found in close proximity to larger urban centres.
- Approximately 6 million Canadians (22% of the total population) live in CDs with fewer than 40 MLT/PAs per 100,000 population.

Figure 6. Number of Medical Laboratory Technologists and Pathologists' Assistants per 100,000 Population Mapped by Census Division, Canada, 2001



Source: Statistics Canada, 2001 Census of Population.

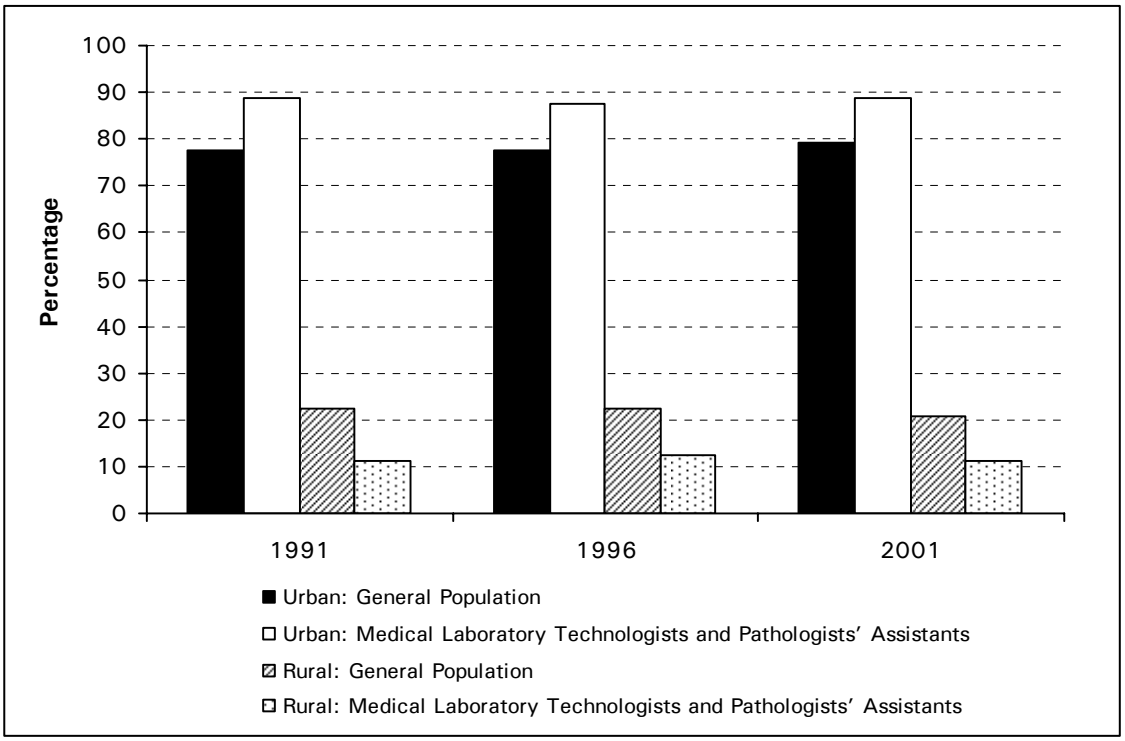
Urban–Rural Distribution

Figure 7 illustrates the variations in the distribution of MLT/PAs among urban–rural locations in 1991, 1996 and 2001. The graph also allows for an urban–rural comparison of MLT/PAs and the Canadian population in general.

In each of the years 1991, 1996 and 2001, the proportions of the general population located in urban areas of the country were lower than those of MLT/PAs. However, the differences between the two decreased. In 1991, 89% of MLT/PAs lived in urban areas, while 77% of the general population was located in those areas—a difference of 12%. By 2001 the difference had decreased to 10%.

Consistent with the changes in the urban proportions, both the general population and the number of MLT/PAs living in rural areas of the country have decreased. For the general population, the decrease in the rural proportions has been from 23% in 1991 to 21% in 2001, a difference of 2%. By comparison, there was only a less than 1% decrease in the proportions of MLT/PAs located in rural areas of the country (11%). It should be noted, however, that the proportion of MLT/PAs living in rural areas of the country increased from 1991 to 1996 before decreasing again in 2001.

Figure 7. Percentage Distribution of Medical Laboratory Technologists and Pathologists' Assistants and the General Population by Urban–Rural Locations, Canada, 1991, 1996 and 2001



Source: Statistics Canada, Census of Population.

Migration

Migration Composition

Migration composition identifies, for any point in time, the numbers or proportion 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 or territory but in a different community five years before;
- Interprovincial migrants: lived in a different province/territory five years before; and
- International migrants[v]: lived in another country five years before.

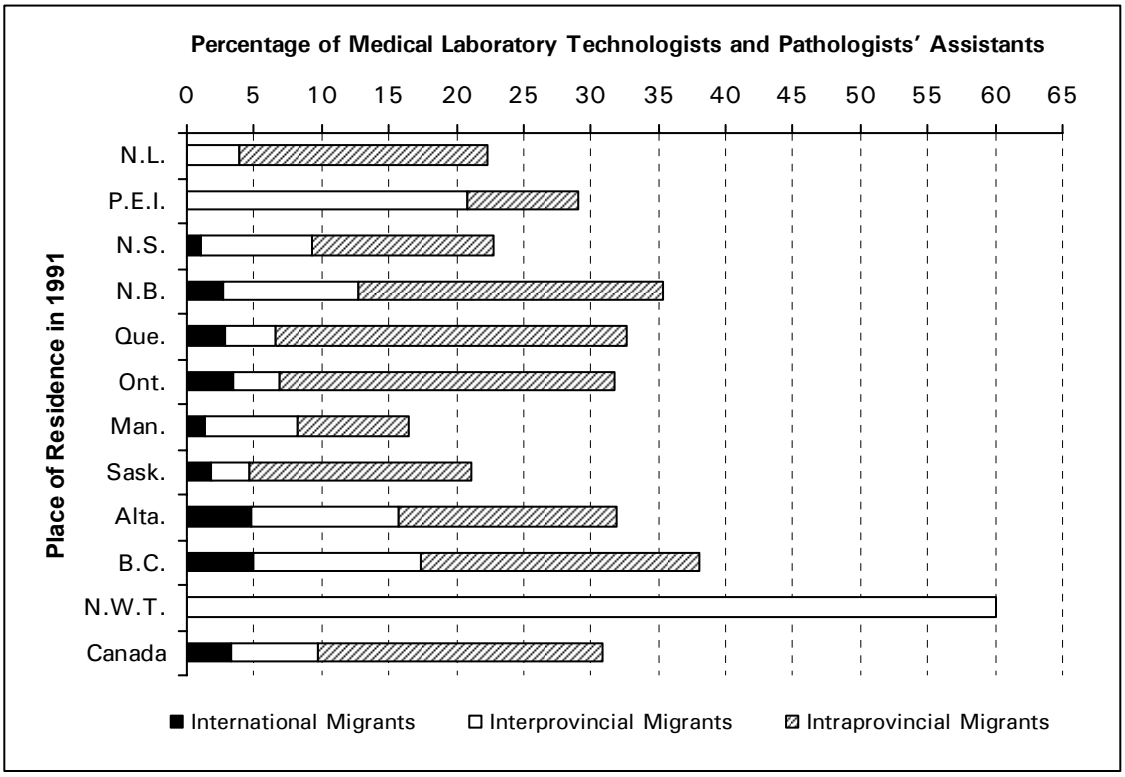
For MLT/PAs, the migration composition of provinces and Canada is illustrated for 1991 (Figure 8), 1996 (Figure 9) and 2001 (Figure 10). These figures show only the proportions for the migrant MLT/PAs: those who came from outside the country (international), from another province or territory (interprovincial) or from somewhere within the same province or territory (intraprovincial). The percentages were computed using the total population of MLT/PAs in each of the jurisdictions illustrated as the denominator. For ease of comparison, the value axes (percentage of the workforce) of the three diagrams have been set to a common value.

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

- In Canada, as a whole, the overall proportion of MLT/PAs who would be classified as migrants is between approximately 20% and 30%. This overall proportion decreased from 31% in 1991, to 21% and 18% in 1996 and 2001, respectively.
- The number of migrant MLT/PAs that these diagrams are based on decreased from 6,385 in 1991 to 4,010 in 1996. The total number of migrants continued to decrease in 2001 to 3,595 MLT/PAs.
- B.C. was the province with the highest proportion of migrants in 1991, when 36% of the overall MLT/PA workforce could be classified as either international, interprovincial or intraprovincial migrants. In 2001, Quebec had the highest proportion of migrants, followed closely by Alberta and Prince Edward Island.
- Overall, the majority of migrant MLT/PAs are intraprovincial movers.
- Quebec had the highest proportions of intraprovincial migrants in 1991 and 1996, with 26% and 24%, respectively. By 2001, there were two provinces with the highest, or close to the highest, proportions of intraprovincial migrants: Prince Edward Island (22%) and Quebec (20%). The P.E.I. proportions must be treated with caution because of the relatively small overall numbers of MLT/PAs.
- Excluding P.E.I., in 1991 the province with the highest proportion of its MLT/PA workforce made up of interprovincial migrants was B.C., which was supplanted by Alberta in 2001.

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

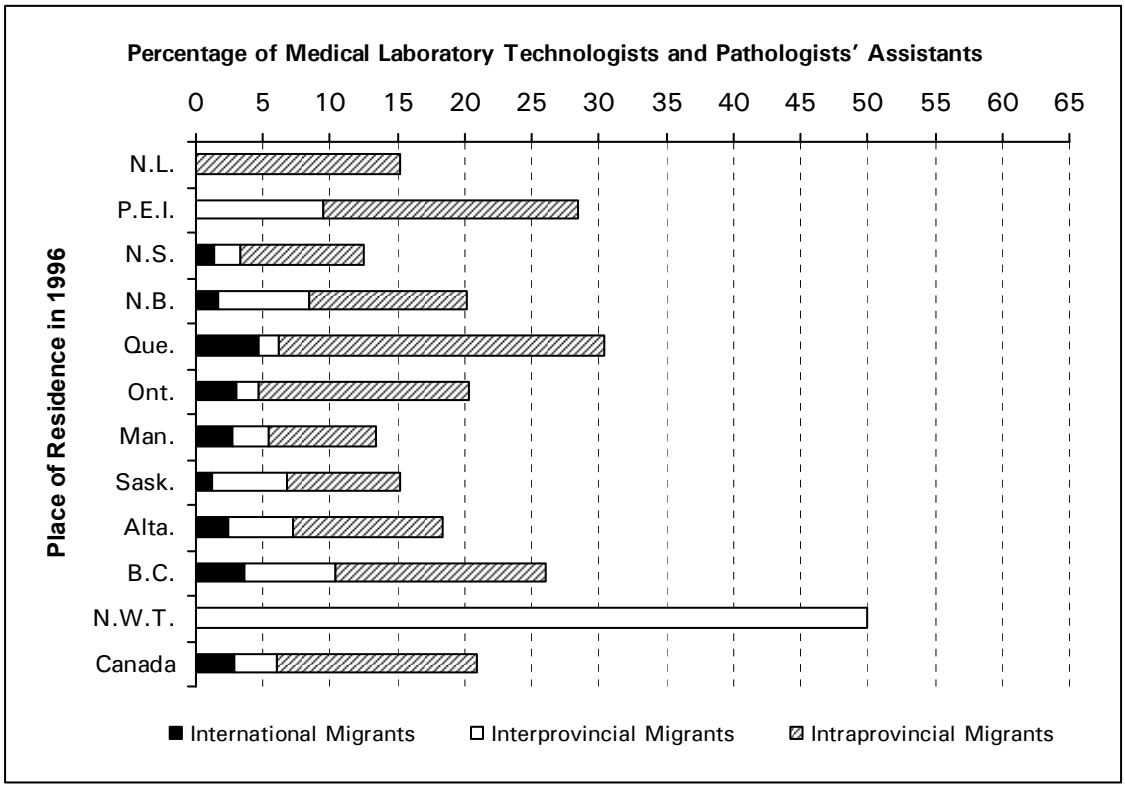
Figure 8. Percentage Migration Composition (Place of Residence Five Years Ago) for Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory and Canada, 1991



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

Source: Statistics Canada, Census of Population.

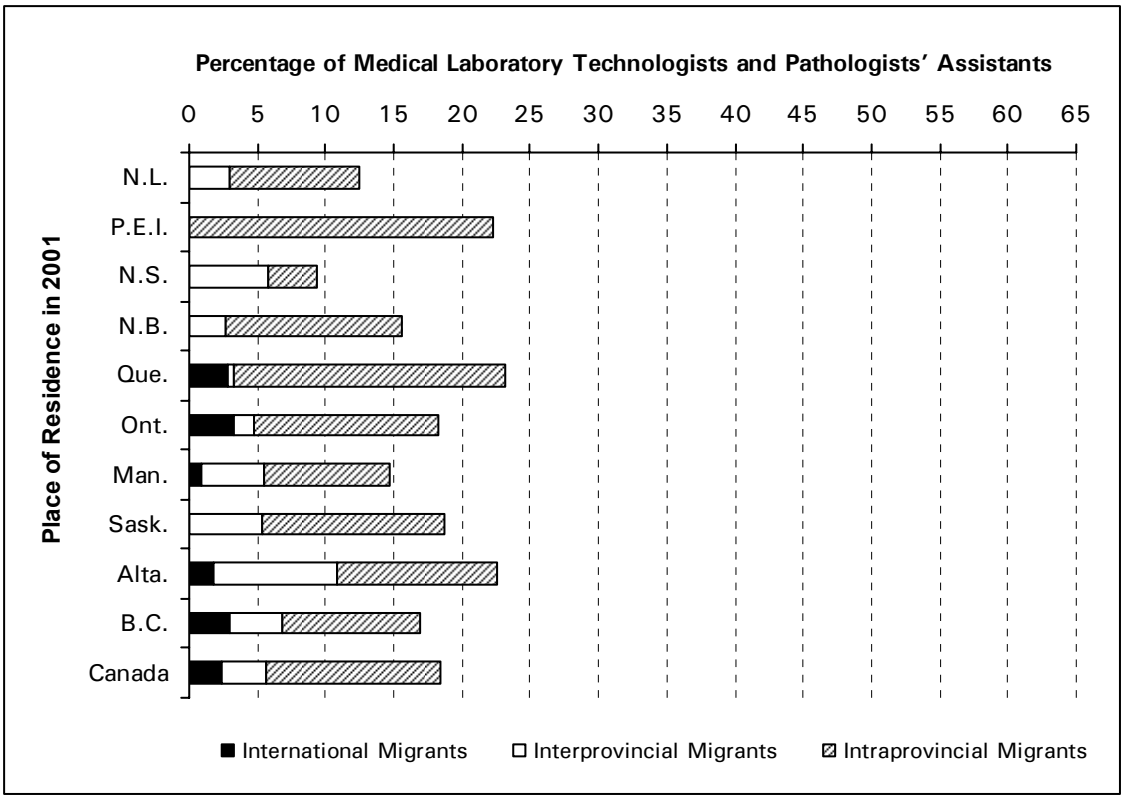
Figure 9. Percentage Migration Composition (Place of Residence Five Years Ago) for Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory and Canada, 1996



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

Source: Statistics Canada, Census of Population.

Figure 10. Percentage Migration Composition (Place of Residence Five Years Ago) for Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory and Canada, 2001



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

Source: Statistics Canada, Census of Population.

Interprovincial Migration

The migration composition section discussed above does not provide information on the specific origins and destinations of the internal migrant MLT/PAs. The next two sections of the report examine some of these movements in some detail for both interprovincial and intraprovincial flows. The latter focuses on overall urban–rural migration patterns.

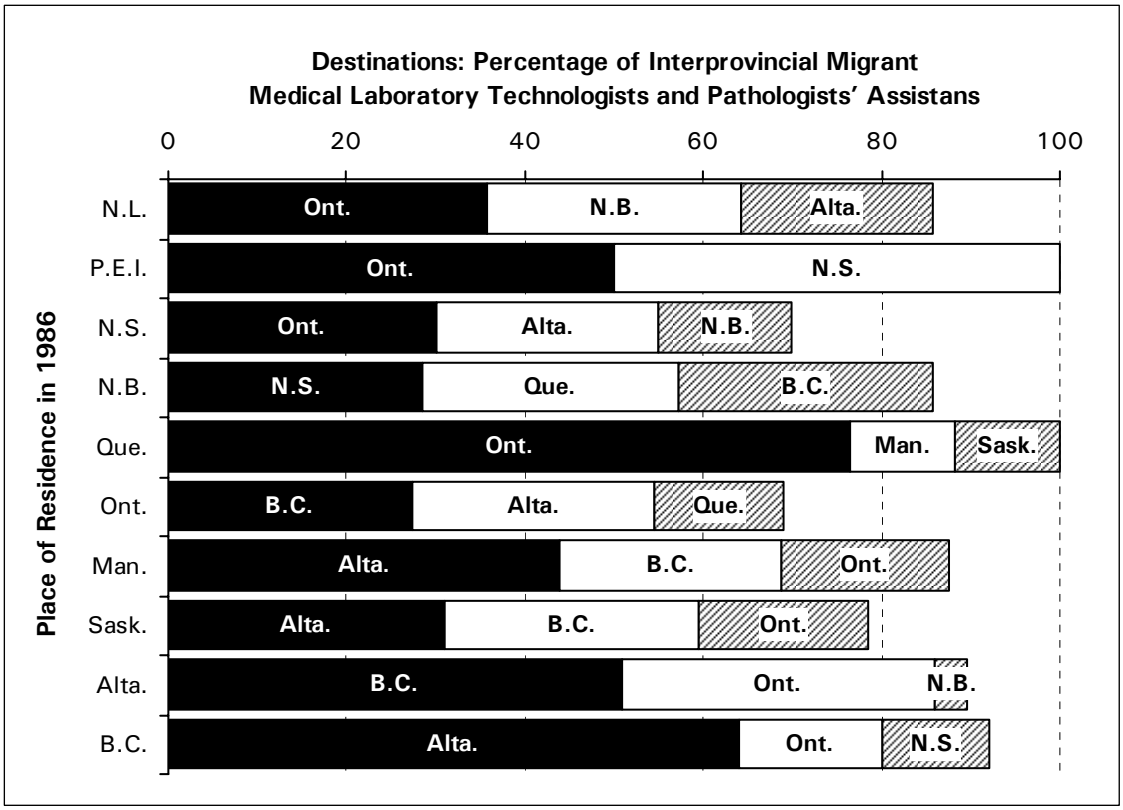
In terms of interprovincial migration flows, detailed origin and destination counts are provided for the MLT/PA workforce for 1991 (Appendix C, Table C7), 1996 (Appendix C, Table C8) and 2001 (Appendix C, Table C9). Here, the focus of the illustrations is on the principal destinations for 1991 and 2001. To provide some reference points for the interprovincial migration patterns of MLT/PAs, comparisons are made with the principal interprovincial migration destinations of the general population for both of those census years.

In 1991, members of the general population who had lived in an eastern province in 1986 generally headed to Ontario (Figure 12). Neighbouring provinces were usually the second most important destination choices. From Ontario westward, B.C. and Alberta were the first-choice destinations, particularly the former. Ontario was the next most important destination for people moving from western provinces.

The 1991, the first choice destinations for interprovincial MLT/PA migrants were somewhat similar to those of the general population. For example, in the 1986-to-1991 migration period, 46% of the migrants from the general population of Nova Scotia relocated to Ontario. In that same migration period, Ontario was also the first-choice destination of MLT/PA migrants from Nova Scotia, although the proportion was lower (30%).

When comparing Figure 11 and Figure 12, one must be cautious in concluding that there were differences in the order of the destination choices. For some provinces, the first, second and even third choices may have been of equal importance. For example, the 86% of the MLT/PAs who migrated from New Brunswick during the 1986 to 1991 migration period chose to relocate in equal proportions (29%) to Nova Scotia, Quebec and B.C.

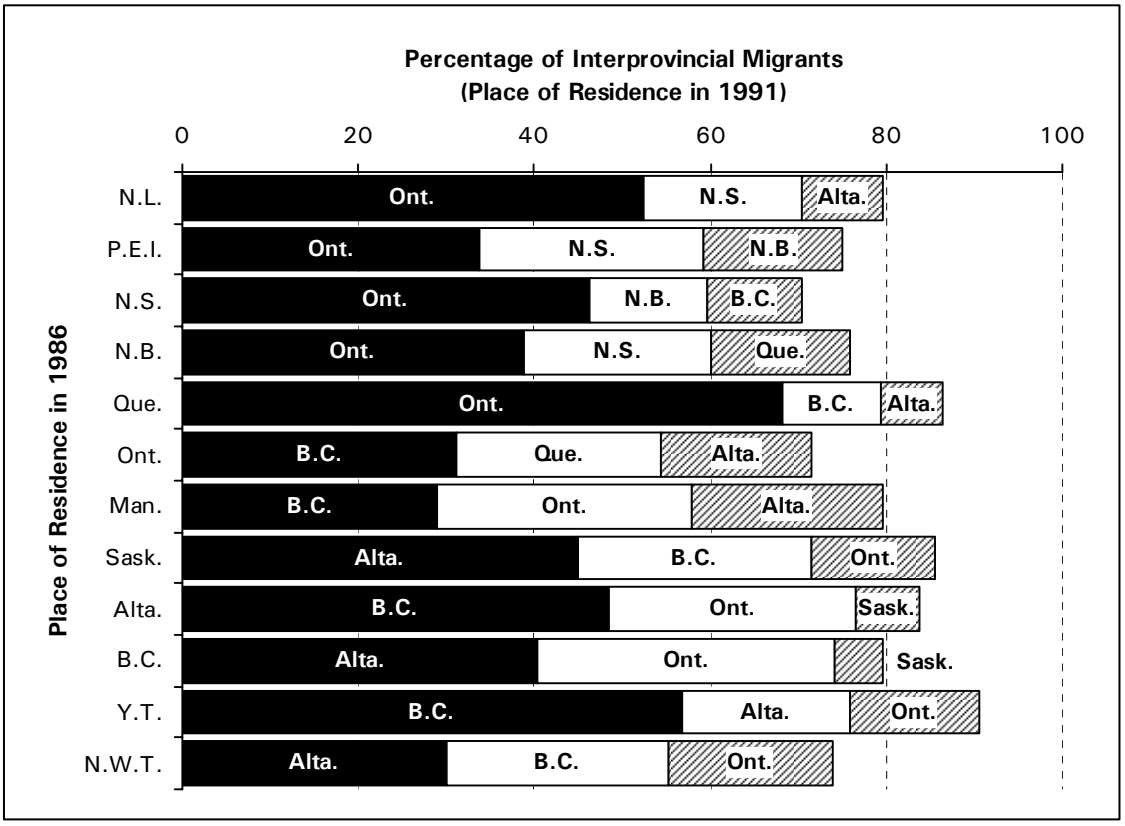
Figure 11. Principal 1986-to-1991 Migration Destinations as a Percentage of Interprovincial Migrant Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory of Residence



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

Source: Statistics Canada, Census of Population.

Figure 12. Principal 1986 to 1991 Migration Destinations as a Percentage of All Interprovincial Migrants of Canada by Province/Territory of Residence

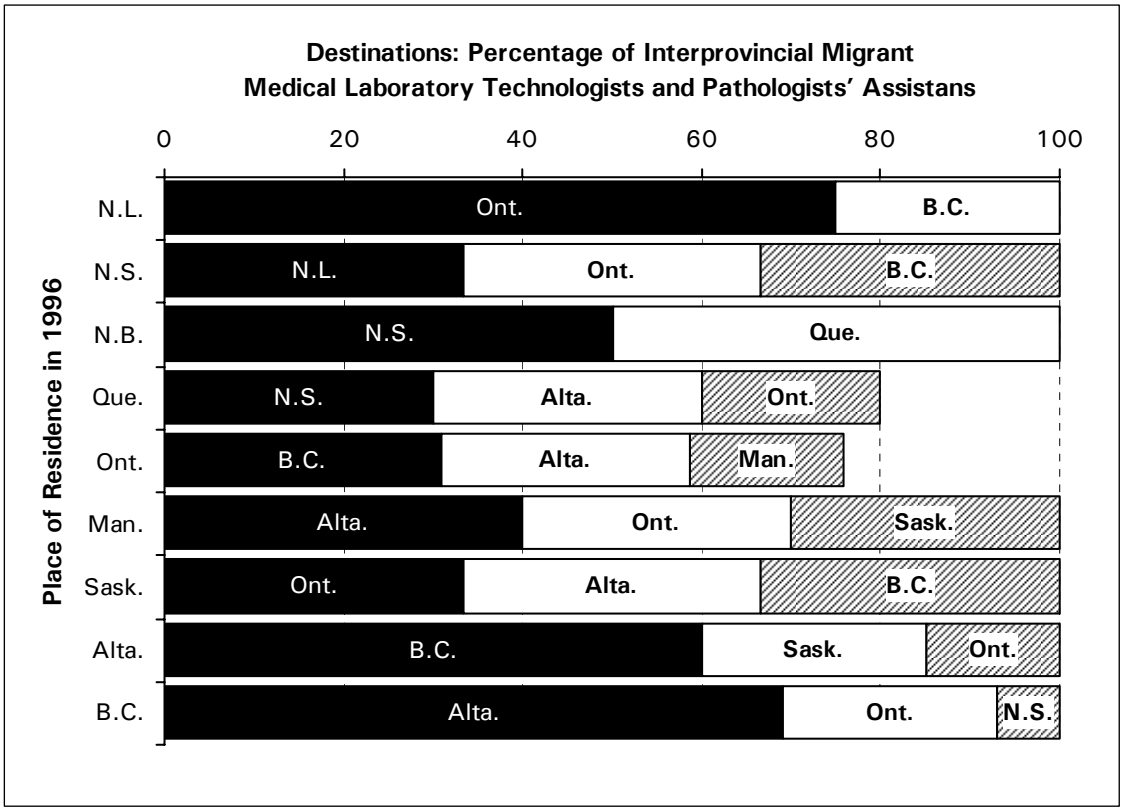


Source: Statistics Canada, Census of Population.

The principal destinations for interprovincial migrants in 2001 are illustrated in Figure 13 for MLT/PAs and in Figure 14 for the general population.

The cautionary note given above with respect to the order of destinations shown is particularly relevant when examining Figure 13. For example, the three principal destinations shown for MLT/PA migrants from Nova Scotia and Saskatchewan are all of equal importance. This is also the case for the first two principal destinations shown for migrants from New Brunswick and Quebec. The orders shown in Figure 13 could be altered by interchanging the principal destinations.

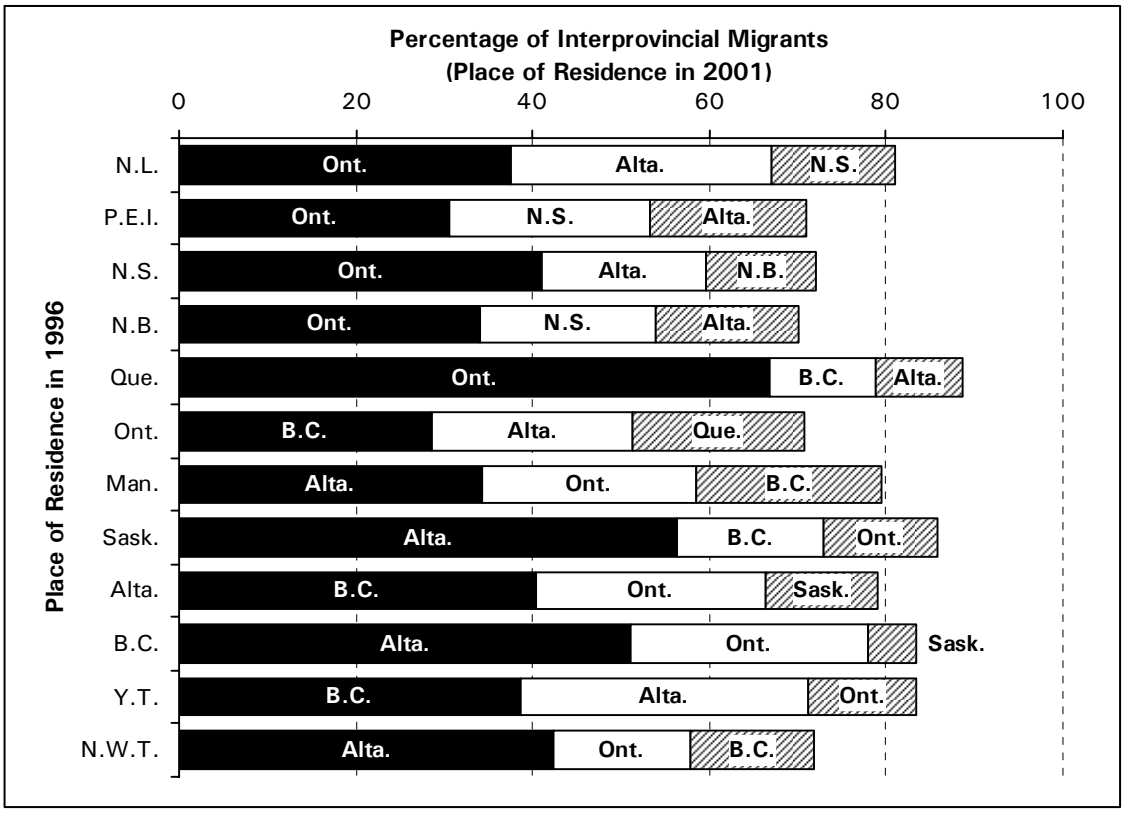
Figure 13. Principal 1996-to-2001 Migration Destinations as a Percentage of Interprovincial Migrant Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory of Residence



Note: Some provincial and territorial data have been suppressed due to small cell size.

Source: Statistics Canada, Census of Population.

Figure 14. Principal 1996-to-2001 Migration Destinations as a Percentage of All Interprovincial Migrants of Canada by Province/Territory of Residence



Source: Statistics Canada, Census of Population.

For interprovincial MLT/PA migrants, some of the key patterns regarding origin and destinations are noted below:

- The primary destination for the majority of interprovincial MLT/PA migrants is one of the large magnet provinces (Ontario, Alberta and B.C.).
- From these illustrations it is difficult to determine whether there was a shift in the principal destinations from 1991 to 2001.
- For most provinces, if a magnet province was not the second most important destination it was usually a neighbouring province that was.

Overall, most provinces have experienced a negative net-migration of MLT/PAs in either one or more years of this study. Only two provinces, Alberta and B.C., have had neutral or positive net-migration rates in both 1991 and 2001. This can be seen with the counts for the number of in-, out- and net-migrants[vi] by province and territory that are provided in Appendix C (Table C10). Figure 15 gives a summary of the net-migration rates for 1991 and 2001.

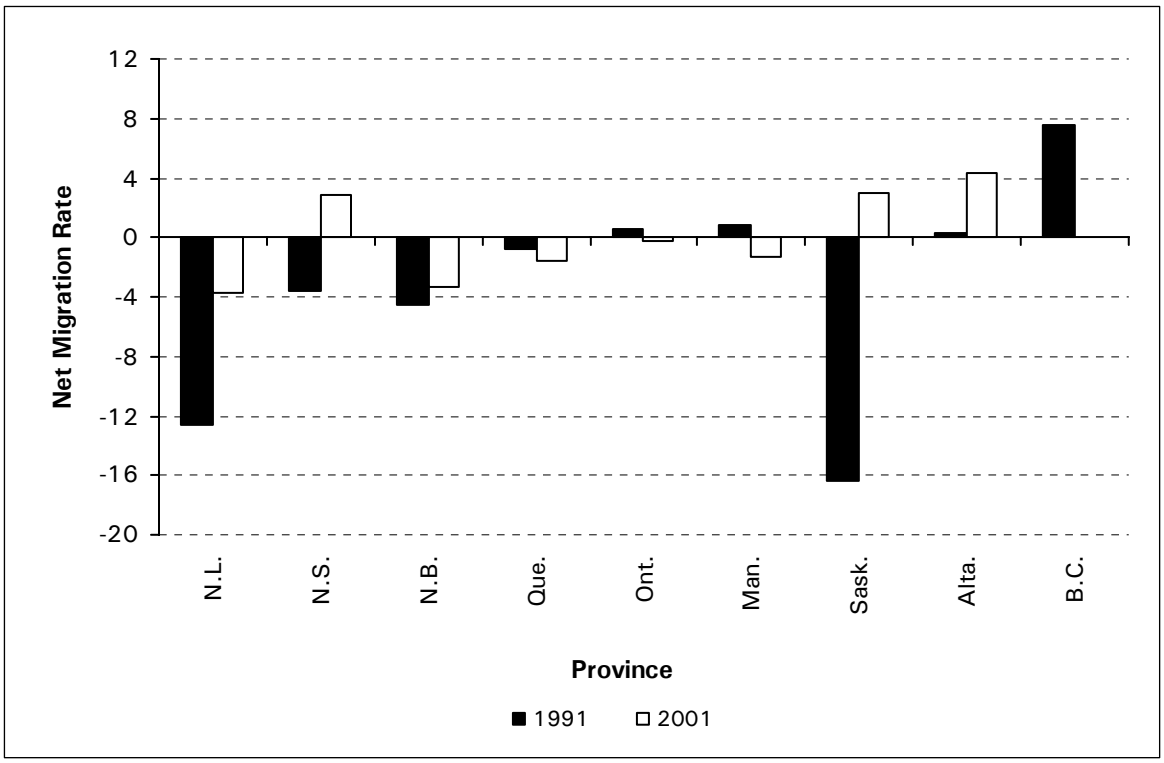
vi. See Appendix A for an explanation of "in-migrant," "out-migrant" and "net-migrant."

Overall losses (negative net-migration) in both 1991 and 2001 are highlighted for the provinces of Newfoundland and Labrador, New Brunswick and Quebec. When comparing rates from 1991 to 2001, the relative losses of MLT/PAs decreased for both Newfoundland and Labrador and New Brunswick but increased for Quebec.

Figure 15 shows four provinces that experienced negative net-migration rates in one year but not the other. For example, in Ontario there were net gains in the number of MLT/PAs in 1991 through interprovincial migration, but net losses in 2001. On the other hand, Saskatchewan experienced the reverse: net losses in 1991 and then net gains in 2001.

Overall gains (positive net-migration) or a balance between the numbers of in- and out-migrants in 1991 and 2001 were experienced only in Alberta and B.C. In 1991, B.C. experienced a positive net-migration rate of 8%, but in 2001 the numbers of in- and out-migrants equaled each other. Alberta was the province that gained in the numbers of MLT/PAs in both years; the rate was less than 1% in 1991 but increased to 4% in 2001. In 1991 and 1996, B.C. had the highest number of net migrants in the MLT/PA workforce. By 2001, Alberta had supplanted B.C. as the primary interprovincial destination (see Table C10 in Appendix C).

Figure 15. Net Interprovincial Migration Rates for Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory, 1991 and 2001



Note: Data from P.E.I and the territories have been suppressed due to small cell size.

Source: Statistics Canada, Census of Population.

Urban–Rural Migration[vii]

The overall five-year migration flows of MLT/PAs between urban and rural areas of Canada are summarized in Table 2 for the three migration periods included in this study. The flows described are for the total MLT/PA workforce. Similarities and differences in these urban–rural migration patterns for males and females can be seen in Appendix C (Table C11). Combined urban–rural and interprovincial–intraprovincial proportions of all internal migrant MLT/PAs are also provided in Appendix C (Table C12).

In 1991, fewer MLT/PAs in Canada moved from rural areas of the country (20%) than moved to (21%) rural and small-town Canada. This resulted in a negative rural net-migration rate of 1%. The flows changed in the 1991-to-1996 migration period, when rural areas of the country experiencied a positive net-migration rate of 5%. By 2001, the flows had again reversed and there was negative net-migration of 8% from rural and small-town Canada.

Naturally, the inverse of the rural patterns can be seen when examining the net-migration rates to urban areas of the country. Because of the total overall numbers of people in this occupational group in urban areas of the country, the urban migration rates are lower than the rural rates.

Table 2 also shows that there has been an overall decrease in the flow of MLT/PAs from or to rural and urban areas of the country. The actual counts of the numbers of MLT/PAs urban–rural migrants decreased from 1,215 movers in 1991 to 705 in 2001. This decrease in the overall numbers of migrants is also reflected in the overall in-, out- and net-migration counts of the interprovincial movements of MLT/PAs shown in Appendix C (Table C10).

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.

Table 2. Medical Laboratory Technologists and Pathologists' Assistants: Migration Between Larger Urban Centres (Urban) and Rural and Small-Town (Rural) Areas of Canada, 1991 to 2001

	1986–1991	1991–1996	1996–2001
	Number of Non-Movers and Internal Migrants		
Non-movers			
Rural	2,300	2,380	2,175
Urban	18,370	16,760	17,375
Internal migrants			
Rural to urban	625	245	455
Urban to rural	590	380	250
Total net migration to rural areas	-35	135	-205
	Internal Migration Rates (Percent)		
Rural			
In-migration rate	20	15	10
Out-migration rate	21	9	17
Net migration rate	-1	5	-8
Urban			
In-migration rate	3	1	3
Out-migration rate	3	2	1
Net migration rate	0	-1	1

Note:
Rural in-migration rate = (urban to rural) / (rural non-movers) + (rural to urban) * 100
Rural out-migration rate = (rural to urban) / (rural non-movers) + (rural to urban) * 100
Urban in-migration rate = (rural to urban) / (urban non-movers) + (urban to rural) * 100
Urban out-migration rate = (urban to rural) / (urban non-movers) + (urban to rural) * 100

Source: Statistics Canada, Census of Population.

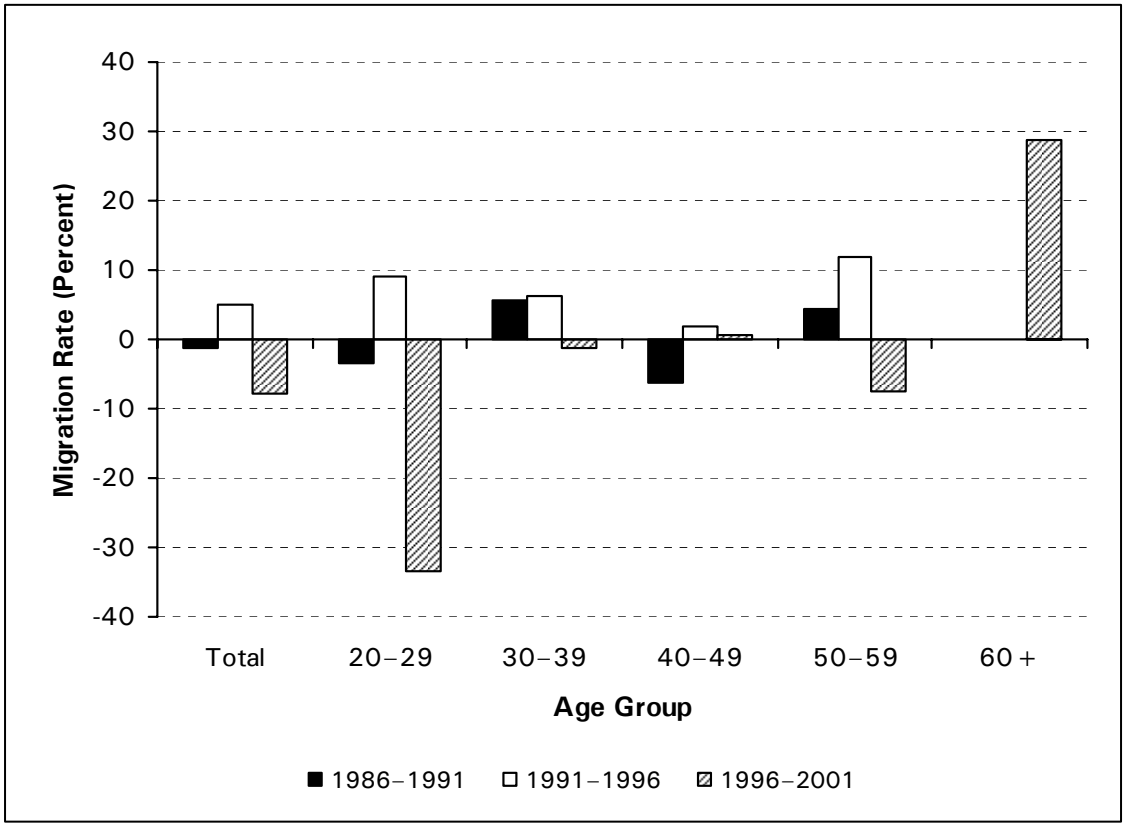
The associations between age groups and rural net-migration for MLT/PAs are described in Figure 16.[viii]

Across the decade, MLT/PAs who were 20 to 29 years of age generally moved from rural to urban areas. This is shown in Figure 16 by the negative net-migration rates for this age group. However, in common with the overall flows described earlier, the flows of MLT/PAs were reversed in 1996. Thus, this pattern is not identical to the rural out-migration of youth in the general Canadian workforce (see Appendix B) that was experienced in each of the migration periods being examined in this study.

viii. A similar graph of urban net-migration by these same age groups and years would appear as a mirror image of the rural patterns illustrated in Figure 16. The only differences would be in the magnitude of the urban net-migration rates, which tend to be smaller because of the dampening effect of larger numbers of urban movers and non-movers.

For the general workforce there was a positive rural net-migration for all of the other age groups. In general, this was the pattern as well for MLT/PAs. However, there were negative rural net-migration flows in 2001 for personnel in this occupation in the 30-to-39 year and 50-to-59 year age groups and for the 40-to-49 year age group in 1991.

Figure 16. Medical Laboratory Technologists and Pathologists' Assistants: Rural and Small Town Net-Migration by Age Group, Canada, 1991, 1996 and 2001



Source: Statistics Canada, Census of Population.

Summary Notes

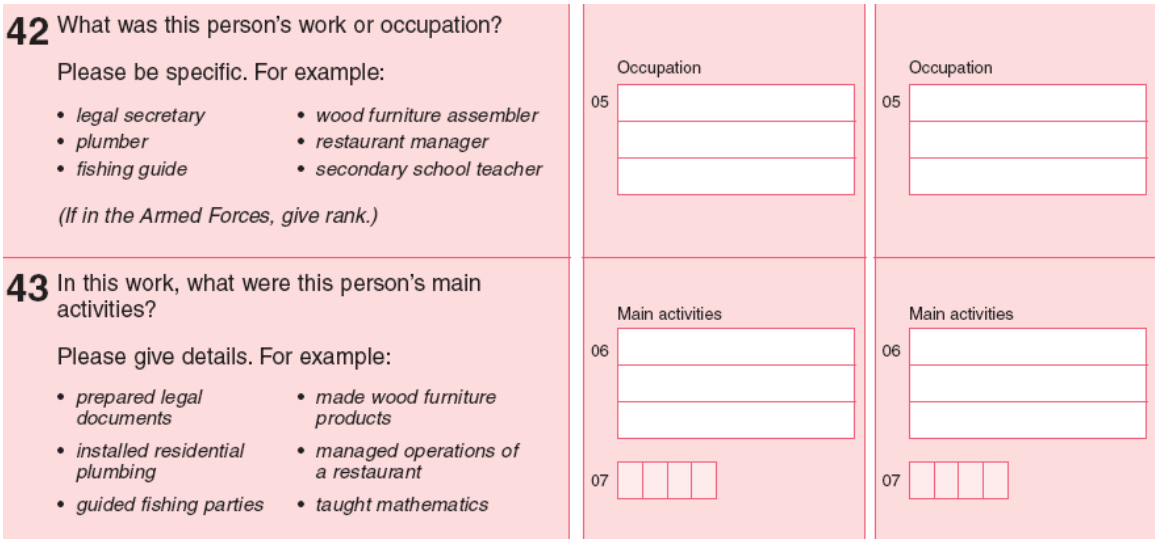
- The number of MLT/PAs decreased by 6% from 1991 to 2001.
- The proportion of female MLT/PAs changed little from 1991 (80%) to 2001 (81%).
- The average age of MLT/PAs increased from 37 years in 1991 to 42 years in 2001.
- The average age of MLT/PAs was three years lower than the general Canadian workforce (all non-health occupations 20 years of age and older) in 1991, but by 2001 this occupational group was one year older, on average.
- The number of MLT/PAs per 100,000 population decreased from 76 in 1991 to 65 in 2001.
- Several provinces (Newfoundland and Labrador, New Brunswick, Quebec and B.C.) did not follow the national trend, as they experienced increases in their numbers of MLT/PAs per 100,000 population from 1991 to 2001.
- The proportion of MLT/PAs located in rural areas of the country was unchanged from 1991 to 2001.
- The numbers of migrants making up the MLT/PA workforce decreased from 6,385 in 1991 to 3,595 in 2001.
- As a proportion of the overall MLT/PA workforce, interprovincial migrants decreased from 6% in 1991 to 3% in both 1996 and 2001.
- The proportions of the MLT/PAs who moved within their own province (intraprovincial migrants) decreased from 21% in 1991 to 13% in 2001.
- From 1991 to 2001, the primary destinations for interprovincial MLT/PA migrants were the magnet provinces of Ontario, Alberta and B.C.
- Of interprovincial movements of MLT/PAs, B.C. had the highest absolute net-migration in 1991 and 1996, but was supplanted by Alberta as the principal overall destination in 2001.
- Rural areas of the country experienced relative losses in the numbers of MLT/PAs in 1991 and 2001, but had positive net-migration in 1996.
- Rural and small-town Canada had net gains of migrating young (20 to 29 years of age) MLT/PAs in 1996, but experienced relative losses in both 1991 and 2001. With few exceptions, the positive urban-to-rural flows of older MLT/PAs were similar to those of the general population.

Appendix A—Methodological Notes

All of the data sets employed in this report were derived from the Census of Population. Custom tabulations were prepared by Statistics Canada using 1991, 1996 and 2001 census data. Aggregate counts were provided for selected geographical areas (see below) for the employed workforce and for selected health occupations. The variables for the data sets are described below.

Health Occupations

In each of the long-form questionnaires (completed by one in five households) for the censuses used in this study, there were questions seeking out the occupation of respondents 15 years of age and older in each household. For example, the relevant 2001 census questions are shown below:



Based on the information from these two questions, census coders grouped each respondent into one of the categories of the 2001 National Occupational Classification for Statistics.[49, 50] The 1991 and 1996 census questions were similar, but respondents in those years were grouped using the 1991 Standard Occupational Classification. For the present series of reports, the health occupations of interest were classified using codes and coding definitions[ix] identical to both the 1991 and 2001 classification systems.[51]

The target population for this study was selected from the broad occupational category referred to as "health occupations." The present analysis excludes the occupations in this broad category defined by Statistics Canada that are vague (for example, "other occupations in . . . ") and those dealing with animals (for example, veterinarians). The table below lists the health occupations that are the subject of these reports, groups the occupations as they were examined for this study and lists the four-character

ix. See page c131 of Statistics Canada, *National Occupational Classification for Statistics* (Ottawa: Ministry of Industry, 2001), catalogue no. 12-583-XPE for a comparison of the 2001 National Occupational Classification for Statistics and the 1991 Standard Occupational Classification.

code that is used to identify each of the occupations using the 2001 National Occupational Classification for Statistics/1991 Standard Occupational Classification. In the left-hand column of the table, an "X" identifies those health occupations examined in the *Distribution and Internal Migration* series. Tables and graphs for the remaining occupations may be obtained by visiting the CIHI website at www.cihi.ca.

	Code	Occupation Title
Nurses and Nursing Services		
X	D111	Head nurses and supervisors*
X	D112	Registered nurses*
X	D233	Licensed practical nurses
	D312	Nurse aides, orderlies and patient service associates
Technical Group		
X	D211	Medical laboratory technologists and pathologists' assistants
X	D212	Medical laboratory technicians
X	D214	Respiratory therapists, clinical perfusionists and cardio-pulmonary technologists
X	D215	Medical radiation technologists
X	D216	Medical sonographers
	D217	Cardiology technologists
	D218	Electroencephalographic and other diagnostic technologists
Rehabilitative Occupations		
X	D041	Audiologists and speech-language pathologists
X	D042	Physiotherapists
X	D043	Occupational therapists
Dental Group		
X	D013	Dentists
	D221	Denturists
X	D222	Dental hygienists and dental therapists
	D223	Dental technologists, technicians and laboratory bench workers
X	D311	Dental assistants
Other Occupations		
X	D031	Pharmacists
	D021	Optometrists
	D231	Opticians
	D022	Chiropractors
	D032	Dietitians and nutritionists
	D234	Ambulance attendants and other paramedical occupations
Physicians		
X	D011	Specialist physicians†
X	D012	General practitioners and family physicians†

* In this study, the numbers for these two nursing groups (head nurses and supervisors, plus registered nurses) have been added together and examined under the grouping registered nurses. This group also includes registered psychiatric nurses.

† In this study, the two physician groups (specialists and general practitioners/family physicians) are examined separately as well as being added together to examine the distribution and internal migration of all physicians.

The geographical distribution of each of these health occupations is illustrated using counts and ratios for provinces/territories and for the urban–rural categories that are illustrated below. The health-care-provider-to-population ratios are computed and reported as the number of health care providers per 10,000 or 100,000 population. The former rate (that is, per 10,000 population) is employed for health occupations whose overall totals are relatively small. Temporal comparisons of the counts and ratios are examined using three census years (1991, 1996 and 2001).

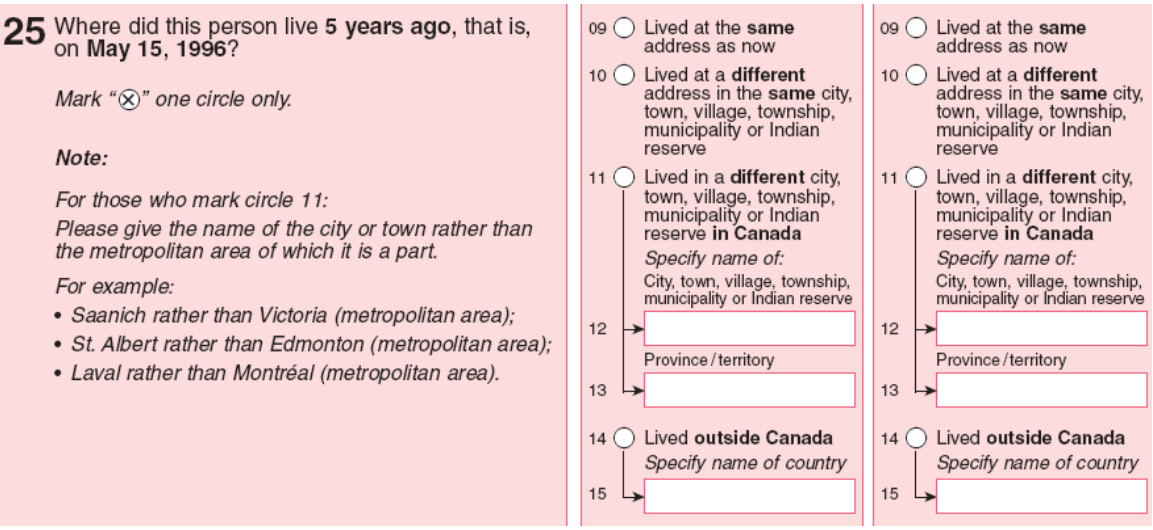
Using the language of Statistics Canada, the data sets employed for this part of the study are summarized below:

- Population 15 years and over, by sex (3), age group (7) and health occupation (30) for Canada, provinces and territories and census subdivisions; 20% sample data; 1991 Census.
- Population 15 years and over by sex (3), age group (7) and health occupation (30) for Canada, provinces and territories and census subdivisions; 20% sample data; 1996 Census.
- Population 15 years and over by sex (3), age group (7) and health occupation (30) for Canada, provinces and territories and census subdivisions; 20% sample data; 2001 Census.

The numbers in brackets for the data sets listed above identify the number of categories that were included in the data provided. These categories are described later in this appendix.

Mobility

In census years that this study is based on, the long-form questionnaires included a question that asked where all individuals 15 years of age and older in a household lived five years ago (see below).



25 Where did this person live **5 years ago**, that is, on **May 15, 1996**?

Mark "⊗" one circle only.

Note:

For those who mark circle 11:
Please give the name of the city or town rather than the metropolitan area of which it is a part.

For example:
- *Saanich rather than Victoria (metropolitan area);*
- *St. Albert rather than Edmonton (metropolitan area);*
- *Laval rather than Montréal (metropolitan area).*

09 ◯ Lived at the **same** address as now

10 ◯ Lived at a **different** address in the **same** city, town, village, township, municipality or Indian reserve

11 ◯ Lived in a **different** city, town, village, township, municipality or Indian reserve **in Canada**
Specify name of:
City, town, village, township, municipality or Indian reserve
12 →
Province / territory
13 →

14 ◯ Lived **outside Canada**
Specify name of country
15 →

09 ◯ Lived at the **same** address as now

10 ◯ Lived at a **different** address in the **same** city, town, village, township, municipality or Indian reserve

11 ◯ Lived in a **different** city, town, village, township, municipality or Indian reserve **in Canada**
Specify name of:
City, town, village, township, municipality or Indian reserve
12 →
Province / territory
13 →

14 ◯ Lived **outside Canada**
Specify name of country
15 →

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:
e) Non-migrant: lived at a **different address** within the **same community** five years ago;
f) Intraprovincial internal migrant: lived in a **different community** within the **same province/territory** five years ago;
g) Interprovincial internal migrant: lived in a **different province/territory** five years ago; and
h) International migrant: lived **outside of Canada** five years ago.

Note: Statistics Canada labels the last category (international migrant) as "external migrant." This category is primarily made up of people who were born and raised in another country before moving to Canada. However, it also includes Canadians who were living outside of the country for a time and have returned to Canada.

The counts for each of these mobility status categories were provided by Statistics Canada for each of the geographical units discussed below and for each health occupation. In addition, the aggregate counts were provided for the total of all other occupations, here referred to as "non-health occupations" or the "general Canadian workforce." For this study, these counts were used to identify the **migration composition** of each province and territory, each census division and Canada as a whole. For each of these geographical units, migrants are identified as a proportion of the total population of the relevant occupational group. Then the percentages of intraprovincial, interprovincial and external migrants are computed, both as a proportion of the total number of migrants and as a proportion of the relevant total population.

Again, using the language of Statistics Canada, the data sets employed for this part of the study are summarized below:

- Population 15 years and over by age group (7), health occupation (30) and place of residence five years ago (10) for Canada, provinces and territories and census subdivisions; 20% sample data; 1991 Census.
- Population 15 years and over by age group (7), health occupation (30) and place of residence five years ago (10) for Canada, provinces and territories and census subdivisions; 20% sample data; 1996 Census.
- Population 15 years and over by age group (7), health occupation (30) and place of residence five years ago (10) for Canada, provinces and territories and census subdivisions; 20% sample data; 2001 Census.

The migration composition data sets provided for this study do not indicate the source–destination links of the migrants. Separate data sets for **migration flow** analyses were provided that allowed for summary analyses of interprovincial as well as intraprovincial direction and rates of migration flows. These data sets are listed below (note: this group of data was provided separately for males, females and the total of males and females together):

- Population 15 years and over by age group (7), health occupation (30) and place of residence five years ago (252) for Canada, provinces and territories and census metropolitan areas and census agglomeration areas; 20% sample data; 1991 Census.
- Population 15 years and over by age group (7), health occupation (30) and place of residence five years ago (252) for Canada, provinces and territories and census metropolitan areas and census agglomeration areas; 20% sample data; 1996 Census.
- Population 15 years and over by age group (7), health occupation (30) and place of residence five years ago (252) for Canada, provinces and territories and census metropolitan areas and census agglomeration areas; 20% sample data; 2001 Census.

Due to the limitations of these data sets, migration flow analyses are limited to simple urban–rural categories by province or territory. Thus, two types of questions can be posed, with examples shown below.

- How many health care providers (by each health occupation) have moved from P.E.I. to Ontario?
- How many health care providers (by each health occupation) have moved from rural Nova Scotia to urban Alberta?

Cross-tabulations of the numbers of migrants from source areas to destination areas are illustrated for the total migrants of each health occupation. For each of these tabulations, often referred to as transition matrices, provincial/territorial and/or rural–urban sums are computed to determine the numbers and proportions for each area's in-, out- and net-migration. In addition, sex and age group similarities and differences are presented.

When summarizing in-, out- and net-migration, counts and rates are provided. Referring to the migrants and the total population of a selected health care provider group, the latter rates for any geographical region are computed as follows: [46]

- Out-migration rate equals the number of migrants who have moved out of the region divided by the total population in that region and expressed as a percentage.
- In-migration rate equals the number of migrants who have moved into the region divided by the total population in that region and expressed as a percentage.
- Net-migration rate is the difference between the in-migration rate and the out-migration rate and therefore can be either positive, negative or zero.

Demographic Characteristics

The following demographic characteristics are employed to compare and contrast the geographical distribution and internal migration of the health occupations:

- Sex: totals and male and female counts.
- Age group counts: under 20, 20 to 29, 30 to 39, 40 to 49, 50 to 59, 60 and up.

For the majority of the health occupations examined in this study, the under-20 age group was not relevant. Consequently, most of the tables and discussion in this report begin with the 20-to-29 age group.

Geographical Units of Analysis and Urban–Rural Designations

The data provided by Statistics Canada for this study were aggregated to each of the following Standard Geographical Classification (SGC) units[51]: province/territory, census division and census subdivision.

Note that:
Census subdivision (CSD) is "the general term for municipalities (as determined by provincial or territorial legislation) or their equivalents (for example, Indian reserves, Indian settlements and unorganized territories)."[52] In this report, CSDs are used only indirectly, allowing for the identification of urban and rural communities.

"Census Division (CD) is the general term applied to areas established by provincial law that are intermediate geographical areas between the municipality and the province/territory level. Census divisions represent counties, regional districts, regional municipalities and other types of provincially legislated areas. In Newfoundland and Labrador, Manitoba, Saskatchewan, Alberta, the Yukon, the Northwest Territories and Nunavut, provincial/territorial law does not provide for these administrative geographical areas. Therefore, Statistics Canada, in cooperation with these provinces and territories, has created census divisions for the dissemination of statistical data."[53]

Summary counts and percentages are provided in this report for provinces and territories. Occupation-to-population ratios were mapped, where feasible, for CDs. Given the very large numbers of CSDs (5,600 in 2001, for example), distribution and migration data from the CSDs have been aggregated by urban–rural categories based on the SGC system. Groupings of CSDs or individual CSDs with large population size and high density are categorized as urban. In the SGC system, these are referred to as "census metropolitan areas" (CMAs) and "census agglomerations" (CAs). The combination of CMAs and CAs identifies large urban centres (LUCs). All other CSDs are included as "rural and small–town Canada."

Large urban centre 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 areas include:

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

Limitations

Counts

It is very unlikely that the counts of the health occupations used in this study would perfectly match the counts from other databases, such as the CIHI-maintained databases: Scott's Medical Database for physicians, the Registered Nurses Database, the Licensed Practical Nurses Database or the Registered Psychiatric Nurses Database. Nor would the counts likely match the databases of many of the specific health occupation organizations or associations. Data for the census and all of the other databases are collected at different times of the year and, for the census, administered only once every five years. In addition, the occupation and mobility questions are included only on the long-form questionnaire, which is administered to only 20 percent of households. Furthermore, there are features of census data release that make it impossible to precisely match other databases. The most important of these features are rounding and area suppression.

Statistics Canada uses a random rounding method for the release of data. Based on established probabilities, "it involves rounding every figure in a table (including the totals) randomly up or down to the nearest multiple of 5, or in some cases, 10. For instance, random rounding of 12 to a multiple of 5 would yield either 10 or 15; applying the same operation to 10 would produce 10. This technique provides strong protection against direct, residual or negative disclosure, without adding significant error to the census data."[53] For the occupation data sets provided for this study, the smallest number in any of the cells (other than zero) was a 10. In all tables and graphs presented in this report, values of zero and 10 must be treated with caution. Precision of counts cannot be claimed. However, significant error is not introduced when, as in this study, a majority of the results are expressed as ratios or percentages of relatively large total numbers.

Area suppression occurs when Statistics Canada releases data tables, but it is unlikely that such suppression has had a major impact on the results reported here. The numbers may, however, differ from other health occupation databases if they report information for areas as small as, or smaller than, census subdivisions. Area suppression "involves removing all characteristic data for geographical areas with populations below a specified size."[53] Thus small census subdivisions may have been excluded. However, in this study, CSDs are used only to aggregate numbers by urban–rural categories. Again, a majority of the results reported for these geographical units are expressed as ratios or percentages.

Migration

The majority of migration studies, including this one, have a number of common limitations. Here, comparisons are made between where a person lives at two points in time: current residence and residence five years ago. During that five-year period, a person may have moved several times or moved and returned to the same location. These multiple moves and return migration are not captured with data from the census. Another difficulty specific to health care providers is the fact that location is equated with place of residence as opposed to place of work. In this study, some error could be introduced with, for example, people who live in rural areas but work in urban areas, or vice versa.

Random rounding has also had an impact on the migration component of this study. For both geographical areas and for occupations that have relatively small numbers, random rounding could result in misallocating health care providers. Thus, for migration composition and flow analyses, results are provided in this report only when the numbers are 15 or greater. This arbitrary number was chosen in an attempt to avoid as many errors as possible.

The migration analysis, but not the geographical distribution, components of this study may include individuals who were not in the labelled occupation five years ago. For example, a registered nurse (RN) in the 20-to-29 age category in 1991 might well have been a student in 1986. Thus, the migration flows in particular may include inflated numbers if one wanted to strictly compare where an RN in 1986 was later located as an RN in 1991. In spite of this limitation, the migration streams described in these reports do tell us of the movement of the overall supply (actual and potential) of the health care occupation in question.

Similarly, there is a possibility of under-counting at the other end of the age spectrum. Individuals who retired just before the census enumerations may not be included in the counts of an occupation category. However, such numbers would be very small, as the census questionnaire indicates that if a person did not work in the census week, that person was instructed to identify the job that he or she had worked at over the past year and a half, approximately.

Determinants of Migration

A further limitation of this study is the fact that only two variables, sex and age, are available that can be considered as determinants of migration. Even though these elements of a population influence migration "push" and "pull" factors[53] and are significant contributors to what is known as a "migrant personality,"[54] other elements are known to influence the decision to migrate.[8, 55, 56] Income is one of those, but even its influence is debatable. The following references identify some of the mixed messages that have been generated from research in Canada regarding the influence of income as a determinant of migration for nurses and physicians:

- "In the 1990s, better salaries were not cited as the major reason for migration."[41] But Baumann et al., in the same publication, go on to say that, "the above notwithstanding, salary remains an important motive for migration."[41]

- Using aggregate-level data to examine the interprovincial migration of Canadian physicians, "the results suggest that differences in real income have a positive and significant effect on a physician's decision to migrate from one province to another . . . income differences are, however, not the only factor influencing a physician's choice to move."[38]
- Using individual-level data to examine the interprovincial migration of Canadian physicians, "expected income in a province is a significant determinant of the choice of province of residence for physicians residing in Ontario and Saskatchewan . . . The effect, however, is not large in magnitude . . . Income in a province is not significant in other models or for physicians residing in other provinces besides Ontario and Saskatchewan."[57]

Although income data are not included in these analyses, age and sex variables that are included may be sufficient for this exploratory analysis. They, or associated variables, have been observed as having important influences on migration of health care providers in Canada. For example:

- "Movement is most prevalent among physicians with less than 10 years of experience."[58]
- "Compared to the middle age physicians (45–50 years old) younger ones are more likely to move while the older ones are less likely to move."[59]
- "Female rural RNs are more likely to migrate . . ." than male rural RNs, and "those who are older" are more likely to have migrated.[8]

Appendix B—A Brief Summary of Internal Migration in Canada

Internal migration—movement within a country from one region to another—is a concern for governments, business leaders, researchers and, ultimately, the general population. "Migration is the main mechanism through which regional and local populations adjust to changing economic and social circumstances."[60] As a result, this topic (as well as immigration) has been widely studied in Canada.[61, 62, 63, 64]

In a 2004 publication, *Mobility of Nurses in Canada*[41] the authors provided background for the internal migration of nurses by summarizing some of the more recent studies on the mobility of the general population of Canada. While this is a very good summary, the emphasis was only on interprovincial migration.[32, 65, 66, 67] Those studies were not designed to examine the equally important component of Canadian mobility and intraprovincial movement. Nor did they focus on urban–rural movement, about which it has been observed that, "Migration is a concern for Rural and Small–Town (RST) areas of Canada as rural development is essentially a demographic phenomenon."[34]

In addition, the focus of many of these analyses is the migration patterns of the general population. They do not always focus on particular occupations.

To provide a backdrop to the analyses of the internal migration patterns of health care providers in Canada, this appendix summarizes some of those patterns for the aggregated non-health occupations. As will be shown, Canadians make up "a nation on the move."[35]

Migration Composition

The magnitude of the mobility of Canadians in non-health occupations is shown in Table B1. Over 3 million people in this group lived in another location (excluding moves within the same community) five years prior to the respective census years shown. These counts include intraprovincial migrants, interprovincial migrants and external migrants (people who lived outside of Canada). The raw counts shown in that table reflect the observation that, overall, there were fewer migrants recorded in the 1996 Census compared with the 1991 Census; however, the gross numbers of migrants increased by 2001.

Table B1. Total Migrants in the General Canadian Workforce by Province/Territory and Canada, 1991, 1996 and 2001

Province	1991	1996	2001
N.L.	42,895	33,915	34,015
P.E.I.	14,515	12,420	12,620
N.S.	93,195	75,635	72,845
N.B.	66,545	59,070	64,875
Que.	867,610	733,945	819,625
Ont.	1,513,640	1,195,450	1,297,805
Man.	93,450	84,035	88,750
Sask.	96,750	94,640	95,390
Alta.	359,840	340,045	427,985
B.C.	590,170	607,550	511,655
Y.T.	6,465	6,060	4,300
N.W.T.	10,595	10,035	9,025
Canada	3,755,665	3,252,805	3,438,885

Notes:

Sums of the numbers for provinces/territories may not equal the sums for Canada due to Statistics Canada's random rounding.

Migrants include all intraprovincial, interprovincial and international migrants.

2001 Northwest Territories data include Nunavut.

Source: Statistics Canada, Census of Population 1991, 1996 and 2001.

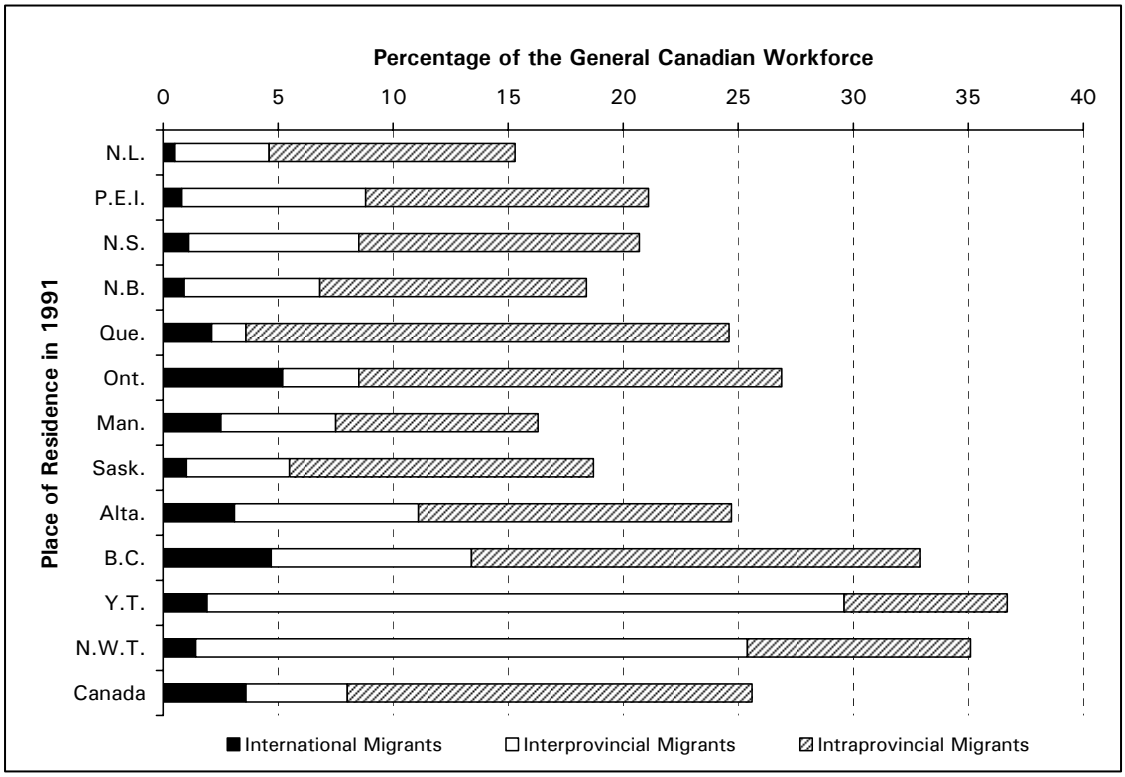
Even though the total number of migrants increased in 2001, it has been observed that the overall proportions of migrants decreased.[35] This is best shown in figures B1 to B3, which show the relative migration composition of people in non-health occupations for each province and territory and for Canada for the 1991 (Figure B1), 1996 (Figure B2) and 2001 (Figure B3) censuses. For each geographical unit shown, proportions of the total population of the non-health occupations have been computed and illustrated for the following: international migrants, interprovincial migrants and intraprovincial migrants.

Overall in Canada in 1991, 25% (3,755,665 people) of non-health workers lived in a different Canadian community or outside the country in 1986 compared to their place of residence in 1991. For the 1991 census year, 4% of the population of non-health workers had lived outside of Canada (international migrants) in 1986. Interprovincial migrants made up 4% of that population, and 18% moved from one community to another as intraprovincial migrants.

The overall proportions of migrants within Canada decreased to 22% and 21% in 1996 and 2001, respectively. During those time periods, there was no change in interprovincial proportions. Intraprovincial proportions decreased from 18% in 1991 to 14% in 2001. There was also a decrease in the proportions of international migrants from 1991 to 1996 (4% and 3%, respectively) and no change from 1996 to 2001.

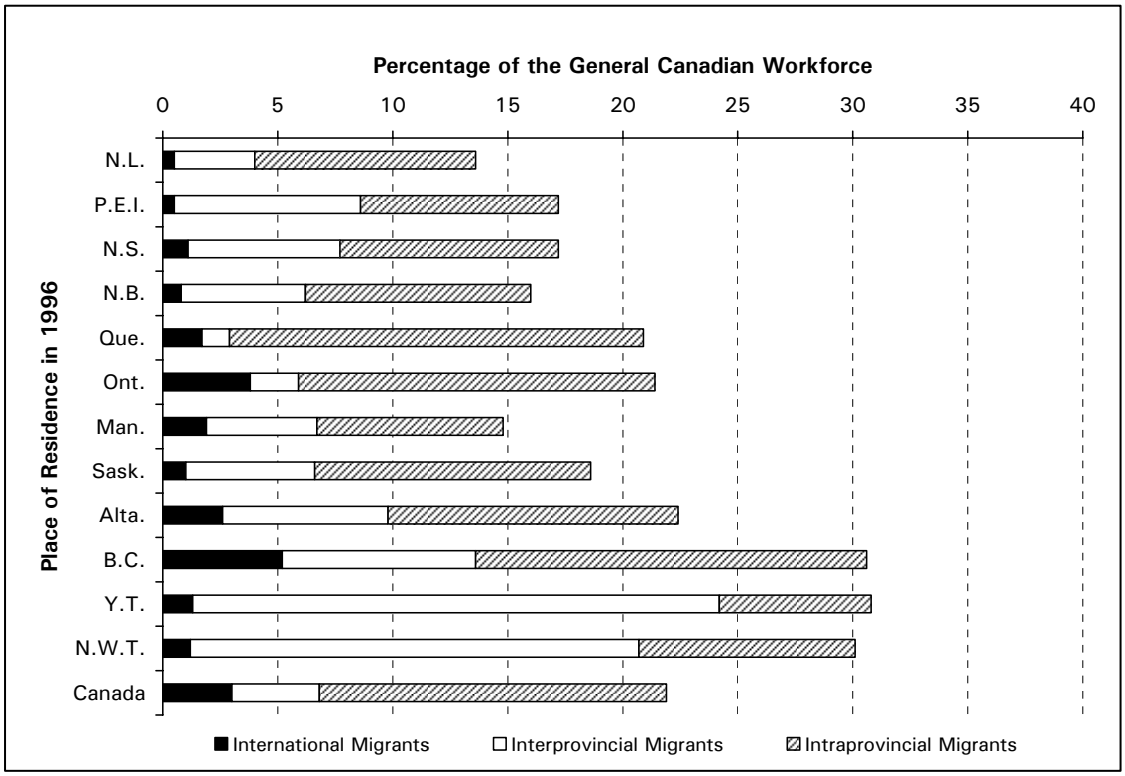
The provincial and territorial variations in the migration composition are illustrated in figures B1 to B3.

Figure B1. Percentage Migration Composition (Place of Residence Five Years Ago) for the General Canadian Workforce by Province/Territory and Canada, 1991



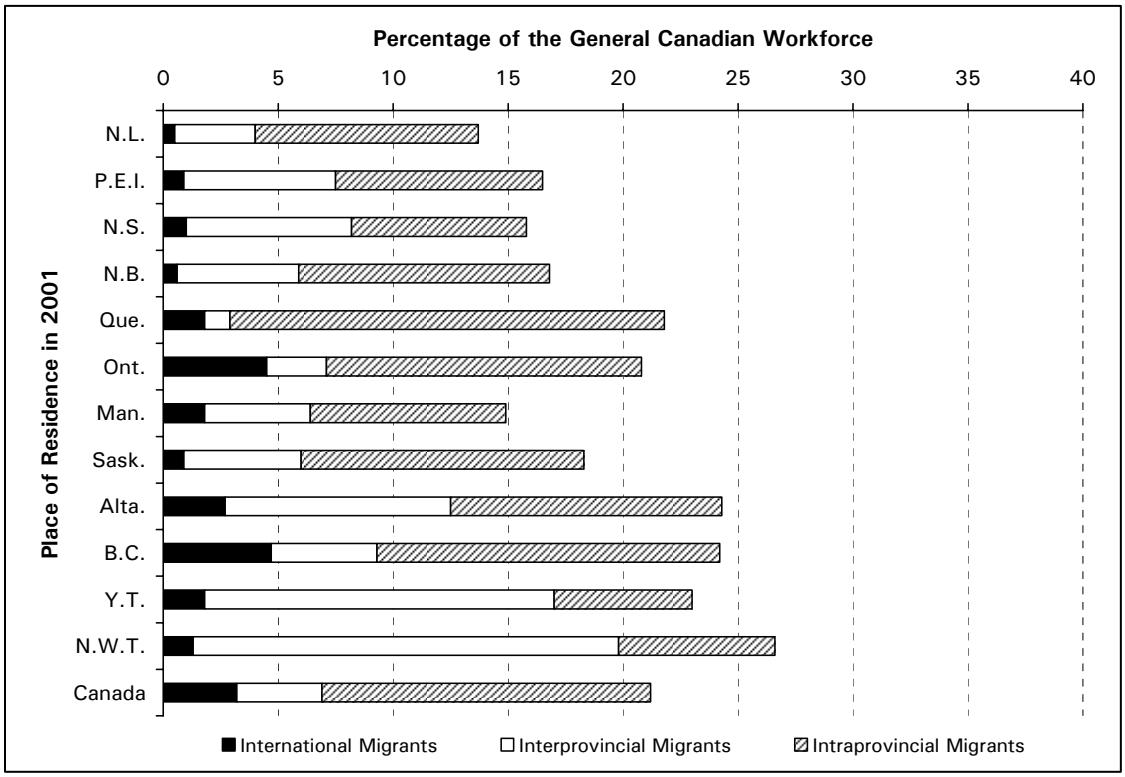
Source: Statistics Canada, Census of Population.

Figure B2. Percentage Migration Composition (Place of Residence Five Years Ago) for the General Canadian Workforce by Province/Territory and Canada, 1996



Source: Statistics Canada, Census of Population

Figure B3. Percentage Migration Composition (Place of Residence Five Years Ago) for the General Canadian Workforce by Province/Territory and Canada, 2001



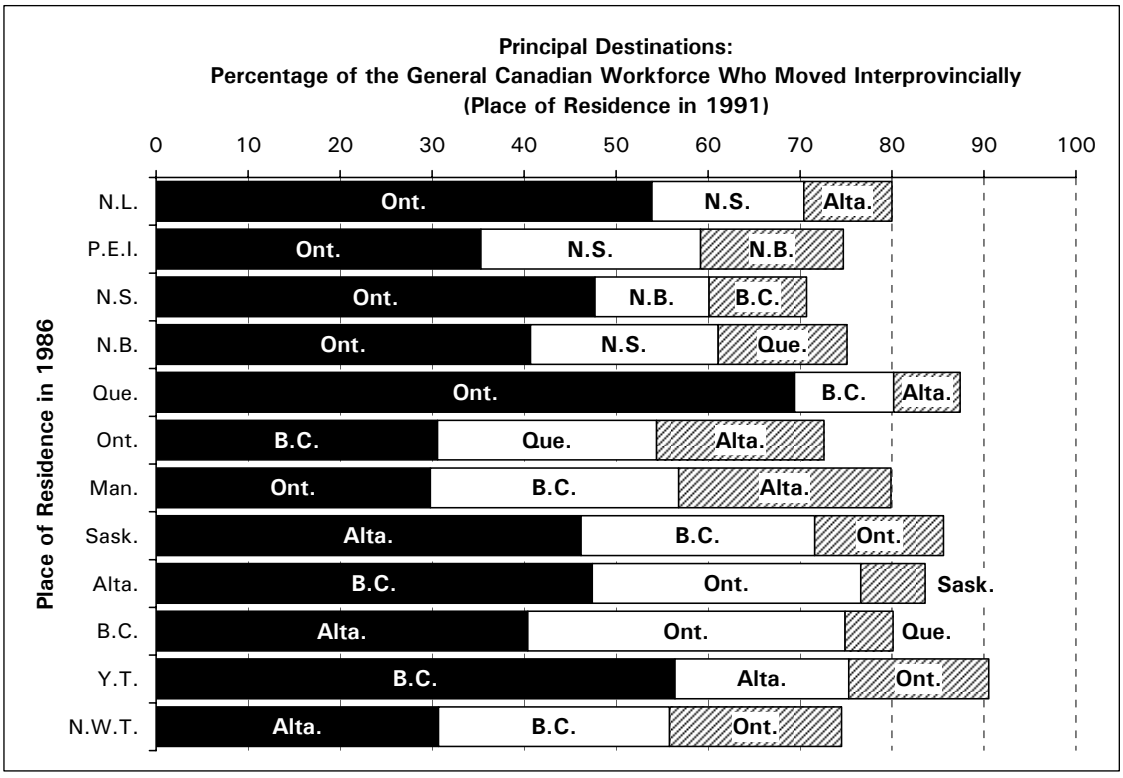
Source: Statistics Canada, Census of Population.

Interprovincial Migration

Figures B4 and B5 illustrate both the source and principal destination regions for the non-health occupations interprovincial migrants. The three most common provincial destinations for each province and territory are shown for the 1991 Census (Figure B4) and the 2001 Census (Figure B5). Raw counts for these interprovincial migrations, including all origin and destination provinces and territories, are shown in Table B2. The latter table also includes the origin-destinations of the interprovincial migrants enumerated in 1996.

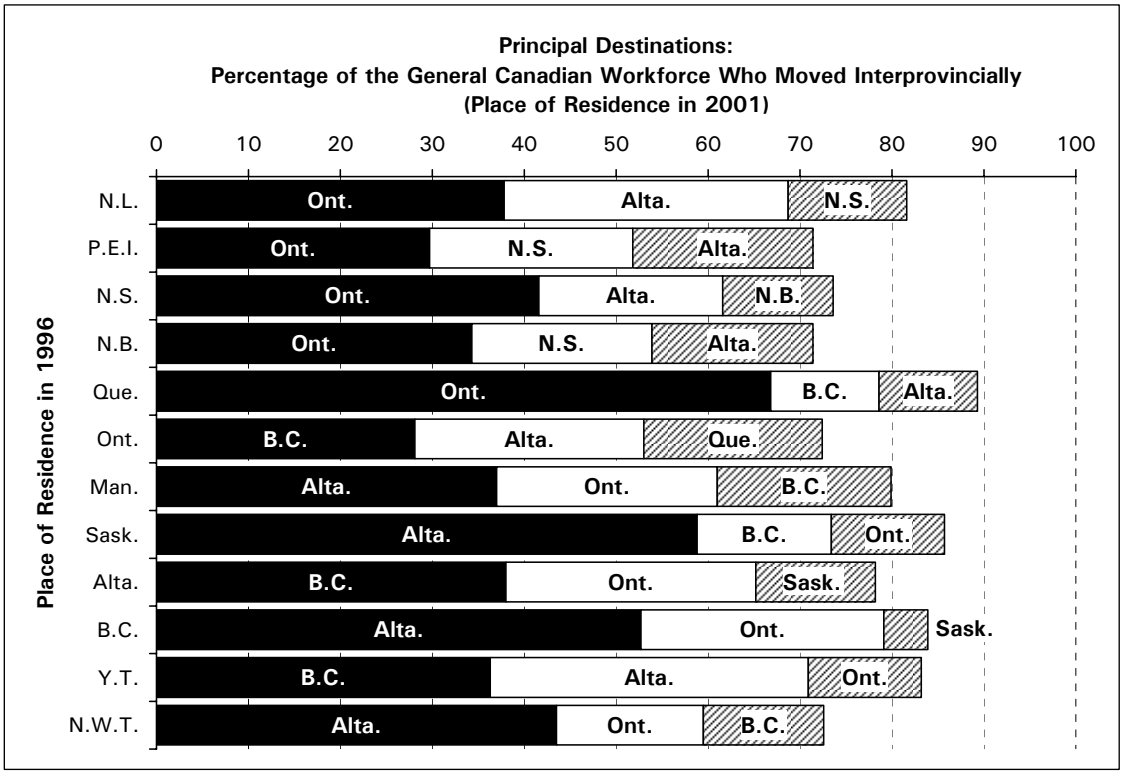
These illustrations support the general observation that interprovincial movement in Canada tends "to be toward provinces which have been nearby, large, or further west."[68] For example, people in non-health occupations who lived in eastern Canada in 1986 but moved to another province or territory by 1991 most often moved to Ontario. Their next most important destination was a province close by. For example, if migrant Nova Scotians did not choose to relocate to Ontario, they most likely migrated to New Brunswick. B.C. was the prime destination for migrants from Ontario, in both 1991 and 2001. And western Canadians primarily moved to adjacent provinces, although Ontario was an important secondary destination as well.

Figure B4. Principal Destinations: Percentage of the General Canadian Workforce Who Moved Interprovincially, 1991



Source: Statistics Canada, Census of Population.

Figure B5. Principal Destinations: Percentage of the General Canadian Workforce Who Moved Interprovincially, 2001



Source: Statistics Canada, Census of Population.

Although figures B4 and B5 give an indication of the primary destinations, Table B2 highlights the complex interaction between all provinces. Table B2 should be read along with Table B3, which provides provincial and territorial in-, out- and net-migration counts.

Tables B2 and B3 emphasize the observation that when comparing 1996-to-2001 internal migration with earlier interprovincial movement, "We're still heading west, but stopping at the Rockies."[35] As shown in Table B3, most provinces in 1991 had a negative net migration. That is, there were more out-migrants than in-migrants for the period 1986 to 1991. The highest positive net migration in that period was experienced by B.C. That high positive net migration was again recorded in the 1996 Census, but, by 2001, B.C. had experienced a negative net migration. Contrasting that pattern, Alberta saw the 1991 negative net migration replaced by positive net migration numbers in both 1996 and 2001. In 2001, Alberta had the highest provincial positive net migration.

Table B2. Interprovincial Migration Flows for All People in the General Canadian Workforce: Numbers of Five-Year Interprovincial Migrants by Province/Territory of Residence for Census Years 1991, 1996 and 2001

1986–1991 Migration Flows		Place of Residence in 1986											
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.
Place of Residence in 1991	N.L.	0	135	1,925	700	660	5,445	335	135	1,435	720	10	140
	P.E.I.	365	0	1,280	815	320	1,580	165	135	615	195	10	25
	N.S.	4,145	1,595	0	5,815	1,995	12,090	1,125	440	3,435	2,460	20	280
	N.B.	1,140	1,035	4,920	0	3,595	6,655	630	400	1,905	1,090	25	110
	Que.	535	435	2,520	3,980	0	34,720	2,555	1,130	4,295	3,920	80	205
	Ont.	13,525	2,355	18,920	11,590	49,090	0	15,265	9,265	37,455	25,825	590	1,320
	Man.	600	85	905	805	1,290	8,575	0	6,030	6,065	3,745	70	365
	Sask.	155	115	420	375	590	3,875	4,575	0	8,910	3,740	75	365
	Alta.	2,420	485	4,070	2,300	5,085	26,590	11,850	30,535	0	30,275	735	2,170
	B.C.	1,730	360	4,200	1,845	7,640	44,680	13,815	16,760	60,760	0	2,190	1,775
	Y.T.	140	25	125	55	105	580	295	310	1,030	1,920	0	305
	N.W.T.	335	55	385	170	395	1,065	620	890	2,265	970	80	0
1991–1996 Migration Flows		Place of Residence in 1991											
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.
Place of Residence in 1996	N.L.	0	125	1,705	535	385	4,330	150	160	690	475	10	190
	P.E.I.	600	0	1,360	940	300	1,690	100	50	505	300	0	35
	N.S.	4,050	1,185	0	4,600	2,100	10,935	800	440	2,355	2,315	10	240
	N.B.	1,580	755	4,705	0	2,900	6,540	565	215	1,425	1,070	25	120
	Que.	630	220	2,015	3,275	0	28,795	1,390	645	2,880	3,350	65	270
	Ont.	10,485	1,230	12,865	6,990	38,565	0	8,910	4,215	17,960	16,845	235	830
	Man.	565	145	820	680	1,310	9,355	0	4,515	5,760	3,625	95	215
	Sask.	160	75	490	300	720	4,815	4,285	0	12,045	5,060	190	405
	Alta.	4,865	575	4,585	2,950	4,880	26,915	10,780	22,020	0	29,110	765	1,865
	B.C.	4,005	605	6,820	2,795	12,490	61,005	11,955	10,825	52,755	0	2,030	1,360
	Y.T.	250	15	140	65	135	610	255	280	1,035	1,515	0	210
	N.W.T.	675	30	415	175	315	1,290	410	505	1,925	655	105	0
1996–2001 Migration Flows		Place of Residence in 1996											
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.
Place of Residence in 2001	N.L.	0	185	1,530	540	505	3,195	190	110	1,245	990	55	225
	P.E.I.	680	0	1,150	760	220	1,410	55	70	390	295	10	40
	N.S.	4,505	1,210	0	5,605	2,035	10,520	1,010	610	3,325	3,910	105	280
	N.B.	1,630	800	4,535	0	3,100	5,945	580	275	1,855	1,560	115	170
	Que.	615	130	1,985	4,095	0	23,905	1,265	640	2,855	5,355	90	225
	Ont.	13,220	1,630	15,735	9,820	50,920	0	9,600	5,620	21,595	31,540	565	1,145
	Man.	545	70	950	675	1,185	8,280	0	4,330	5,755	5,030	100	395
	Sask.	510	60	505	350	590	3,250	4,420	0	10,345	5,770	170	485
	Alta.	10,800	1,075	7,560	5,010	8,195	30,650	14,790	26,950	0	62,860	1,590	3,120
	B.C.	1,650	280	3,350	1,590	8,970	34,565	7,540	6,680	30,160	0	1,665	935
	Y.T.	90	0	85	25	145	445	75	190	430	1,220	0	145
	N.W.T.	715	40	440	165	380	1,055	395	325	1,335	805	125	0

Source: Statistics Canada, Census of Population.

Table B3. General Canadian Workforce: Number of Interprovincial Out-, In- and Net-Migrants by Province and Territory, 1991, 1996 and 2001

	Migration Summaries								
	1991			1996			2001		
	Out	In	Net	Out	In	Net	Out	In	Net
N.L.	25,090	11,640	-13,450	27,865	8,755	-19,110	34,960	8,770	-26,190
P.E.I.	6,680	5,505	-1,175	4,960	5,880	920	5,480	5,080	-400
N.S.	39,670	33,400	-6,270	35,920	29,030	-6,890	37,825	33,115	-4,710
N.B.	28,450	21,505	-6,945	23,305	19,900	-3,405	28,635	20,565	-8,070
Que.	70,765	54,375	-16,390	64,100	43,535	-20,565	76,245	41,160	-35,085
Ont.	145,855	185,200	39,345	156,280	119,130	-37,150	123,220	161,390	38,170
Man.	51,230	28,535	-22,695	39,600	27,085	-12,515	39,920	27,315	-12,605
Sask.	66,030	23,195	-42,835	43,870	28,545	-15,325	45,800	26,455	-19,345
Alta.	128,170	116,515	-11,655	99,335	109,310	9,975	79,290	172,600	93,310
B.C.	74,860	155,755	80,895	64,320	166,645	102,325	119,335	97,385	-21,950
Y.T.	3,885	4,890	1,005	3,530	4,510	980	4,590	2,850	-1,740
N.W.T.	7,060	7,230	170	5,740	6,500	760	7,165	5,780	-1,385

Source: Statistics Canada, Census of Population.

Intraprovincial and Urban–Rural Migration

The rural and small-town net migration rates for all individuals 15 years of age and over were reported as 0% from 1986 to 1991 and then 1% from 1991 to 1996.[34] The same authors reported that the net migration rates for larger urban centres for those same years remained unchanged. Significantly, there was virtually no net movement from 1986 to 1991, but rural areas of the country experienced a positive net migration. However, these rates were based on the migration movement that included people who were not in the labour force.

Using the same methodology as the study above, the rural–urban migration numbers and rates have been calculated for the aggregate of all Canadians working in non-health occupations (Table B4).

The movement of non-health workers differs from that of the overall population in that from 1986 to 1991, there was a negative net-migration rate (-1%) for rural areas and a positive net-migration rate for urban areas, as a whole. But 1991 to 1996 net-migration patterns were somewhat similar: positive for rural areas and negative for the larger urban centres. Although there were numerical differences of some significance between the net-migration rates for men and women, their patterns were similar for both rural and urban areas of the country. Table B4 also shows that there was a return for 1996 to 2001 to a negative net-migration rate for rural areas and a positive rate for urban regions. In both the 1986-to-1991 and the 1996-to-2001 periods for rural areas of the country, the negative net-migration rates for women were greater than the equivalent rates for men. Along the same lines, the positive net migration experienced in rural areas in 1991 to 1996 was higher for men than for women.

Table B4. General Canadian Workforce: Migration Between Larger Urban Centres and Rural and Small-Town Areas

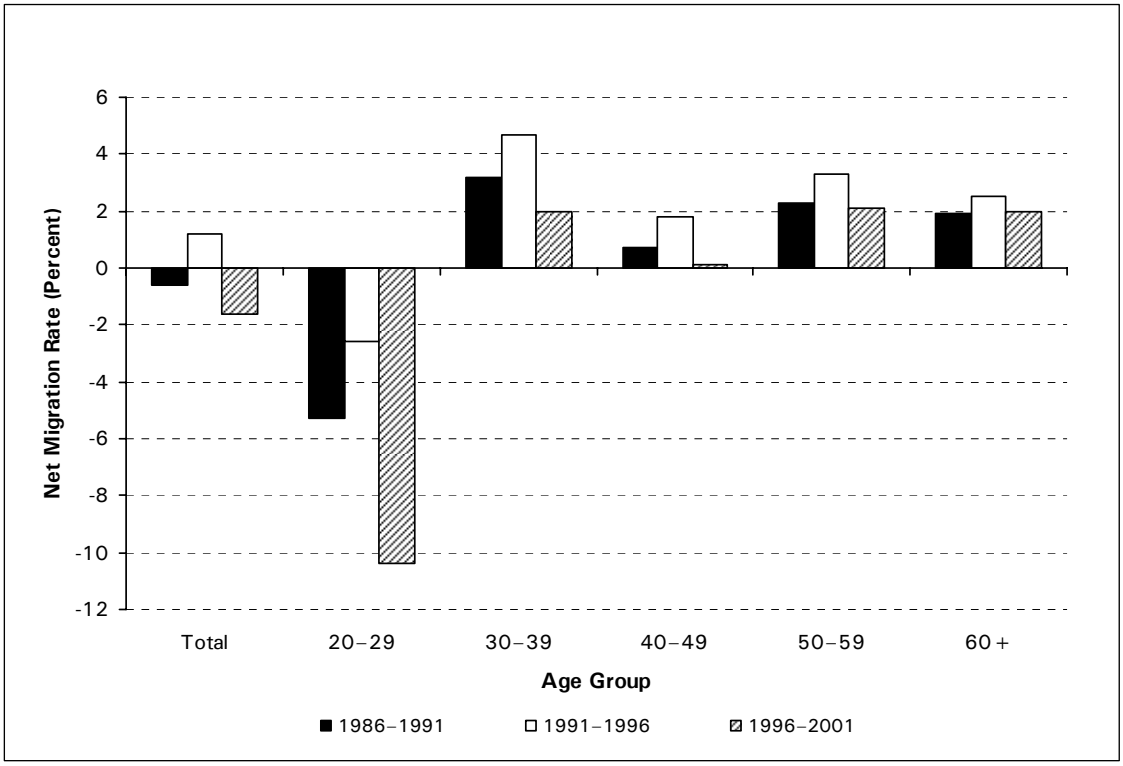
	1986–1991			1991–1996			1996–2001		
	Total	**Males**	**Females**	**Total**	**Males**	**Females**	**Total**	**Males**	**Females**
	Number of Non-Movers and Internal Migrants								
Non-movers									
Rural	3,131,960	1,822,910	1,309,050	3,160,255	1,817,850	1,342,405	3,191,250	1,797,295	1,393,960
Urban	11,575,680	6,365,655	5,210,025	11,682,065	6,367,405	5,314,655	13,010,475	6,987,445	6,023,030
Internal migrants									
Rural to urban	423,870	228,600	195,275	340,065	181,720	158,350	414,145	217,275	196,870
Urban to rural	402,075	223,645	178,425	382,005	209,850	172,155	355,075	192,825	162,255
Total net migration rate to rural	-21,795	-4,955	-16,850	41,940	28,130	13,805	-59,070	-24,450	-34,615
	Percentage of Migrants								
Rural									
In-migration rate	11	11	12	11	11	12	10	10	10
Out-migration rate	12	11	13	10	9	11	12	11	12
Net migration rate	-1	0	-1	1	1	1	-2	-1	-2
Urban									
In-migration rate	4	4	4	3	3	3	3	3	3
Out-migration rate	3	3	3	3	3	3	3	3	3
Net migration rate	0	0	0	0	0	0	0	0	1

Source: Statistics Canada, Census of Population.

The complexity of urban–rural migration flows is further illustrated upon examination of the net-migration rates for rural areas (Figure B6) by age groupings.[x] As illustrated, the overall net-migration rates for the 20-to-29 age group are higher than for any other age grouping. This age group shows a negative net-migration rate for all of the census years being examined. All other age groups have a positive net migration with respect to the rural areas of the country. However, especially for the 1986-to-1991 and 1996-to-2001 migration periods, the inflow of people in these older age groups is not sufficient to produce an overall positive net migration. Figure B6 illustrates the exodus of young people in non-health occupations from rural and small-town Canada.

x. A similar graph of urban net migration by these same age groups and years would appear as a mirror image of the rural patterns illustrated in Figure B6. The only differences would be in the magnitude of the urban net migration rates, which tend to be smaller because of the dampening effect of larger numbers of urban movers and non-movers.

Figure B6. General Canadian Workforce: Rural and Small-Town Net Migration by Age Group, Canada, 1991, 1996 and 2001



Source: Statistics Canada, Census of Population.

Additional details of the internal migration patterns of non-health workers are shown in Table B5. The table provides an overall summary of interprovincial and intraprovincial migration, as well as movement between rural and urban areas of the country. Three examples illustrate how that table could be read:

- For the 1986-to-1991 movement, 42% of internal migrants who lived in urban areas of Newfoundland and Labrador in 1986 made their way to urban areas outside of the province. This interprovincial urban-to-urban movement was recorded again in 1996 and 2001.
- The predominantly rural-to-urban movement of people in non-health occupations is illustrated by Alberta: for 1986 to 1991, 44% of workers in this group moved from rural to urban areas (within the same province). This proportion of rural-and-small-town-to-large-urban-centre intraprovincial movers decreased to 42% by 1996, but increased again to 48% in 2001.
- Not all movement from rural areas is to urban locations. In New Brunswick in the 1986-to-1991 period, other rural areas within the province were the recipients of rural New Brunswick workers (34% in 1991 and 33% in 1996). However, the rural-and-small-town-to-large-urban-centre movement became more dominant in New Brunswick by 2001.

Table B5. General Canadian Workforce: Summary of Urban–Rural Migration Flows (as a Percent of Total Migrants) by Province and Territory for 1991, 1996 and 2001 Census Years

Place of Residence—Five Years Ago	Place of Residence in 1991				Place of Residence in 1996				Place of Residence in 2001			
	Same Jurisdiction		Different Jurisdiction		Same Jurisdiction		Different Jurisdiction		Same Jurisdiction		Different Jurisdiction	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
N.L.												
Urban	38	14	42	6	30	16	45	9	28	11	54	8
Rural	27	29	37	7	23	23	42	12	23	20	48	10
P.E.I.												
Urban	40	10	42	8	30	18	42	10	31	17	43	9
Rural	32	34	26	8	36	32	23	9	35	32	28	5
N.S.												
Urban	43	13	38	6	35	15	42	8	20	17	54	9
Rural	32	30	30	8	35	28	28	9	37	26	28	8
N.B.												
Urban	41	15	39	6	40	19	34	7	38	17	39	6
Rural	30	34	27	9	31	33	27	9	34	32	28	7
Que.												
Urban	78	12	9	1	76	13	9	1	77	12	10	1
Rural	58	38	3	1	56	40	3	1	60	36	3	2
Ont.												
Urban	74	13	11	2	73	12	13	2	76	11	11	2
Rural	51	40	7	3	53	35	8	4	61	30	7	3
Man.												
Urban	15	21	57	8	17	24	51	8	20	22	51	8
Rural	37	32	20	10	39	36	15	10	40	35	18	8
Sask.												
Urban	26	14	51	9	29	20	43	9	30	20	43	8
Rural	39	28	22	11	38	34	18	10	40	31	19	10
Alta.												
Urban	38	16	39	8	41	19	32	8	48	19	27	6
Rural	44	35	14	7	42	39	12	7	48	36	10	6
B.C.												
Urban	72	10	15	3	71	13	13	3	63	9	23	4
Rural	53	30	12	5	49	33	11	7	48	26	19	8
Y.T.												
Urban	0	15	64	22	2	14	59	26	3	7	66	25
Rural	26	14	37	24	33	12	28	27	28	9	40	23
N.W.T.												
Urban	0	12	65	23	0	13	62	26	0	5	73	22
Rural	10	27	38	25	11	38	33	19	13	21	42	24

Source: Statistics Canada, Census of Population.

Appendix C—Medical Laboratory Technologist and Pathologists' Assistant Workforce—Supplementary Tables

Table C1. Percentage of Females in the Medical Laboratory Technologist and Pathologists' Assistant Workforce by Province/Territory and Canada, 1991, 1996 and 2001

	1991	1996	2001	Absolute Change From 1991 to 2001
N.L.	65	74	71	(+7)
P.E.I.	81	74	77	(-5)
N.S.	83	85	83	(+0)
N.B.	89	87	88	(-1)
Que.	73	76	77	(+4)
Ont.	78	78	80	(+2)
Man.	85	79	76	(-9)
Sask.	90	86	87	(-3)
Alta.	83	85	89	(+6)
B.C.	83	80	79	(-4)
Y.T.	100			
N.W.T.	100	100	100	(+0)
Canada	80	80	81	(+0)

Notes: 2001 Northwest Territories data include Nunavut. Yukon data have been suppressed due to small cell size.

Source: Statistics Canada, Census of Population.

Table C2. Estimated Average Age (Years) of Medical Laboratory Technologists and Pathologists' Assistants and the Differences From the General Workforce by Province/Territory and Canada, 1991, 1996 and 2001

	1991		1996		2001	
	Medical Laboratory Technologists and Pathologists' Assistants	Difference From the General Workforce	Medical Laboratory Technologists and Pathologists' Assistants	Difference From the General Workforce	Medical Laboratory Technologists and Pathologists' Assistants	Difference From the General Workforce
N.L.	36	(-2)	38	(-1)	41	(+0)
P.E.I.	38	(-2)	37	(-3)	40	(-1)
N.S.	36	(-2)	41	(+1)	43	(+2)
N.B.	34	(-5)	38	(-2)	42	(+1)
Que.	37	(-2)	39	(-2)	39	(-1)
Ont.	37	(-2)	40	(-0)	42	(+2)
Man.	37	(-3)	39	(-1)	42	(+1)
Sask.	37	(-4)	39	(-2)	42	(+0)
Alta.	36	(-3)	38	(-1)	41	(+0)
B.C.	38	(-2)	40	(-0)	43	(+2)
Y.T.	35	(-4)			35	(-7)
N.W.T.	31	(-6)	38	(+1)		
Canada	37	(-3)	39	(-1)	42	(+1)

Notes: 2001 Northwest Territories data include Nunavut.
Average ages for the general Canadian workforce were computed for persons 20 years of age and older.
Some data from the territories have been suppressed due to small cell sizes.

Source: Statistics Canada, Census of Population.

Table C3. Age Distribution (Percent) of Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory and Canada, 1991

	20–29	30–39	40–49	50–59	60+
N.L.	15	58	24	3	0
P.E.I.	9	50	41	0	0
N.S.	26	42	23	8	1
N.B.	39	34	25	0	2
Que.	24	38	29	8	2
Ont.	25	37	28	8	2
Man.	28	36	26	6	4
Sask.	23	43	22	8	4
Alta.	30	39	23	7	1
B.C.	24	36	31	8	2
Y.T.	33	33	33	0	0
N.W.T.	40	60	0	0	0
Canada	26	38	27	7	2

Source: Statistics Canada, Census of Population.

Table C4. Age Distribution (Percent) of Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory and Canada, 1996

	20–29	30–39	40–49	50–59	60+
N.L.	15	50	27	6	2
P.E.I.	11	58	32	0	0
N.S.	11	33	41	15	0
N.B.	18	44	26	10	2
Que.	25	31	28	14	3
Ont.	14	37	34	12	3
Man.	15	35	37	13	0
Sask.	13	41	34	11	1
Alta.	18	38	34	8	2
B.C.	18	31	34	14	3
Y.T.	0	0	0	0	0
N.W.T.	33	33	0	33	0
Canada	17	36	34	12	2

Source: Statistics Canada, Census of Population.

Table C5. Age Distribution (Percent) of Medical Laboratory Technologists and Pathologists' Assistants by Province/Territory and Canada, 2001

	20–29	30–39	40–49	50–59	60+
N.L.	12	29	43	15	0
P.E.I.	17	33	28	22	0
N.S.	9	25	46	18	3
N.B.	9	32	38	17	3
Que.	24	26	32	15	3
Ont.	11	28	36	22	3
Man.	17	26	29	24	4
Sask.	12	31	35	20	3
Alta.	17	28	34	18	2
B.C.	10	27	34	26	4
Y.T.	50	0	50	0	0
N.W.T.	0	0	0	0	0
Canada	14	28	35	21	3

Source: Statistics Canada, Census of Population.

Table C6. Number of Medical Laboratory Technologists and Pathologists' Assistants per 100,000 Population by Province/Territory and Canada, 1991, 1996 and 2001

	1991	1996	2001	Absolute Change From 1991 to 2001	Percentage Change From 1991 to 2001
N.L.	70	87	103	(+34)	(+49)
P.E.I.	85	71	67	(-18)	(-22)
N.S.	108	85	96	(-12)	(-11)
N.B.	75	81	81	(+6)	(+7)
Que.	31	28	35	(+4)	(+13)
Ont.	87	76	69	(-18)	(-21)
Man.	102	100	99	(-3)	(-3)
Sask.	111	85	86	(-25)	(-22)
Alta.	112	86	66	(-46)	(-41)
B.C.	83	75	83	(+0)	(+0)
Y.T.	108		70	(-38)	(-35)
N.W.T.	43	47	47	(+3)	(+8)
Canada	76	66	65	(-11)	(-14)

Notes: 2001 Northwest Territories data include Nunavut.

Source: Statistics Canada, Census of Population.

Table C7. Medical Laboratory Technologists and Pathologists' Assistants: Numbers of Interprovincial Migrants by Province/Territory of Residence, 1986 to 1991

		Place of Residence—1986											
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.
Place of Residence—1991	N.L.	0	0	10	0	0	10	0	0	0	0	0	0
	P.E.I.	10	0	0	0	0	10	0	10	0	0	0	0
	N.S.	0	10	0	20	0	20	0	0	0	15	0	0
	N.B.	20	0	15	0	0	0	0	0	10	0	0	0
	Que.	0	0	0	20	0	40	0	0	10	0	0	0
	Ont.	25	10	30	10	65	0	15	40	100	20	0	10
	Man.	0	0	10	0	10	35	0	25	10	0	0	0
	Sask.	0	0	0	0	10	0	10	0	10	0	0	0
	Alta.	15	0	25	0	0	75	35	65	0	80	0	0
	B.C.	0	0	10	20	0	75	20	60	145	0	0	0
	Y.T.	0	0	0	0	0	0	0	0	0	0	0	0
	N.W.T.	0	0	0	0	0	10	0	10	0	10	0	0

Source: Statistics Canada, Census of Population.

Table C8. Medical Laboratory Technologists and Pathologists' Assistants: Numbers of Interprovincial Migrants by Province/Territory of Residence, 1991 to 1996

		Place of Residence—1991											
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.
Place of Residence—1996	N.L.	0	0	0	0	0	0	0	0	0	10	0	0
	P.E.I.	0	0	10	0	0	0	0	0	0	0	0	0
	N.S.	0	0	0	0	0	0	0	0	0	0	0	0
	N.B.	0	0	10	0	0	15	0	0	10	0	0	0
	Que.	0	0	0	0	0	15	0	0	0	15	0	0
	Ont.	0	0	10	10	25	0	15	10	15	45	0	10
	Man.	0	0	0	0	0	10	0	10	10	0	0	0
	Sask.	0	0	0	0	0	10	10	0	25	0	0	0
	Alta.	0	0	0	0	10	55	15	15	0	15	0	0
	B.C.	10	0	0	10	20	25	10	15	105	0	0	0
	Y.T.	0	0	0	0	0	0	0	0	0	0	0	0
	N.W.T.	10	0	0	0	0	0	0	0	0	10	0	0

Source: Statistics Canada, Census of Population.

Table C9. Medical Laboratory Technologists and Pathologists' Assistants: Numbers of Interprovincial Migrants by Province/Territory of Residence, 1996 to 2001

		Place of Residence—1996											
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.
Place of Residence—2001	N.L.	0	0	10	0	0	10	0	0	0	0	0	0
	P.E.I.	0	0	0	0	0	0	0	0	0	0	0	0
	N.S.	0	10	0	10	15	10	0	0	0	10	0	0
	N.B.	0	0	0	0	0	0	0	0	0	0	0	0
	Que.	0	0	0	10	0	0	0	0	0	0	0	0
	Ont.	30	0	10	0	10	0	15	10	15	35	0	0
	Man.	0	0	0	0	0	25	0	0	0	0	0	10
	Sask.	0	0	0	0	0	15	15	0	25	0	0	0
	Alta.	0	0	0	0	15	40	20	10	0	100	0	0
	B.C.	10	0	10	0	10	45	0	10	60	0	0	0
	Y.T.	0	0	0	0	0	0	0	0	0	0	0	0
	N.W.T.	0	0	0	0	0	0	0	0	0	0	0	0

Notes: 2001 Northwest Territories data include Nunavut.

Source: Statistics Canada, Census of Population.

Table C10. Medical Laboratory Technologists and Pathologists' Assistants: Numbers of Out-, In- and Net-Migrants by Province/Territory, 1991, 1996 and 2001

		1991			1996			2001		
		Out-	In-	Net-	Out-	In-	Net-	Out-	In-	Net-
Province or Territory	N.L.	70	20	-50	20	10	-10	40	20	-20
	P.E.I.	20	30	10	0	10	10	10	0	-10
	N.S.	100	65	-35	30	0	-30	30	55	25
	N.B.	70	45	-25	20	35	15	20	0	-20
	Que.	85	70	-15	55	30	-25	50	10	-40
	Ont.	275	325	50	130	140	10	145	125	-20
	Man.	80	90	10	50	30	-20	50	35	-15
	Sask.	210	30	-180	50	45	-5	30	55	25
	Alta.	285	295	10	165	110	-55	100	185	85
	B.C.	125	330	205	95	195	100	145	145	0
	N.W.T.	10	30	20	10	20	10	10	0	-10

Notes: 2001 Northwest Territories data include Nunavut. Yukon data have been suppressed due to small cell size.

Source: Statistics Canada, Census of Population.

Table C11. Medical Laboratory Technologists and Pathologists' Assistants: Migration Between Urban Regions and Areas of Canada by Sex, 1991, 1996 and 2001

	1986–1991		1991–1996		1996–2001	
	Males	Females	Males	Females	Males	Females
	Number of Non-Movers and Internal Migrants					
Non-movers						
Rural	285	2,020	320	2,060	255	1,920
Urban	3,790	14,585	3,560	13,200	3,565	13,815
Internal migrants						
Rural to urban	100	525	35	205	90	365
Urban to rural	75	520	50	330	40	210
Total net migration to rural areas	-25	-5	15	125	-50	-155
	Migration Rates (Percent)					
Rural						
In-migration rate	20	20	14	15	12	9
Out-migration rate	26	21	10	9	26	16
Net-migration rate	-7	0	4	6	-15	-7
Urban						
In-migration rate	3	4	1	2	3	3
Out-migration rate	2	3	1	2	1	2
Net-migration rate	1	0	0	-1	1	1

Source: Statistics Canada, Census of Population.

Table C12. Medical Laboratory Technologists and Pathologists' Assistants: Summary of Urban–Rural and Intraprovincial–Interprovincial Migration Flows by Province/Territory, 1991, 1996 and 2001

Place of Residence—Five Years Ago	Place of Residence in 1991				Place of Residence in 1996				Place of Residence in 2001			
	Intraprovincial		Interprovincial		Intraprovincial		Interprovincial		Intraprovincial		Interprovincial	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
N.L.												
Urban	36	7	57	0	62	23	15	0	42	33	25	0
Rural	0	40	60	0	50	50	0	0	0	33	33	33
P.E.I.												
Urban	0	0	100	0	50	0	50	0	0	0	100	0
Rural	0	0	0	0	0	100	0	0	0	0	0	0
N.S.												
Urban	45	13	38	5	29	35	35	0	33	33	33	0
Rural	18	27	18	36	0	67	0	33	50	0	50	0
N.B.												
Urban	59	0	32	9	67	17	17	0	60	20	20	0
Rural	47	21	21	11	33	67	0	0	57	43	0	0
Que.												
Urban	81	2	15	2	85	5	10	0	88	4	8	0
Rural	71	29	0	0	62	23	15	0	100	0	0	0
Ont.												
Urban	79	10	9	2	82	9	9	0	82	6	9	3
Rural	67	16	12	4	36	45	7	13	69	20	11	0
Man.												
Urban	10	45	45	0	25	38	38	0	19	43	38	0
Rural	40	30	30	0	50	50	0	0	64	18	18	0
Sask.												
Urban	25	12	56	7	27	18	46	9	56	11	22	11
Rural	67	11	11	11	50	0	0	50	83	17	0	0
Alta.												
Urban	41	15	41	3	44	16	34	6	54	7	39	0
Rural	52	29	7	13	41	24	24	12	46	29	17	8
B.C.												
Urban	78	6	14	2	71	10	17	2	65	4	32	0
Rural	46	27	18	9	55	46	0	0	40	40	20	0

Source: Statistics Canada, Census of Population.

Appendix D—National Occupational Classification (NOC) Definitions[69, xi]

D011 Specialist Physicians

This unit group includes specialist physicians in clinical medicine, in laboratory medicine and in surgery. Specialists in clinical medicine diagnose and treat diseases and physiological or psychiatric disorders and act as consultants to other physicians. Specialists in laboratory medicine study the nature, cause and development of diseases in humans. Specialists in surgery perform and supervise surgical procedures. Specialists in clinical medicine usually work in private practice or in a hospital while those in laboratory medicine and in surgery usually work in hospitals. Residents in training to become specialist physicians are included in this unit group.

Exclusions

- Medical directors are classified in unit group A321—Managers in Health Care
- Family physicians and family doctors are classified in unit group D012—General Practitioners and Family Physicians
- Dental surgeons are classified in unit group D013—Dentists
- Chiropractors are classified in unit group D022—Chiropractors
- Osteopathic surgeons and naturopathic physicians are classified in unit group D023—Other Professional Occupations in Health Diagnosing and Treating
- Homeopathic practitioners are classified in unit group D232—Midwives and Practitioners of Natural Healing

D012 General Practitioners and Family Physicians

General practitioners and family physicians diagnose and treat the diseases, physiological disorders and injuries of patients. They provide primary contact and continuous care toward the management of patients' health. They usually work in private practice, including group or team practices, hospitals and clinics. Residents in training to be general practitioners and family physicians are included in this unit group.

Exclusions

- Chiropractors are classified in unit group D022—Chiropractors
- Other professional occupations in health diagnosing and treating such as podiatrists, chiropodists, naturopathic and osteopathic physicians are classified in unit group D023—Other Professional Occupations in Health Diagnosing and Treating
- Medical doctors specializing in a particular field of medicine are classified in unit group D011—Specialist Physicians
- Occupations in medicine and health such as acupuncturists, homeopathic practitioners, herbalists and rolfers are classified in unit group D232—Midwives and Practitioners of Natural Healing

xi. The text contained in Appendix D is used with permission from Statistics Canada.

D013 Dentists

Dentists diagnose, treat, prevent and control disorders of the teeth and mouth. They work in private practice or may be employed in hospitals, clinics, public health facilities or universities.

Exclusions

- Denturists are classified in unit group D221—Denturists
- Dental hygienists and dental therapists are classified in unit group D222—Dental Hygienists and Dental Therapists
- Dental technicians are classified in unit group D223—Dental Technologists, Technicians and Laboratory Bench Workers
- Dental assistants are classified in unit group D311—Dental Assistants

D021 Optometrists

Optometrists examine eyes, prescribe and fit eyeglasses and contact lenses and recommend treatments such as exercises to correct vision problems or ocular disorders. They work in private practice, clinics and community health centres.

Exclusions

- Ophthalmologists are classified in unit group D011—Specialist Physicians
- Ophthalmic dispensers and opticians are classified in unit group D231—Opticians
- Orthoptist and ophthalmological technicians are classified in unit group D235—Other Technical Occupations in Therapy and Assessment

D022 Chiropractors

Chiropractors diagnose and treat patients' neuromuscular-skeletal disorders of the spine and other body joints by adjusting the spinal column or through other corrective manipulation. Chiropractors are usually in private practice or in clinics with other health practitioners.

D023 Other Professional Occupations in Health Diagnosing and Treating

This unit group includes health professionals who diagnose and treat the diseases and injuries of patients and who are not elsewhere classified. This includes doctors of podiatric medicine, chiropodists and podiatrists, naturopaths, orthoptists and osteopaths. They work in private practices, clinics and hospitals.

Exclusions

- Instructors working in educational institutions are classified in an appropriate unit group of major group E1—Teachers and Professors
- Non-professional diagnosing and treating occupations such as acupuncturists, herbalists, rolfers, or shiatsu therapists are classified in unit group D232—Midwives and Practitioners of Natural Healing

D031 Pharmacists

Community pharmacists and hospital pharmacists compound and dispense prescribed pharmaceuticals and provide consultative services to both clients and health care providers. They are employed in community and hospital pharmacies, or they may be self-employed. Industrial pharmacists participate in the research, development, promotion and manufacture of pharmaceutical products. They are employed in pharmaceutical companies and government departments and agencies.

Exclusions

- Managers of a pharmacy or pharmacy department in a retail outlet are classified in unit group A211—Retail Trade Managers
- Pharmacological chemists are classified in unit group C012—Chemists
- Pharmacologists and toxicologists are classified in unit group C021—Biologists and Related Scientists
- Clinical pharmacologists are classified in unit group D011—Specialist Physicians
- Pharmacy assistants are classified in unit group D313—Other Assisting Occupations in Support of Health Services

D032 Dietitians and Nutritionists

Dietitians and nutritionists plan, organize, conduct and supervise programs in nutrition, diet and food service. They are employed in a variety of settings including hospitals, extended-care facilities, public health centres, the food and beverage industry, educational institutions, sports organizations and government, or they may be self-employed.

Exclusions

- Dietary aides and assistants are classified in unit group G961—Food Counter Attendants, Kitchen Helpers and Related Occupations
- Dietary technicians are classified in unit group D219—Other Medical Technologists and Technicians (Except Dental Health)
- Food service supervisors are classified in unit group G012—Food Service Supervisors

D041 Audiologists and Speech-Language Pathologists

Audiologists and speech-language pathologists diagnose, evaluate and treat human communication disorders including hearing, speech, language and voice disorders. Audiologists and speech-language pathologists are employed in hospitals, community and public health centres, extended care facilities, day clinics, rehabilitation centres and educational institutions, or may work in private practice.

Exclusions

- Technicians and other assistants to audiologists and speech-language pathologists are classified in unit group D235—Other Technical Occupations in Therapy and Assessment

D042 Physiotherapists

Physiotherapists assess patients and plan and carry out individually designed treatment programs to maintain, improve or restore physical functioning, alleviate pain and prevent physical dysfunctioning in patients. Physiotherapists are employed in hospitals, clinics, industry, sports organizations, rehabilitation centres and extended care facilities, or they may work in private practice.

Exclusions

- Technicians giving technical assistance to physiotherapists are classified in unit group D235—Other Technical Occupations in Therapy and Assessment

D043 Occupational Therapists

Occupational therapists develop individual and group programs with people affected by illness, injury, developmental disorders, emotional or psychological problems and ageing to maintain, restore or increase their ability to care for themselves and to engage in work, school or leisure. They also develop and implement health promotion programs with individuals, community groups and employers. They are employed in health care facilities, schools, and by private and social services agencies, or they may be self-employed.

D044 Other Professional Occupations in Therapy and Assessment

This unit group includes specialized therapists not elsewhere classified who use techniques such as art, athletic, dance, music or recreational therapy or remedial gymnastics to aid in the treatment of mental and physical disabilities. They are employed by establishments such as hospitals, rehabilitation centres, clinics, recreational centres, nursing homes, educational institutions, prisons and day-care facilities or may work in private practice.

D111 Head Nurses and Supervisors

Head nurses and supervisors supervise and co-ordinate the activities of registered nurses, licensed practical nurses and other nursing personnel in the provision of patient care. They are employed in health care institutions such as hospitals, clinics and nursing homes and in nursing agencies.

Exclusions

- Directors of nursing are classified in unit group A321—Managers in Health Care
- Charge nurses are classified in unit group D112—Registered Nurses

D112 Registered Nurses

This unit group includes registered nurses, registered psychiatric nurses and graduates of a nursing program who are awaiting registration (graduate nurses). They provide direct nursing care to patients, deliver health education programs and provide consultative services regarding issues relevant to the practice of nursing. They are employed in a variety of settings including hospitals, nursing homes, extended-care facilities, rehabilitation centres, doctors' offices, clinics, community agencies, companies and private homes, or they may be self-employed.

Exclusions

- Head nurses and nurse supervisors are classified in unit group D111—Head Nurses and Supervisors
- Licensed practical nurses and registered nursing assistants are classified in unit group D233—Licensed Practical Nurses

D211 Medical Laboratory Technologists and Pathologists' Assistants

Medical laboratory technologists conduct medical laboratory tests, experiments and analyses to assist in the diagnosis, treatment and prevention of disease. They are employed in medical laboratories in hospitals, private clinics, research institutions and universities. Pathologists' assistants assist at autopsies and examinations of surgical specimens or perform autopsies under a pathologist's supervision. They are usually employed in hospitals. Medical laboratory technologists who are also supervisors are included in this unit group.

Exclusions

- Applied chemical technologists not employed in medical laboratories are classified in unit group C111—Chemical Technologists and Technicians
- Biological technologists not employed in medical laboratories are classified in unit group C121—Biological Technologists and Technicians
- Medical laboratory technicians are classified in unit group D212—Medical Laboratory Technicians

D212 Medical Laboratory Technicians

Medical laboratory technicians conduct routine medical laboratory tests and set up, clean and maintain medical laboratory equipment. They are employed in medical laboratories in hospitals, clinics, research institutes and universities and in government research laboratories.

Exclusions

- Applied chemical technicians not employed in medical laboratories are classified in unit group C111—Chemical Technologists and Technicians
- Biological technicians not employed in medical laboratories are classified in unit group C121—Biological Technologists and Technicians
- Medical laboratory technologists are classified in unit group D211—Medical Laboratory Technologists and Pathologists' Assistants

D213 Veterinary and Animal Health Technologists and Technicians

Veterinary and animal health technologists and technicians provide technical support to veterinarians by caring for animals and assisting in the diagnosis and treatment of animal health disorders. They are employed in veterinary clinics, animal hospitals, animal shelters, zoos, animal research laboratories, government and pharmaceutical companies.

Exclusions

- Veterinary assistants and other animal care workers are classified in unit group G923—Pet Groomers and Animal Care Workers

D214 Respiratory Therapists, Clinical Perfusionists and Cardio-Pulmonary Technologists

Respiratory therapists assist physicians in the diagnosis, treatment and care of patients with respiratory and cardiopulmonary disorders. They are employed in hospitals, medical clinics, health units, extended-care facilities, public health centres and respiratory home care companies. Clinical perfusionists provide technical support to patients undergoing cardiac surgery and patients requiring cardio-respiratory support. Cardiopulmonary technologists assist physicians in the technical aspects of diagnosis and treatment of cardiovascular and pulmonary disease. Clinical perfusionists and cardiopulmonary technologists are primarily employed in hospitals. Supervisors and instructors of respiratory therapists, clinical perfusionists and cardiopulmonary technologist are included in this unit group.

D215 Medical Radiation Technologists

This unit group includes technologists who operate radiographic and radiation therapy equipment to administer radiation treatment and produce images of body structures for the diagnosis and treatment of injury and disease. They are employed in hospitals, cancer treatment centres, clinics and radiological laboratories. Medical radiation technologists who are supervisors or instructors are included in this unit group.

D216 Medical Sonographers

Medical sonographers operate ultrasound equipment to produce and record images of various parts of the body to aid physicians in monitoring pregnancies and in diagnosing cardiac, ophthalmic, vascular and other medical disorders. They are employed in clinics and hospitals. Medical sonographers who are supervisors or instructors are included in this unit group.

Exclusions

- Medical laboratory technologists are classified in unit group D211—Medical Laboratory Technologists and Pathologists' Assistants
- Electroencephalographic, electromyography, vascular and other technologists who operate computerized and electronic equipment to aid in the diagnosis of disease are classified in unit group D218—Electroencephalographic and Other Diagnostic Technologists, n.e.c.
- Cardiology technologists are classified in unit group D217—Cardiology Technologists

- Medical laboratory technicians are classified in unit group D212—Medical Laboratory Technicians
- Radiography, nuclear medicine and radiation therapy technologists are classified in unit group D215—Medical Radiation Technologists

D217 Cardiology Technologists

Cardiology technologists operate electrocardiogram and other electronic equipment to record cardiac activity of patients to aid in the diagnosis and treatment of heart disease. They are employed in hospitals and clinics. Cardiology technologists who are supervisors or instructors are included in this unit group.

Exclusions

- Medical laboratory technologists are classified in unit group D211—Medical Laboratory Technologists and Pathologists' Assistants
- Radiography, nuclear medicine and radiation therapy technologists are classified in unit group D215—Medical Radiation Technologists
- Medical sonographers are classified in unit group D216—Medical Sonographers
- Electroencephalographic, electromyography, vascular and other technologists who operate computerized and electronic equipment to aid in the diagnosis of disease are classified in unit group D218—Electroencephalographic and Other Diagnostic Technologists, n.e.c.

D218 Electroencephalographic and Other Diagnostic Technologists, n.e.c.

This unit group includes other diagnostic technologists not elsewhere classified who operate electroencephalographic and other diagnostic equipment to assist physicians in diagnosing diseases, injuries and abnormalities. Electroencephalographic and other diagnostic technologists who are supervisors or instructors are included in this unit group. They are employed in clinics, hospitals and medical laboratories.

Exclusions

- Cardiology technologists are classified in unit group D217—Cardiology Technologists
- Medical laboratory technologists are classified in unit group D211—Medical Laboratory Technologists and Pathologists' Assistants
- Radiography, nuclear medicine or radiation therapy technologists are classified in unit group D215—Medical Radiation Technologists
- Medical Sonographers are classified in unit group D216—Medical Sonographers

D219 Other Medical Technologists and Technicians (Except Dental Health)

This unit group includes medical technologists and technicians not elsewhere classified, such as dietary technicians, ocularists, prosthetists, orthotists, prosthetic technicians and orthotic technicians. Dietary technicians are employed in health care and commercial food service establishments such as hospitals, extended care facilities, nursing homes, schools, cafeterias and fast food outlets. Ocularists are employed in custom ocular prosthetic laboratories, or they may be self-employed. Prosthetists, orthotists and prosthetic and orthotic technicians are employed in hospitals, clinics, prosthetics and orthotics laboratories, and prosthetic device manufacturing companies. Prosthetists and orthotists may also be self-employed.

Exclusions

- Dietary aides and assistants are classified in unit group G961—Food Counter Attendants, Kitchen Helpers and Related Occupations

D221 Denturists

Denturists examine patients and design, construct and repair removable dentures. Most denturists work in private practice.

Exclusions

- Dentists are classified in unit group D013—Dentists
- Persons who fabricate dentures in dental laboratories are classified in unit group D223—Dental Technologists, Technicians and Laboratory Bench Workers

D222 Dental Hygienists and Dental Therapists

Dental hygienists provide dental hygiene treatment and information related to the prevention of diseases and disorders of the teeth and mouth. They are employed in dentists' offices, hospitals, clinics, educational institutions, government agencies and private industry. Dental therapists carry out limited dental services related to the prevention and treatment of diseases and disorders of the teeth and mouth. They are employed by the federal government and the provincial governments to provide services in rural and remote communities.

Exclusions

- Dentists are classified in unit group D013—Dentists
- Persons who perform clerical duties and assist dentists in dental offices are classified in unit group D311—Dental Assistants

D223 Dental Technologists, Technicians and Laboratory Bench Workers

Dental technologists and technicians design, prepare and fabricate dentures and dental devices as prescribed by dentists and other specialists. Dental laboratory bench workers assist dental technologists and technicians in preparing and fabricating dentures and other dental devices. They are employed in dental laboratories. Supervisors of dental technologists and technicians are also included in this unit group.

Exclusions

- Persons who fit patients for dentures and construct dentures in their own practices are classified in unit group D221—Denturists

D231 Opticians

Opticians fit clients with prescription eyeglasses or contact lenses, assist clients in the selection of eyeglass frames, arrange for the production of eyeglasses or contact lenses and mount lenses in eyeglass frames. They are employed in optical retail outlets or other establishments with optical dispensing departments, or they may be self-employed. Student opticians and opticians who are managers of optical retail outlets are included in this group.

Exclusions

- Managers of optical dispensing departments or of optical retail outlets are classified in unit group A211—Retail Trade Managers
- Optometrists examine eyes, prescribe eyeglasses and contact lenses in addition to fitting eyeglasses and are classified in unit group D021—Optometrists
- Optical laboratory technicians are classified in unit group D313—Other Assisting Occupations in Support of Health Services

D232 Midwives and Practitioners of Natural Healing

Midwives provide full-course care to women and their babies during pregnancy, labour, birth and the post-natal period. They are employed in hospitals, birthing centres and private practice. Practitioners of natural healing provide alternative forms of health care to patients. They are employed by clinics, health clubs, spas or health food stores, or they may work in private practice.

D233 Licensed Practical Nurses

Licensed practical nurses provide nursing care usually under the direction of medical practitioners, registered nurses, or other health team members. They are employed in hospitals, nursing homes, extended-care facilities, rehabilitation centres, doctors' offices, clinics, companies, private homes and community health centres. Operating room technicians are included in this unit group.

Exclusions

- Nursing aides and orderlies, and ward aides, are classified in unit group D312—Nurse Aides, Orderlies and Patient Service Associates

D234 Ambulance Attendants and Other Paramedical Occupations

This unit group includes workers who administer pre-hospital emergency medical care to patients and transport them to hospitals or other medical facilities for further medical care. They are employed by private ambulance services, hospitals, fire departments, government departments and agencies, manufacturing firms, mining companies and other private sector establishments.

D235 Other Technical Occupations in Therapy and Assessment

This unit group includes workers, not elsewhere classified, who perform various technical therapy and assessment functions. Some may assist professionals such as audiologists, speech-language pathologists, ophthalmologists and physiotherapists. They are employed in hospitals, clinics, extended care facilities, rehabilitation centres, educational institutions and in the private practices of the professionals they assist. Massage therapists may also be self-employed.

Exclusions

- Naturopathic and osteopathic physicians are classified in unit group D023—Other Professional Occupations in Health Diagnosing and Treating
- Faith healers and religious healers are classified in unit group E216—Other Religious Occupations

D311 Dental Assistants

Dental assistants assist dentists during the examination and treatment of patients and perform clerical functions. Dental assistants work primarily in dentists' offices, or they may be employed by government and educational institutions.

Exclusions

- Dental hygienists are classified in unit group D222—Dental Hygienists and Dental Therapists
- Dental technicians are classified in unit group D223—Dental Technologists, Technicians and Laboratory Bench Workers

D312 Nurse Aides, Orderlies and Patient Service Associates

Nurse aides, orderlies and patient service associates assist nurses, hospital staff and physicians in the basic care of patients. They are employed in hospitals, nursing homes, and other health care facilities.

Exclusions

- Registered nursing assistants are classified in unit group D233—Licensed Practical Nurses
- Visiting homemakers and housekeepers are classified in unit group G811—Visiting Homemakers, Housekeepers and Related Occupations

D313 Other Assisting Occupations in Support of Health Services

This unit group includes workers who provide services and assistance to health care professionals and other health care staff. They are employed in hospitals, clinics, offices of health care professionals, nursing homes, optical retail stores and laboratories, pharmacies and medical pathology laboratories.

Exclusions

- Operating room technicians are classified in unit group D233—Licensed Practical Nurses
- Pathologists' assistants are classified in unit group D211—Medical Laboratory Technologists and Pathologists' Assistants

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