

Canadian Laboratory Physician Supply: Falling Behind

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ABSTRACT

Purpose: High-quality pathology and laboratory medicine require a sufficient supply of laboratory physicians. This study sought to identify trends in the supply of laboratory physicians over the past decade.

Methods: Physician supply data were retrieved from the “*Supply, Distribution and Migration of Canadian Physicians*” of the Canadian Institute for Health Information for the years 1998 and 2008. Three measures of laboratory physician and/or pathologist supply were defined and then calculated: (1) population-to-laboratory physician and population-to-pathologist ratios; (2) clinical physician-to-laboratory physician ratio; and (3) comparison of population-to-pathologist and population-to-radiation oncologist ratios.

Results: All three of the chosen demographic parameters indicate that the supply of laboratory physicians and/or pathologists has diminished in the past decade, relative to population, clinical physician, and radiation oncologist numbers. Supply trends varied by province and parameter, but the supply of laboratory physicians for clinical physicians fell in most provinces.

Conclusions: Current trends in the supply of laboratory physicians give rise to concerns. If these trends continue, an adverse impact on Canadian health care can be expected.

RÉSUMÉ

But : L'offre de services de qualité dans les domaines de la pathologie et de la biologie médicale est une question notamment d'effectifs médicaux suffisants dans ces disciplines. La présente étude a pour objectif de cerner les tendances qui marquent les effectifs de pathologistes et de médecins biologistes dans les dix dernières années.

Méthode : L'information sur la main-d'œuvre médicale des années 1998 et 2008 provient de la publication *Nombre, répartition et migration des médecins canadiens* de l'Institut canadien d'information sur la santé. Nous avons calculé la proportion des effectifs de médecins biologistes et de pathologistes par rapport à la population (ratio médecins biologistes-population et ratio pathologistes-population) et le rapport entre les médecins cliniciens et les médecins biologistes; enfin, nous comparons entre eux les ratios pathologistes-population et radio-oncologues-population.

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Résultats : Les trois paramètres démographiques choisis indiquent que les effectifs de médecins biologistes et de pathologistes ont diminué dans la dernière décennie, par rapport à la population, aux médecins cliniciens et aux radio-oncologues. Les tendances de l'offre varient selon la province et le paramètre; à noter, cependant, que l'effectif de médecins biologistes par rapport à l'effectif de médecins cliniciens a reculé dans la plupart des provinces.

Conclusion : Les tendances qui caractérisent l'effectif de médecins biologistes à l'heure actuelle sont préoccupantes. Si elles se maintenaient, la situation pourrait entraîner des répercussions de taille sur le système de santé au pays.

High-quality clinical and pathology laboratories are essential to Canadian health care. Indeed, in the past decade there has been renewed interest in improving the quality of laboratory testing and consultation.¹⁻³ Medical leadership and consultation by laboratory physicians are key components in establishing and maintaining these high-quality laboratories. There are no Canadian studies on trends in the supply of laboratory physicians even though it is generally recognized that an increased supply of health care professionals is required to meet the demographic challenge of Canada's aging population. The purpose of this Canada-wide study was to determine whether there has been any demonstrable trend in laboratory physician and pathologist supply in the past decade.

Materials and Methods

This study used data exclusively from the *Supply, Distribution, and Migration of Canadian Physicians* reports of the Canadian Institute for Health Information (CIHI).⁴ The CIHI is a not-for-profit independent organization created by the federal, provincial, and territorial governments and is dedicated to forging a common approach to Canadian health information. Physician data were derived primarily from Scott's Medical Database⁵ and then verified or supplemented through cross-reference with data from the Royal College of Physicians and Surgeons of Canada, the College of Family Physicians, and the Collège des médecins du Québec. Active physicians include all those in clinical practice or those with a valid address. Residents and military, non-licensed, and semi-retired physicians are excluded from the database.

Although the CIHI database recognizes six laboratory specialties, two specialist groupings were defined for the purposes of this study. The first group consisted of laboratory physicians working in all six laboratory specialties (i.e., anatomical pathologists, general

pathologists, neuropathologists, hematopathologists, medical microbiologists, and medical biochemists). The second group consisted of pathologists only, a subset of laboratory physicians that encompasses anatomical and general pathologists and neuro- and hematopathologists. All non-laboratory physicians were designated "clinical physicians"; these included family practitioners, clinical specialists of internal medicine, and surgical specialists. Many microbiologists are also qualified in infectious disease and consequently could be listed in either the clinical medicine or the laboratory medicine category. Any change in the listing of this group between the years 1998 and 2008 could potentially impact trends. An assessment of the CIHI database suggested that this had not happened since microbiologists made up a similar proportion of laboratory physicians in 1998 (16.3%) and 2008 (16.8%).

The following three parameters were defined and then used to measure the supply of laboratory physicians and pathologists:

1. **Population-to-laboratory physician or pathologist ratio.** This parameter is an established measure of laboratory physician supply and is based upon the assumption that the need for laboratory services and consultations is directly correlated with population size.
2. **Clinical physicians-to-laboratory physician ratio.** Laboratory testing and pathology consultations are performed at the request of clinical specialists and family practitioners. In both institutional and community laboratory settings, each laboratory physician or pathologist supports a number of clinical specialists and family practitioners in their daily practice. In this parameter, the number of clinical physicians (i.e., both clinical specialists and family practitioners) per laboratory physician was calculated.
3. **Comparison of population-to-pathologist and**

population-to-radiation oncologist ratios. Cancer diagnosis and monitoring of cancer management is a major component of pathology practice. Owing to the aging of Canada’s population, the increase in the incidence of cancer exceeds that of the population. Consequently there is a growing need for the provision of oncologic diagnosis and treatment. The only clinical oncology specialty that can be identified in the CIHI database is radiation oncology. This specialty was used as a measure of the changes in oncologist supply to meet the growing demand for cancer management.

Provincial and Canadian data from the CIHI database were extracted for 1998 and 2008. Subsequently the three parameters were calculated for each of the 2 years. The difference between 1998 and 2008 was calculated, followed by the proportional (percentage) change from the base year, 1998. The year 1998 was used as the study’s reference point, but this was an arbitrary choice and does not imply that 1998 represents an ideal or optimal state for supply. A ratio that increased between 1998 and 2008 signified a decreased supply. Conversely, a ratio that decreased between 1998 and 2008 signified an increased supply.

Results

The supply of Canadian physicians as reflected in the

population-to-physician ratio is shown in Table 1. In brief, the overall supply of physicians increased by 4.8% between 1998 and 2008. This increased supply was entirely attributable to family practice and to clinical medical specialties since both surgical and laboratory specialties registered a decreased supply (i.e., an increase in their population-to-physician ratios). Of the nine surgical specialties, the following six experienced an increased population-to-physician ratio (i.e., a decreased supply): general surgery, cardiothoracic surgery, ophthalmology, otolaryngology, plastic surgery, and urology. The remaining three (neurosurgery, obstetrics, and orthopedics) experienced decreased population-to-physician ratios.

Changes in laboratory physician supply varied across Canada. Five provinces (Alberta, Manitoba, New Brunswick, Prince Edward Island, and Nova Scotia) did show a stable or decreased population to-laboratory physician ratio, but the three largest provinces by population (Ontario, Quebec, and British Columbia), along with Newfoundland and Saskatchewan, all experienced a decline in laboratory physician supply, ranging from 1.2 to 31.6% from 1998 to 2008 (Table 2).

Similar trends were evident with respect to the supply of pathologists during the same period (Table 3). Only a minor increase in the population-to-pathologist ratio was noted for Canada overall (1.4%). This decreased pathologist

Table 1. Supply of Canadian Physicians: Population-to-Practitioner Ratio by Specialty Groups, 1998 versus 2008

	1998	2008	Change in Supply (%)
Family practitioners	1,060	994	↑ 6.2
Clinical medical specialists	1,635	1,529	↑ 6.5
Surgical specialists	3,912	4,068	↓ 4.0
Laboratory physicians	21,311	21,686	↓ 1.8
Pathologists	27,612	27,991	↓ 1.4
All physicians	538	512	↑ 4.8

Table 2. Provinces Showing Decrease in the Supply of Laboratory Physicians by Population-to-Laboratory Physician Ratio, 1998 versus 2008

	1998	2008	Change in Supply (%)
Saskatchewan	19,943	26,251	↓ 31.6
British Columbia	18,498	19,644	↓ 6.2
Ontario	23,744	24,784	↓ 4.4
Quebec	18,276	18,753	↓ 2.6
Newfoundland	16,769	16,967	↓ 1.2
Canada	21,311	21,686	↓ 1.8

supply was entirely attributable to four provinces whereas the six other provinces had stable or increased pathologist numbers. The four provinces experiencing declines in pathologist supply were Saskatchewan, British Columbia, Ontario, and Quebec; declines ranged from 3.0 to 31.2%.

Table 3. Provinces Showing Decrease in the Supply of Pathologists by Population-to-Pathologist Ratio, 1998 versus 2008

	1998	2008	Change in Supply (%)
Saskatchewan	23,653	31,024	↓31.2
British Columbia	22,322	23,636	↓5.9
Ontario	27,587	28,418	↓3.0
Quebec	33,844	37,237	↓10.0
Canada	27,612	27,991	↓1.4

The second parameter, the ratio of clinical physicians to laboratory physicians, is shown in Table 4. In 1998 there were 38.5 clinical physicians for each Canadian laboratory physician. By 2008, this ratio had increased to 41.4, an increase of 7.5%. In seven provinces, the ratio increased by 0.5 to 43.0% (Table 5).

Table 4. Clinical and Laboratory Physicians in Canada, 1998 versus 2008

	1998	2008
Clinical physicians	54,722	63,865
Laboratory physicians	1,420	1,545
Ratio of clinical to laboratory physicians	38.5	41.4 (↑7.5%)

Table 5. Provinces Showing Increased Ratio of Clinical Physicians to Laboratory Physicians, 1998 versus 2008

	1998	2008	% Increase
Saskatchewan	29.0	41.5	43.0
Newfoundland	27.9	36.0	29.0
British Columbia	34.7	39.3	13.3
Alberta	38.7	43.7	12.9
Quebec	37.6	40.1	6.6
Ontario	41.5	43.0	3.9
New Brunswick	40.1	40.3	0.5
Canada	38.5	41.4	7.5

The third parameter, the ratio of pathologists to radiation oncologists, is shown in Table 6. From 1998 to 2008, the ratio of the Canadian population to radiation oncologists

decreased by 11.9%, indicating a significant improvement in supply. During the same time period, the supply of both laboratory physicians and pathologists decreased slightly, as indicated by increases of less than 2% in the population-to-practitioner ratio.

Table 6. Supply of Canadian Pathologists and Laboratory Physicians Compared with Radiation Oncologists: Population-to-Practitioner Ratios, 1998 versus 2008

	1998	2008	Change in Supply (%)
Radiation oncologists	99,547	87,709	↑11.9
Pathologists	27,612	27,991	↓1.4
All laboratory physicians	21,311	21,686	↓1.8

Discussion

From 1998 to 2008, the Canadian population grew by 10.7%, presenting a challenge to Canada's physician supply. Nevertheless, the overall supply of physicians met this challenge, leading to an improved population-to-physician ratio of almost 5% (from 538 to 512). In contrast, there has been a slight decrease in both the laboratory physician (1.8%) and pathologist (1.4%) supply. The overall supply of surgical specialists also dropped (see Table 1). This study cannot identify the reason or reasons for the increased ratio of population to surgical specialists or whether such a decreased supply could be appropriate with shifting technologies and emerging subspecialties in clinical internal medicine.

Not surprising, there is variability among the provinces with respect to any change in laboratory physician supply (see Table 2). With the exception of Newfoundland, the same provinces that experienced a drop in laboratory physician supply also showed a drop in pathologist supply (see Table 3).

In addition to overall population growth, health care faces increased demand for clinical services by an aging population. The second parameter, the ratio of clinical physicians to laboratory physicians, examines whether the growth in clinical physicians is matched by a similar growth in laboratory physicians since laboratory testing and consultations underpin clinical practice and diagnosis. The data clearly demonstrate that each laboratory physician is

“supporting” more clinical physician practitioners in Canada overall (see Table 4) and in seven of Canada’s 10 provinces, including the four most populous provinces (see Table 5). Notably, even Alberta, which had maintained a stable or slightly improved laboratory physician supply, showed a 12.9% increase in the ratio of clinical physicians to laboratory physicians during the same period. To maintain the 1998 ratio of clinical physicians to laboratory physicians (38.5) would have required an increase of 114 laboratory physicians across Canada in 2008. This is approximately the total number of laboratory physicians practising in the three provinces of Nova Scotia, Newfoundland, and New Brunswick in 2008.

From 1998 to 2008, the supply of radiation oncologists increased by almost 12% (see Table 6) while that of both pathologists and laboratory physicians registered a slight decrease. Undoubtedly, one of the drivers of the increased supply of radiation oncologists is the federal wait-times strategy, which rewards provinces that meet benchmarks for cancer treatment wait times. These benchmarks do not include a wait time for pathological diagnosis, thus providing no incentive for bolstering pathology capacity.⁶ What is the appropriate laboratory physician supply for the Canadian health care system? The data from this study cannot address this central question. Laboratory automation, which has greatly improved productivity in the technical components of laboratory testing, does not provide opportunities for improved efficiencies in the medical practice of laboratory medicine and pathology. Both the regionalization of laboratory services (which occurred throughout most Canadian provinces either prior to or during the period of this study) and the movement toward subspecialty practice in all areas of laboratory medicine may have provided opportunities for improving professional efficiency. On the other hand, laboratory physicians and pathologists must meet the demands of a growing list of new or expanding activities, including infectious epidemic response and planning, increasing test menus, forensic pathology, case complexity, quality management, novel screening programs, and “personalized medicine” with requisite molecular pathology and “pharmacopathology.” These growing demands likely outweigh the efficiencies that may have been realized

through laboratory restructuring and subspecialization.

Why have clinical physicians been able to meet the Canadian demographic challenge whereas laboratory physicians have not? In most provinces, the vast majority of clinical services are performed on a fee-for-service basis, thus providing a link between demand and remuneration. In contrast to these clinical physicians, most Canadian laboratory physicians are remunerated largely or entirely through salary or contract with the hospital, regional system, or province. Within this arrangement, laboratory, regional, and/or governmental administrators are often reluctant to recognize the need for more laboratory physician positions or to enhance the attractiveness of current unfilled positions. As more physicians are encouraged to adopt salaried or contractual arrangements similar to those for laboratory physicians, the supply trends of laboratory physicians should become of greater interest to the medical profession as a whole. Although workload systems for some areas of laboratory medicine have been devised, acceptance by both laboratory physicians and administrators in light of the funding implications has often been difficult.⁷⁻⁹

In conclusion, all three of the selected demographic parameters indicate that the supply of laboratory physicians and/or pathologists relative to population, clinical physicians, or radiation oncologists has diminished in the past decade. Some provinces have been more affected than others. The impact of a diminishing supply of Canadian laboratory physicians, if any, needs to be identified. At a minimum, it will likely have an effect on the ability to institute new (or maintain existing) quality management programs.

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