

Original Article

Gastroenterology Numbers in Canada: A Comparison of Human Resource Databases

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Abstract

Several databases track gastroenterology (GI) human resource (HR) numbers in Canada. They differ in the data which they collect and, hence, in their estimates of GI HR. The two most likely to reflect current HR are the Canadian Institute of Health Information (CIHI) and Canadian Medical Association (CMA) databases. The estimates of GI's generated by each of the databases correlate closely with each other. Approximately 50 trainees enter the adult GI workforce per year, and approximately five enter the pediatric group. We estimate that Canada as a whole has between 782 and 848 GIs or 2.14 GIs per 100,000 population in 2016. Six of the 10 provinces have fewer than two GIs per 100,000 population. National GI numbers are increasing by 6% per year. Validation studies are required.

Introduction

Data on the Canadian GI workforce is necessary to ensure that human resources are sufficient to meet needs, to plan recruitment, to anticipate retirement, and to allow advocacy for a sufficient number of trainees to enter residency training. In order for information to be available year over year, a method needs to be developed to allow consistent capture of the data. A number of databases exist, but they measure different aspects of gastroenterology practice and produce differing numbers.

The purpose of this review is to explain the parameters which each database captures, to show the resultant estimates, and to suggest a method for annual capture of numbers without the need for the commission of customized Canadian GI reports.

Who is a Gastroenterologist?

The definition of a gastroenterologist is difficult, since many of the skills, and much of the knowledge, involved in the care of patients with digestive disease is not exclusive to GI specialists. This issue of definition results in a lack of agreement between the databases, which capture GI workforce numbers.

For example, the definition of a gastroenterologist as *someone with internal medicine and subspecialty training in digestive disease who provides care for patients throughout the spectrum of cancer*

care and prevention, nutrition, liver disease, IBD and emergency care might be ideal but would exclude many leaders in the field.

In addition, gastroenterologists work in a variety of roles including clinical, administrative, research and educational. They may be full time, part time, active or retired; paid by fee for service or alternative funding; registered or not; formally certified in a specialty or not (1). The databases capture different aspects of this depending on what they were designed to do.

Available National Databases

The databases which track GI workforce and activities include:

- Canadian Post-M.D. Education Registry (CAPER),
- Canadian Institute of Health Information: National Physician Data Base (CIHI-NPDB),
- Canadian Institute of Health Information: Scott's Medical Data Base (CIHI-SMDB),
- Canadian Medical Association (CMA) Masterfile,
- The Royal College of Physicians and Surgeons (RCPSC).

In addition, many provinces maintain their own datasets on GI numbers. These can usually be accessed through the provincial medical colleges. In this review, we have focused on national databases.

Canadian Post-M.D. Education Registry (CAPER)

CAPER is maintained by the Association of Faculties of Medicine of Canada and is mandated “to provide accurate information which may be used for physician resource planning on a national basis” (2). Operating since 1986, data is submitted annually on November 1st from each university postgraduate medical education office (2). The data is collected from a number of organizations and institutions, such as the Association of Faculties of Medicine of Canada, Resident Doctors of Canada, the CMA, the RCPSC, the Medical Council of Canada, as well as Health Canada, and the provincial and territorial ministries of health (2).

CAPER's Annual Census report provides Canadian post-graduate training statistics, including first year trainees and estimated practice entry cohort. CAPER provides data which is likely very accurate since it comes directly from the universities, and the numbers are small. Hence, it is the preferred database for Canadian GI trainee information, but does not reflect the number of GIs in practice.

Canadian citizens (CC) and permanent residents (PR) are highlighted in Figure 1 for their potential to enter the Canadian GI workforce. The number of trainees in adult gastroenterology has been stable for the last three years at around 100 per year. Adult GI is a two-year program, with the current prediction of 50 new grads to enter the academic and clinical workplace each year. Pediatric trainee numbers are much smaller and generally in the range of 5 trainees per year (2).

In addition to Canadian citizens and permanent residents, Canada trains a large number of learners who enter on education visas and are expected to return to their home countries. Some visa trainees are in core GI residency training, but many more are in non-exam track fellowship programs.

As can be seen from Table 1, there were 79 core trainees and 22 fellows in training in 2016. In addition, there were 55 visa trainees. Nearly one-third of trainees in Canada are unlikely to enter the workforce. In pediatrics, the numbers of visa trainees are nearly equal to the numbers who may work in Canada.

Data is available at <https://caper.ca/en/post-graduate-medical-education/annual-census/> and <https://caper.ca>.

CIHI: Scott's Medical Database (CIHI-SMDB)

The Canadian Medical Directory is derived from Scott's Directories (www.MDSelect.com), which maintains a database

on physicians for commercial purposes and which strives to ensure data correctness (3). The data is collected from a variety of organizations, such as medical schools, the Collège des médecins du Québec (CMQ), the Royal College of Physicians and Surgeons of Canada, and Canadian hospitals (3). CIHI essentially receives a cut of the data from Scott's Medical Directory and presents it in a formatted version. There is no linkage made at CIHI between the SMDB and a second CIHI database, the NPDB (see next section).

CIHI performs data edit and verification before publishing Scott's data (3). Moreover, periodic comparisons are performed with selected provincial medical associations. Because physicians can be uniquely identified in this database, changes in physician practice category, as well as physician movement between provinces and territories, can be tracked over time. The SMDB includes, but is not limited to, data on physician year of birth, residence postal codes, sub-specialty (gastroenterology), and rural/urban distribution (3, 4).

The data is available on their website <https://secure.cihi.ca/estore/productSeries.htm?pc=PCC34>

CIHI: National Physician Database (CIHI-NPDB)

CIHI maintains and provides access to a second database, the NPDB. This database contains socio-demographic, payment and service utilization data of physicians, and can generate data at the individual, or specialty level (5). CIHI: NPDB reports on Gastroenterology (as well as cardiology) as one of two specialties identified by the CIHI advisory group of interest (5).

This CIHI-NPDB data is not a head count. CIHI-NPDB usefulness relates to payment and clinical data. Payment data being a form of hard data, it likely represents accurate and auditable numbers. The NPDB only reports on clinical payments paid through the medical care plans collected from payment data and specialty assignments, supplied by the provinces. Utilization is not completely captured for Alternative Payment Plans (APP) based on shadow billing practices of physician.

From this data CIHI determines a physicians' full-time equivalent (FTE) (5). NPDB recognizes that high billers may be functioning as more than one full-time equivalent (FTE), while at the same time it might underestimate the number of GIs in administration and research who bill less.

Data is available at <https://www.cihi.ca/en/physicians-in-canada>.

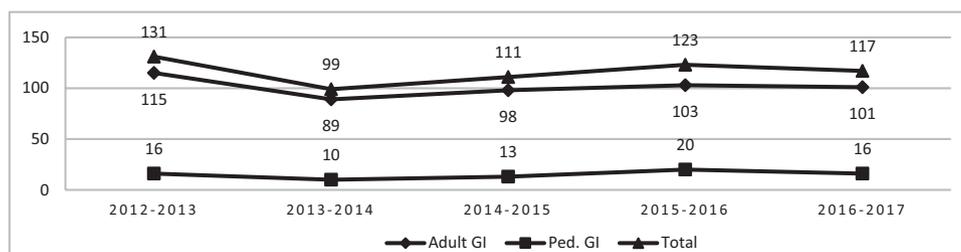


Figure 1. Number of Adult GI and Pediatric GI Trainees and Fellows in Canada from 2012 – 2016. (Canadian Citizens and Permanent Residents) (2)

Canadian Medical Association (CMA)

The CMA Masterfile is populated by regular inputs from the RCPSC and College of Family Physicians of Canada (CFPC), as well as from members themselves. The CMA member data contained within the Masterfile is accurate since the CMA is in regular touch with their members. The non-member data in the file is more difficult to maintain since the CMA does not get regular updates on them, such as when they retire or leave the country. To mitigate this, the CMA identifies the non-member physicians in their Masterfile, who are over the age of 70, on the provincial regulatory websites to determine if they are still licensed. In Quebec, where CMA membership tends to be lower and some physicians may not be registered with the Royal College or CFPC, the CMA receives a data file directly from the CMQ to add missing cases. The CMA also excludes cases over the age of 80 and those for whom they have no valid Canadian address, assuming most of these physicians would no longer be in practice in Canada (6).

CMA data is likely accurate since the CMA has direct contact with its members, includes semi-retired and part-time physicians, including licensed physician non-members (6). By comparison, CIHI's SMDB excludes physicians who are semi-retired (6). Furthermore, CMA provides age breakdown for the subgroup of gastroenterology and an overall gastroenterology profile (6). CMA HR estimates are collected independent of CIHI-SMDB, but do access some of the same sources of information.

Table 1. Numbers of Canadian Citizen and Permanent Resident and Visa Trainees in Core Residency and Fellowship Training 2016 for Both Adult and Pediatric GI²

	Trainees		Fellows		Totals		
	CC/ PR	Visa	CC/ PR	Visa			
Adult	79	13	22	42	156		
Ped	11	1	5	11	28		
Totals	90	14	104	27	53	80	184

Comparison of National GI Workforce Numbers by Database and Trends

As shown in Table 2, there is considerable overlap, and some differences, between the sources of data for the Canadian Institute of Health Information: Scott's Medical Data Base (CIHI-SMDB) and Canadian Medical Association (CMA) databases. As shown in Figure 2, there is a high degree of correlation between the estimates of each database ($r>=0.98$; $P<0.001$). CIHI-SMDB provides the highest numbers, and CMA are about 10% lower.

Using CIHI-SMDB and CMA, the number of GIs in Canada has increased between 2002 and 2016 from 454 to 848 and 416 to 782, respectively (see Figure 2). This gives an absolute increase of 86% and 88%, respectively, and an annual growth of close to 6% for both estimates.

Current Provincial Distribution of GI

The growth in national GI numbers has not resulted in equitable Provincial distribution of GI's as shown in Figure 3.

The numbers utilized were obtained from the CMA (7) and from StatsCan for population numbers. They represent both the adult and GIs of Canada.

Alberta leads the country with 2.74 GIs per 100,000 population. PEI in contrast has 0.67 per 100,000. In the case of PEI, some patients access services in the adjacent provinces. There is a strong correlation between the number of trainees in a province and the number of GIs ($r=0.95$). The difficulty with this data is that it does not take into account FTE, the amount of time spent in academic or clinical administration, presence or absence of a liver transplant program, or whether the GIs are involved in general GI or focused on colon cancer screening.

Discussion

Several national databases capture different aspects of the Canadian GI workforce. They each have their strengths and weaknesses. CAPER data will provide data on the number of trainees and graduates by year and on the new entrants who will

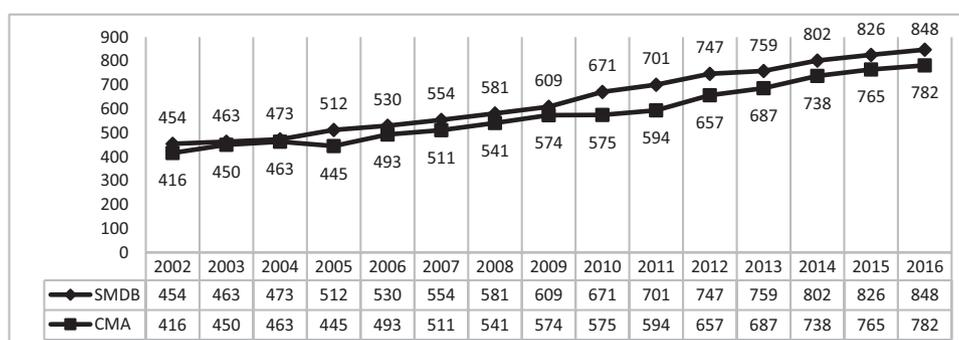


Figure 2. Number of GIs from 2002 to 2016 for CIHI-SMDB and CMA

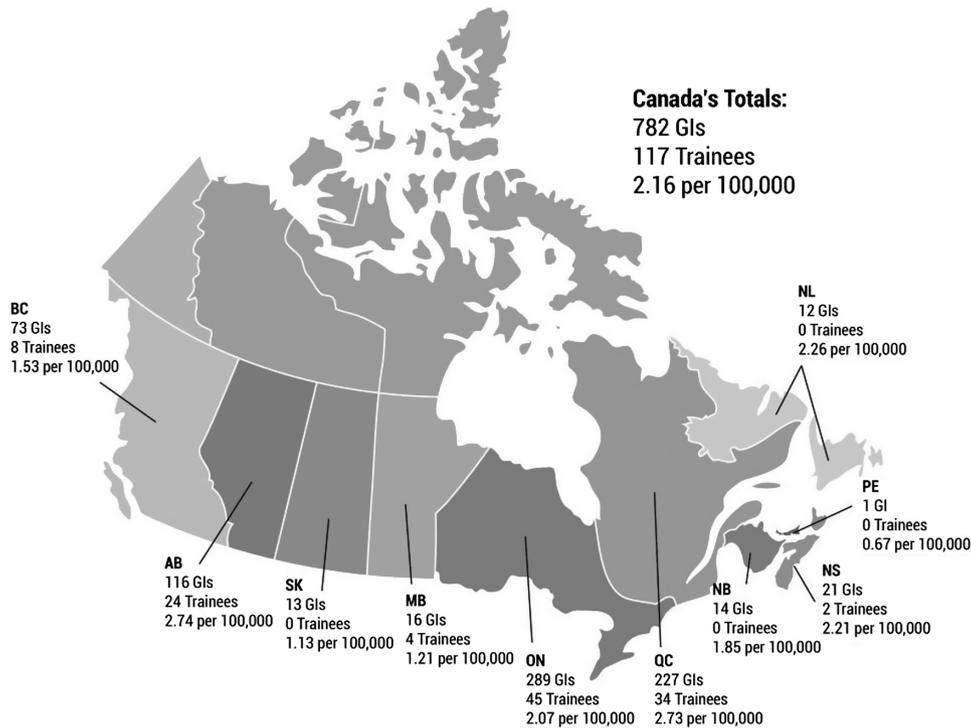


Figure 3. Summary of Canadian Provincial Gastroenterologist Numbers (2, 7, 8)

Table 2. CIHI-SMDB and CMA Sourcing Comparison

Source Type	CMA Masterfile Sources	CIHI: SMDB Sources
The Collège des médecins du Québec (CMQ)	X	X
Association of Faculties of Medicine of Canada	X	
Medical schools		X
The Royal College of Physicians and Surgeons of Canada (Royal College)	X	X
The College of Family Physicians of Canada (CFPC)	X	X
CMA members	X	
Canadian hospitals		X
Jurisdictional registrars		X

augment current resources. CIHI-NPDB (NPDB) captures billing data and is more complex to analyze from a physician number perspective. The CMA database correlates closely with CIHI-SMDB (SMDB), and these two likely give the best estimates of GI HR numbers. The data needs to be validated. We recommend that CAG utilizes these two databases to track GI HR while awaiting validation.

The number of new graduates from GI programs entering the workforce is approximately 50 per year from both core GI and fellowship programs, assuming the fellowship programs are two years in duration. We do not know the rate of attrition of the workforce through reductions in FTE or retirement, but there has been a steady increase in HR numbers of about 6% per year. This suggests that entry is slightly ahead of loss.

Canada trains large numbers of visa trainees who are unlikely to enter the workforce. This is an important contribution to global GI health, although the majority of the visa trainees are likely from developed, rather than developing countries. These trainees contribute very significantly to the GI workforce while they are in the country. Without them, many more resources would be required to maintain the workload of training hospitals.

Canada's GI workforce has increased over the last decade. We do not have recent patient wait time data, but anecdotally wait times are long and access to timely care remains problematic. There are marked differences in GI workforce by province. These numbers are difficult to interpret without reference to other factors in a particular province's pattern of health care delivery. There is much which is not clear beyond the raw numbers. The number who are working part time, or are engaged in non-GI work such as internal medicine, administration, research or education is unknown. We do not know how much of current GI time is devoted to cancer screening. There is not a separate category for hepatology.

Despite the limitations, existing databases do provide a starting point in understanding numbers, trends and distribution of the GI workforce.

It is the goal of CAG to provide Canadian GI workforce data on the CAG website with annual updates through the link <https://www.cag-acg.org/quality/gi-workforce>. Support for access to HR data is available through the CAG office.

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