

# 7 Brain gain and waste in Canada: Physicians and nurses by place of birth and training

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This chapter documents changes from 2006 to 2016 in the number of physicians, registered nurses (RNs) and practical nurses (PNs) in Canada. It identifies those working in each occupation as well as those reporting relevant educational credentials but not working in the occupation. The number of practicing physicians and PNs grew at double the rate of the total workforce, whereas practicing RNs only grew at one-third that rate. The high physician growth rate was a result of education and immigration policies intended to address perceptions of increasing physician shortages. In contrast, the low RN and high PN growth rates likely reflect a shift to lower cost PNs with no growth in total nursing relative to the workforce. The growth rate of foreign-born, foreign-trained professionals working in all three professions was larger than the relevant occupation's average growth rate. Despite this, the percentage of foreign-born, foreign-trained individuals *not* working in their trained profession also increased for physicians and RNs. The net effect is that the percentage of foreign-born, foreign-trained potential physicians and RNs working in their profession declined. This “brain waste” reflects mismatches between health and immigration policies.

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## 7.1. Introduction

Integrating foreign-trained health professionals into the health workforces of OECD countries is an issue of ongoing concern for workers themselves and for the receiving, sending and training countries. In the early 2000s, the sometimes urgent shortages of health care workers in low income countries, and the practices of receiving nations that were frequently seeking to reduce their own shortages of health professionals, drew attention to this long-standing issue (e.g. Chen et al. (2004<sup>[1]</sup>)). In this context, many became concerned about migrant health worker “brain drain” from low income countries and “brain waste” in high income countries. In May 2003, the Commonwealth adopted its “Code of Practice for the International Recruitment of Health Workers” (The Commonwealth, 2003<sup>[2]</sup>). Data collection and analysis conducted primarily by the (OECD, 2007<sup>[3]</sup>; 2008<sup>[4]</sup>) in collaboration with the WHO increased policy attention to this issue, and in May 2010 the WHO passed its Global Code of Practice on the International Recruitment of Health Personnel (WHO, 2010<sup>[5]</sup>).

(OECD, 2016<sup>[6]</sup>), among others, have tracked ongoing issues in the international migration of health professionals, while (Grignon, Owusu and Sweetman, 2013<sup>[7]</sup>) provide an overview of the topic from an economic perspective. Pertinent changes in the landscape include: the small in magnitude, but rapidly growing, internationalisation of health provider education that targets trainees from developed countries wanting to study medicine and other (typically) high earning health occupations; ongoing programmes in some less developed nations training domestic students for international employment; and moves in some OECD countries to increase the domestic health provider supply.

Many receiving nations, including Canada, have made efforts to improve regulatory aspects of international transitions for health professionals who choose to migrate. Dumont, Zurn, Church, and Thi (2008<sup>[8]</sup>) provide a pre-WHO Code of Practice survey of immigrant health professional regulation in the Canadian context. Canada, subsequently made (with various motivations) several relevant changes with, in particular, some regulatory bodies instituting new protocols (Augustine, 2015<sup>[9]</sup>; Augustine, 2015<sup>[10]</sup>), and provincial governments and civil society worked to better integrate increasingly diverse internationally educated immigrant professionals into the workforce. Sweetman, McDonald, and Hawthorne (2015) survey related issues for regulatory institutions (typically self-regulatory Colleges in the Canadian context), including the recognition of credentials and other qualifications. However, despite progress, concerns about the disequilibrium between supply and demand, credential recognition and health professional “brain waste” remain. Sweetman (forthcoming) posits that there are structural problems in the Canadian context resulting from the misalignment of provincial responsibility for healthcare delivery with federal immigrant selection, and proposes a policy change to alleviate negative outcomes going forward by increasing the role of provincial governments in the selection of potential immigrants with healthcare credentials.

Building on earlier research by Owusu and Sweetman (2015<sup>[11]</sup>), the current analysis examines changes between 2006 and 2016 in the degree to which physicians (MDs; medical doctors), registered nurses (RNs) and practical nurses (PNs; called registered practical nurses or RPNs in the province of Ontario, and licensed practical nurses or LPNs in the rest of the country) practice in Canada in the profession of their training as a function of their place of birth and place of professional training. We examine those working in the relevant occupation as well as those who report relevant educational credentials for the occupations under study, but who are not working in the field associated with that credential.

## 7.2. Canadian and foreign trained physicians and nurses are required to pass entry tests to be licensed

Canadian Medicare, narrowly defined, is a set of provincial payment systems for physician and hospital services. With few exceptions, the provision of Medicare-insured services outside of Medicare is prohibited by virtue of the federal government’s Canada Health Act, which may withhold transfers to provinces that

deviate from this principle. Given this structure, almost all physician services are directly covered by the tax revenue that funds Medicare, as are the salaries of registered nurses and practical nurses who work in hospitals and physicians' offices (via physician billings). However, an appreciable number of registered and practical nurses work in activities beyond Medicare that may be funded by combinations of government, private insurance or out of pocket payment. Outside of Medicare the boundaries between government and private payment are not always obvious.

Within each province, billing rates for physicians and the wages of most registered and practical nurses are set by collective bargaining with the province or provincially funded intermediaries. In those cases where nurses are not covered by a collective agreement, such agreements nevertheless play an important benchmark role. Overall, and especially for physicians, provincial labour markets for these three health occupations are similar to bilateral monopolies, with the provincial government on one side and the provincial medical/nursing association on the other, but with an additional complexity in the form of the relevant provincial self-regulatory College. Beyond wages, this economic structure has substantial implications for changes in the number of funded practitioners over time; the demand for physician and nurse services is almost entirely determined by government funding. Provincial governments are also very active in establishing enrolment targets at Canadian educational institutions for physicians and nurses. They essentially dictate enrolment levels for domestic medical students (Bourgeault and Grignon, 2013<sup>[12]</sup>; Sweetman, McDonald and Hawthorne, 2015<sup>[13]</sup>).

Furthermore, most self-regulatory Colleges require candidates to pass national (or international) examinations as part of the licencing process. Since these tests are administered in English or French, to a certain degree they measure language ability as well as professional knowledge and competencies. These tests also measure, to some extent, the alignment of the curriculum taught in each writer's training programme with the test, which is in turn aligned with the demands of the Canadian context. Test takers are categorised into those who completed their professional degree in Canada, and those who are foreign trained (i.e., internationally educated). The foreign trained include Canadians who went outside the country to study as well as those who completed their training prior to immigrating. It is also useful to distinguish between the first attempt for each test, and repeated attempts for those who fail earlier efforts. Sometimes there are limits on the number of repeats that are permitted. For example, starting in 2018, candidates for the relevant Medical Council of Canada exams are permitted to retake each a maximum of four times.

We present selected results for the Medical Council of Canada Qualifying Examination Parts I and II in Table 7.1. Part I is normally administered to those near the end of medical school or to graduates, and Part II is normally administered after at least one year of postgraduate medical (residency) training. The pass rate for Canadian trained medical trainees on the first attempt is typically in the mid- to high-90% range. In contrast, the foreign trained have pass rates approximately 20 to 30% lower. The success rate is lower for both groups on subsequent attempts, but the gap between the Canadian and foreign trained remains about the same or increases.

**Table 7.1. Medical Council of Canada Qualifying Examination Results, Part I and II, 2016 and 2017**

	2016		2017	
	Tested (#)	Pass Rate (%)	Tested (#)	Pass Rate (%)
<b>MCCQE Part I: First Attempt</b>				
Canadian Trained (CT1)	2831	97%	2802	95%
Foreign Trained (FT1)	1704	58%	1677	62%
<b>MCCQE Part I: Repeat Attempts</b>				
CT1	171	69%	156	63%
FT1	1210	29%	1264	29%

	2016		2017	
	Tested (#)	Pass Rate (%)	Tested (#)	Pass Rate (%)
<b>MCCQE Part II: First Attempt</b>				
CT2	2969	92%	2871	97%
FT2	1020	63%	1170	74%
<b>MCCQE Part II: Repeat Attempts</b>				
CT2	282	80%	265	91%
FT2	648	50%	675	65%

Note: Medical Council of Canada Qualifying Exam (MCCQE) Part I is administered to medical students and graduates; for domestic students it is normally taken prior to residency training. MCCQE Part II is for those who successfully complete Part I, hold a recognised medical degree and have completed at least one year of postgraduate medical (residency) training. CT1 = completed medical school in Canada. FT1 = completed medical school outside of Canada. CT2 = completed both MD and residency in Canada. FT2 = completed at least one of MD or residency outside of Canada.

Source: Medical Council of Canada 2017-18 Annual Report.

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Results for registered nurses are in Table 7.2. The overall pass rate on the first attempt is lower on the nursing test than the medical ones, but there is a similar gap between the Canadian- and foreign-trained test writers. We present disaggregated first attempt results by non-Canadian country (where the sample size warrants). There are appreciable differences across jurisdictions. For example, those trained in the Philippines have results like those from the weaker Canadian provinces. There is a long tradition of some Filipino nursing schools aligning their curriculum with that in Canada and the United States.

**Table 7.2. National Council Licensure Examination Results for Registered Nurses (NCLEX-RN), 2016 and 2017**

	2016		2017	
	Tested (#)	Pass Rate (%)	Tested (#)	Pass Rate (%)
<b>NCLEX-RN: First Attempt, Canada</b>				
Canadian Trained (CT)	9 338	79.9%	9 659	82.1%
Foreign Trained (FT)	573	65.4%	966	59.1%
<b>NCLEX-RN: Second Attempt, Canada</b>				
CT	1 775	64.7%	1 105	63.3%
FT	139	51.8%	170	45.9%
<b>NCLEX-RN: First Attempt, FT detailed</b>				
Trained in India	214	56.1%	486	47.5%
Trained in Philippines	173	73.4%	253	72.7%
Trained in Jamaica	21	61.9%	19	68.4%
Trained in UK	23	56.5%	33	63.6%
Trained in Australia	17	70.6%	30	63.3%

Note: Most graduates of Québec nursing programmes write the Ordre des infirmières et infirmiers du Québec's professional examination and are not included. We only include statistics for the first 2 of many possible attempts.

Source: CCRNR (2018).

StatLink  <https://doi.org/10.1787/888933970798>

We observe a broadly similar pattern for practical nurses in Table 7.3, although data are only available with all attempts aggregated, and for selected provinces. Interestingly, the province of Manitoba requires candidate practical nurses who are foreign trained to undergo an initial clinical competence assessment followed by “bridge training” before writing the test. Subsequent to this process their results are as good as or better than those for the Canadian trained.

**Table 7.3. Canadian Practical Nurse Registration Examination Results, 2016 and 2017**

	2016		2017	
	Tested (#)	Pass Rate (%)	Tested (#)	Pass Rate (%)
<b>CPRNE: All Attempts, Canada</b>				
Canadian Trained (CT)	n.a.	89.0%	n.a.	91.0%
Foreign Trained (FT)	n.a.	58.0%	n.a.	74.0%
<b>CPNRE: All Attempts, Manitoba Only</b>				
CT	185	94.0%	131	95.0%
FT	36	94.0%	44	100.0%
<b>CPNRE: First Attempt, Ontario Only</b>				
CT	3 975	91.1%	3 922	92.1%
FT	310	53.9%	1 545	71.8%
<b>CPNRE: Second Attempt, Ontario Only</b>				
CT	350	63.4%	299	69.6%
FT	252	38.9%	274	56.2%

Note: Most graduates of Québec nursing programmes write Québec’s professional examination and are not included. “All Attempts” refers to the total number of tests written in the country or province that year, including candidates on their first, second or third attempt. Number of test takers is not available (n.a.) at the national level. For illustration, we give details of CPNRE results for Manitoba. Manitoba requires FT PNs to complete a pre-test clinical competence assessment and targeted bridging education. We also include CPNRE results for Ontario, which has a similar pass rate to the national average. We only include statistics for the first 2 of 3 possible attempts in Ontario.

Source: CLPNM (2018) and CNO (2018).

StatLink  <https://doi.org/10.1787/888933970779>

Overall, although they are not the only hurdle to foreign trained health professionals obtaining the right to practice in Canada, these examinations are clearly a hurdle to many test writers and either prevent them from practicing, or delay entry to practice. Some successful individuals, especially in medicine, may take several years to successfully achieve licensure. This can represent a nontrivial percentage of an individual’s working career, and during that time those who pass would appear as holding a relevant degree but not practicing.

### 7.3. Census data are used to analyse occupational access of Canadian and foreign trained physicians and nurses

Data for this analysis are drawn from the 2006 and 2016 Canadian long-form censuses. One key advantage of the censuses for this study is that they allow us to observe not only those working in their trained occupation, but those with relevant credentials who are not primarily working in that occupation (the potential “brain waste” issue). Crucially, the census includes occupation, immigration status, educational credentials, and the field of study and location of training for the highest educational credential. The census also collects a broad range of demographic and related questions. Another benefit is that the

censuses reflect the Canadian resident population and have extremely high response rates. For example, the 2016 long-form census response rate was 97.8%.<sup>2</sup>

We restrict the sample for analysis to permanent residents aged 25-64 inclusive, who are in the labour force and have a postsecondary credential. Focusing on the prime age workforce is useful for our policy question, but this restriction causes our counts of practitioners to differ from the aggregate numbers provided by regulatory colleges. For example, the Canadian Institute for Health Information (CIHI, 2017<sub>[14]</sub>) reports that just over 14% of licensed physicians were over age 65 in 2016 (around 2.9% were over age 75). Further, because many questions refer to the preceding calendar year, we restrict immigrants in the sample to those who immigrated prior to 2005 (2015) for the 2006 (2016) census. We include the small percentage of Canadian permanent residents who work in a main job outside of Canada (<2% of MDs, <1% of RNs, 0% of PNs; details in Table 7.4 note). In an effort to eliminate individuals in full-time study we remove anyone under age 35 who also reported attending school. The main group this addresses is physicians doing their residency training, and the number dropped from the sample is very similar to the number of residents reported in administrative data.

Overall, taking our sample selection criteria into account, the census counts of physicians and registered nurses quite closely match the administrative counts as recorded by CIHI. However, the census undercounts PNs relative to that administrative source. Although the use of the job title “registered practical nurse” instead of “licensed practical nurse” may be a source of some mislabelling in Ontario, we speculate that part of the gap is accounted for by less stable employment patterns among PNs. For the province of Ontario we address this using the Health Professions Database (HPDB), which comprises data from that province’s regulatory Colleges.<sup>3</sup> We observe that at the time of registration PNs are less likely to work full-time (54% versus 66%) and full-year (16% worked less than 30 weeks in the previous year versus 10%) than RNs. The PN census sampling methodology is, however, stable across the decade giving it some credibility in measuring trends.

The comparator aggregate health workforce is defined using the two-digit health occupation code (based on the National Occupation Coding system, version 2006 and 2016), but removing veterinarians and their assistants. We identify our three main occupations using the relevant four-digit occupational codes and four-digit field of study codes (based on the Classification of Instructional Programs system, version 2000 and 2016). We also employ ancillary census questions to reduce measurement error in the reported occupation; for example, we use a question asking whether an individual has a degree in any of medicine, dentistry, veterinary medicine or optometry regardless of the highest degree held. One limitation of our analysis is that the only occupation collected in the census is that for each individual’s “main” job, which is the one in which they worked the most hours. This is not innocuous, as discussed below. These sample selection criteria are slightly different, and we think slightly improved, from those employed by Owusu and Sweetman (2015<sub>[11]</sub>).

We classify an individual as being attached to one of the three pertinent occupations if the person: i) holds a relevant educational credential as their highest degree, or ii) reports working in that occupation (subject to cross-checking using ancillary information). This allows us to observe individuals who hold a relevant degree but are not working in the associated occupation as their “main” job.

Two types of misclassification may occur given that only the occupation of the “main” job and the field of the “highest” degree are observed. First, we do not include in our sample individuals who are trained in a relevant occupation but are not currently working in that occupation if they have a “higher” degree in a different profession. We use the HPDB to help understand the magnitude of this misclassification. We calculate what percentage of registered/practical nurses aged 25-64 in Ontario are i) registered/licensed, ii) not currently working and iii) hold a degree that is “higher” than the highest credential associated with their registration/licensure. For this group, 11.7% of practical nurses hold an academic credential outside of their profession higher than their highest professional credential, as do 10.8% of registered nurses.

Second, some individuals may be incorrectly identified as not working in their trained occupation if they are dual job holders – practicing in their trained occupation part of the week but spending a greater number of hours in some other occupation. For example, the small number of physicians who spend most of their work time as hospital administrators or researchers may be identified as holding a medical degree, but their “main” occupation would likely not be coded as physician in the census data. This group of physicians is assigned as trained but not working, although we do not know if they are licensed to practice, nor whether they practice in their trained health profession for a minority of their hours per week.

Two concepts define the four population sub-groups at the core of our study: i) country of birth (Canada or the rest of the world), and ii) country where the highest level of professional education was obtained (Canada and the United States, or the rest of the world). We categorise education from the United States together with domestic Canadian education since many health education programs are similarly accredited. For example, the licensure exam for registered nurses has been common for Canada and the United States since 2015, and medical education in Canada and the United States has been highly integrated since the Flexner (1910<sub>[15]</sub>) report. We identify these four sub-groups as:

- i. CBCT: Canadian born, Canadian trained,
- ii. CBFT: Canadian born, Foreign trained,
- iii. FBCT: Foreign born, Canadian trained, and
- iv. FBFT: Foreign born, Foreign trained.

While place of birth is not a choice variable for individuals (i.e., it is exogenous), the location where the degree is obtained has some element of choice (i.e., it is endogenous). Also, some individuals may obtain additional – perhaps bridging or that is not relevant to the occupation – education in Canada prior to being licensed and they may report this educational input as their highest. Therefore, all interpretations need to keep in mind that there is likely important endogenous selection among the foreign born into place of highest education.

Under Canadian Medicare, involuntary non-employment and involuntary employment in an alternative occupation are virtually unknown for licensed physicians, but these outcomes do exist for registered nurses and practical nurses. For the province of Ontario, we explore this issue with the HPDB. In 2016, for example, at the time of registration with the relevant College, for those age 25 to 64 the ratio of those not working and seeking employment in the profession to those working was 4.7% for practical nurses, and 2.3% for registered nurses. Similar percentages for those working in a different occupation but seeking work in the profession were 2.4% for practical nurses, and 0.3% for registered nurses. These statistics should not be interpreted as unemployment rates; rather, they are the ratio of job seekers in the field to those working in the field. Also, beyond those working or seeking work in their profession in Ontario, many qualified individuals held licenses to practice but at the time of registration were voluntarily doing neither. Their situations included: working outside of Ontario, not working and not seeking work, working in a different occupation and not seeking work in their field of registration, or being on a leave of absence. In total, according to the HPDB, about 23% of practical nurses and 21% of registered nurses holding licenses to practice in Ontario were not practicing in the province at the time of registration.

#### **7.4. Foreign trained physicians and nurses have contributed to the growth in the number of physicians and nurses in Canada, but many have not found jobs in their profession**

For each of the four place of birth and place of highest education subgroups, Table 7.4 compares changes over time in the number of those working as physicians, registered nurses and practical nurses, and those reporting a relevant credential but not working in that occupation. As can be seen in the top right of each panel, the total number of physicians in Canada increased about 30% across the decade (Panel A), while

the number of registered nurses only increased by about 4% (Panel B). In contrast, the total number of practical nurses increased about 45% (Panel C), although there are measurement issues with practical nurses relative to the administrative data as discussed in detail in Annex 7.A. Nevertheless, these numbers are consistently estimated across census years, and the growth rates for both sets of nurses are very similar to those from the administrative data reported by CIHI (2007<sub>[16]</sub>). For comparison, the aggregate health and national workforces grew by about 28% and 14% respectively (Table 7.5), and Canada's population grew by about 11% between 2006 and 2016 (Statistics Canada, Table: 17-10-0009-01, 2019).



**Table 7.4. Comparison of Physicians and Nurses Working and Not Working in their Trained Occupation by Place of Birth and Training, 2006 and 2016**

		CBCT	CBFT	FBCT	FBFT	Total
<b>Panel A: MDs</b>						
Working (Count)	2006	37 045	390	11 245	7 745	56 425
	2016	45 300	1 565	13 860	12 885	73 610
	% Change	22.3%	301.3%	23.3%	66.4%	30.5%
Not Working in Trained Profession. (Count)	2006	3 620	185	1 530	10 940	16 275
	2016	5 165	645	2 355	21 325	29 485
	% Change	42.7%	248.6%	53.9%	94.9%	81.2%
% Working in Trained Profession	2006	91.1%	67.7%	88.0%	41.5%	77.6%
	2016	89.8%	70.8%	85.5%	37.7%	71.4%
	% Change	-1.5%	4.4%	-3.0%	-10.1%	-8.7%
<b>Panel B: RNs</b>						
Working (Count)	2006	187 285	665	25 670	17 440	231 060
	2016	184 445	575	33 780	20 595	239 400
	% Change	-1.5%	-13.5%	31.6%	18.1%	3.6%
Not Working in Trained Profession (Count)	2006	108 680	600	14 490	22 150	145 925
	2016	97 365	580	16 420	33 215	147 575
	% Change	-10.4%	-3.3%	13.3%	50.0%	1.1%
% Working in Trained Profession	2006	63.3%	52.6%	63.9%	44.1%	61.3%
	2016	65.5%	49.8%	67.3%	38.3%	61.9%
	% Change	3.3%	-5.6%	5.0%	-15.1%	0.9%
<b>Panel C: PNs</b>						
Working (Count)	2006	36 040	20	4 765	2 110	42 935
	2016	45 540	20	10 515	5 935	62 010
	% Change	26.4%	0.0%	120.7%	181.3%	44.4%
Not Working in Trained Profession (Count)	2006	44 340	120	4 400	1 650	50 515
	2016	38 625	30	5 710	1 140	45 505
	% Change	-12.9%	-75.0%	29.8%	-30.9%	-9.9%
% Working in Trained Profession.	2006	44.8	14.3	52.0	56.1	45.9
	2016	54.1	40.0	64.8	83.9	57.7
	% Change	17.1	64.3	19.8	33.1	20.3

Note: This table includes permanent resident MDs (2.0% in 2016, 1.1% in 2006) and RNs (0.5% in 2016, 0.7% in 2006) who report working in their main job outside of Canada. There are no such PNs. MDs working in their trained profession outside of Canada represent a small proportion of the working CBCT (0.4% in both years) and FBCT (1.0% in 2006, 2.1% in 2016), but a larger proportion of the FBFT (4.3% in 2006, 8.3% in 2016). RNs working in their trained profession outside of Canada represent a small proportion of each of the CBCT (1.0% in 2006, 0.6% in 2016), FBCT (1.6% in 2006, 0.9% in 2016) and FBFT (1.4% in 2006, 0.6% in 2016); they are 0% of CBFT in both years.

Source: Authors' calculations based on 2006 and 2016 Canadian Census.

For physicians, both the number of individuals working and the number not working have increased for each of the four population groups. Enrollment rates in Canadian medical schools have increased substantially (e.g., OECD (2017<sub>[17]</sub>)). Nevertheless, a disproportionate share of the increase in physicians in this period is from the foreign trained groups who increased their share of the workforce. This represents significant “brain gain” for Canada. However, there is also basis for concern about “brain waste” (and “brain drain” for sending nations). For the CBCT, FBCT and FBFT, the number reporting medical degrees whose main job is not working as a physician has increased so substantially that, despite the appreciable increases in the number of working physicians, the percentage of each of these three working in their training profession has actually declined, with the FBFT experiencing the most extreme drop. The very small CBFT group is the one exception to this pattern, with approximately equally large increases in both working and non-working groups. Looking across physician groups at the percentage working in their trained field, the two Canadian trained groups have broadly similar percentages (with the CBCT slightly higher) while the CBFT is lower and the FBFT lower again. This is consistent with earlier work by Owusu and Sweetman (2015<sub>[11]</sub>).

The data for registered nurses in Panel B provide a sharp contrast to that for physicians. The counts in both the working and non-working groups have increased only slightly across the decade. The absolute number of working and non-working registered nurses in both Canadian born groups declined, whereas that for the foreign-born increased – particularly for the FBFT not working in their trained profession. Overall, growth has occurred exclusively among the foreign-born groups, especially the FBFT.

Practical nurses, seen in Panel C, have experienced even steeper increases in the number working than physicians. These numbers are consistent with reports that employers are substituting lower cost practical nurses for registered nurses. At the national level, nursing labour force growth seems to be happening among practical rather than registered nurses. This increase is concentrated in the FBCT and FBFT groups (the CBFT group is effectively nonexistent for practical nurses). There have been substantial declines in the number and percentage not working in their trained field for the CBCT and FBFT, but not the FBCT, groups.

Table 7.5 Panel A presents the distribution of practitioners across the four population subgroups. For comparison, Panel B presents the same breakdown for the aggregate health and national workforces.

Comparing the share of physicians in each of the four groups to that of the entire workforce, the CBCT group is under-represented among physicians in both 2006 and 2016 while the CBFT, FBCT and FBFT groups are overrepresented. This table again shows that the phenomenon of Canadians going abroad to obtain medical education (i.e., their medical degree) and then returning to Canada to practice is growing. In the Canadian context, where provincial governments control the number of places in domestic medical schools, the relative underrepresentation of the CBCT group and the overrepresentation of FBCT and FBFT groups is a direct result of government policy.<sup>4</sup> The same policies can be interpreted as the motivation for the large increase in the number of CBFT physicians. More broadly, the pattern of change in the share of CBCT, CBFT and FBFT individuals is similar among physicians and the entire workforce, although it is attenuated for the entire workforce. In contrast, the FBCT represent a growing share growing of the entire workforce, but a decreasing one among physicians.

**Table 7.5. Distribution of Physicians, Nurses, and All Workers by Place of Birth and Training, 2006 and 2016**

Occupation	CBCT	CBFT	FBCT	FBFT	Total	Practitioners
<b>Panel A: Three Professions</b>						
MD						
2006	65.7%	0.7%	19.9%	13.7%	100.0%	56 425
2016	61.5%	2.1%	18.8%	17.5%	100.0%	73 610
%Change	-6.3%	208.7%	-5.5%	27.5%	--	30.5%

RN						
2006	81.1%	0.3%	11.1%	7.6%	100.0%	231 060
2016	77.0%	0.2%	14.1%	8.6%	100.0%	239 400
%Change	-4.9%	-17.2%	27.0%	13.9%	--	3.6%
PN						
2006	83.9%	0.1%	11.1%	4.9%	100.0%	42 935
2016	73.4%	0.0%	17.0%	9.6%	100.0%	62 010
%Change	-12.5%	-40.0%	52.8%	94.9%	--	44.4%
<b>Panel B: Aggregate Comparisons</b>						
Health Workforce						
2006	77.1%	0.3%	13.8%	8.8%	100.0%	766 615
2016	72.9%	0.5%	15.8%	10.8%	100.0%	980 715
%Change	-5.4%	71.8%	14.3%	22.4%	--	27.9%
Total Workforce						
2006	75.7%	0.4%	13.0%	10.9%	100.0%	8 791 265
2016	73.6%	0.6%	13.6%	12.2%	100.0%	10 019 030
%Change	-2.7%	27.4%	5.0%	12.0%	--	14.0%

Note: This table includes permanent resident MDs (2.0% in 2016, 1.1% in 2006) and RNs (0.5% in 2016, 0.7% in 2006) who report working in a main job outside of Canada. See Table 4 for details.

Source: Authors' calculations based on 2006 and 2016 Canadian Census.

StatLink  <https://doi.org/10.1787/888933970741>

Registered and practical nurses are more likely to be drawn from the CBCT group than is the case for the total health workforce. In contrast to physicians and the aggregate workforce, the CBFT group is small and declining for both groups of nurses. Canadians are not very likely to obtain foreign education in nursing and then return to practice in Canada. Compared to 2006, the 2016 FBCT group is much more likely to work in nursing, possibly as a result of Canadian bridging programs that select individuals from the FBFT and effectively move them to the FBCT. The share of registered nurses from each population group stayed relatively constant from 2006 to 2016, though the foreign-born groups make up a relatively larger share, as is the case with the aggregate workforce. Turning to practical nurses at the bottom of Panel A in Table 7.5, a large share (although from a small base, as can be seen in Table 7.4, Panel C), of their aggregate growth occurred among the FBCT and FBFT groups who make up a much larger proportion of the practical nursing workforce in 2016.

## 7.5. Conclusions

We observe that the rate of growth in the number of working physicians and practical nurses has increased much more substantially than total workforce growth, as has the rate of growth of the entire health workforce. In contrast, there has only been a minimal increase in the number of practicing registered nurses. Demand and supply – largely driven by government health expenditures, and immigration and education policy – do not seem to be operating similarly across these professions. For example, on the immigration front both the traditional stand-alone Skilled Worker immigration stream, and especially the recent Express Entry framework, have points systems that prioritise new immigrants with greater years of education and thereby treat these occupations asymmetrically. These issues point to the importance of considering occupation-specific factors when interpreting labour market outcomes.

Before 2006, there was a strong perception of physician shortages in Canada which, in the absence of policy change, were anticipated to become more serious given population aging. Provincial governments

took steps to increase enrollment in medical schools and facilitate the transition of internationally educated physicians to practice in Canada. In contrast, the low growth among registered nurses likely reflects a shift to lower cost providers (e.g., practical nurses) among occupations with overlapping scopes of practice.

One of the most striking observations is that the percentage increase in the number of foreign-born, foreign-trained professionals working in each of these three occupations increased faster –much faster in the case of physicians and practical nurses– than both the aggregate rate of labour force growth and the average growth rate of workers in each profession. Furthermore, the percentage increase in foreign-born, foreign-trained individuals reporting a relevant credential but not working in their training profession simultaneously increased appreciably. The net effect is that for both occupations, the percentage working in their trained occupation declined. Despite robust healthcare labour demand overall, excess supply is accumulating; Canada’s immigration system appears to be out of balance. This raises serious questions about “brain waste”.

Furthermore, although the numbers are small, more Canadians are studying medicine abroad and then returning to Canada to practice. We do not observe the same trend for either nursing category. This is consistent with there being limited access to training opportunities in Canada for physicians despite excess demand for those opportunities.

Beyond issues of labour demand, one issue hindering these internationally educated health professionals from entering the workforce is the challenge of successfully completing the relevant licensure exams. Moreover, many internationally educated nurses and international medical graduates would maintain that even meeting the requirements that allow them to register to take the required exams (including, for example, specialty certification exams in medicine) is a significant barrier. Of course, the main purpose of these exams is to protect the public’s interest in having high levels of safety and proficiency among health professionals. One approach currently being undertaken to address this problem is to administer relevant licensure exams internationally, so that potential migrants can write them before making a final decision regarding moving to Canada. For example, the Medical Council of Canada has recently begun offering Part 1 of its Qualifying Exam in over 80 countries, and registered nurses similarly offer the NCLEX-RN exam internationally.

This study highlights the contribution that foreign-trained health workers – be they Canadian- or foreign-born – have made to the growth in the number of physicians and nurses (particularly practical nurses) over the last decade. However, it also points to ongoing issues regarding the high (and increasing) percentage of qualified foreign-trained health professionals that are not working in their field of training, particularly for those trained as physicians and registered nurses.

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## Annex 7.A. Comparing data on physicians and nurses based on census and administrative sources

In this annex, we first describe our process for selecting the sample for analysis from the census. We then compare the count and characteristics of professionals in each of the three occupations in our census sample to health administrative records collected from regulatory Colleges.

In addition to the sample selection criteria discussed in the main body of the text, there are also specific criteria for the two categories of nurses. For registered nurses (RNs), we restrict the sample to those who report at least one year of postsecondary education (including trades/apprenticeship), as we do not include those whose highest educational field of study includes nurse aide, licensed practical nurse training, or other implausible fields (for example, engineering). For practical nurses (PNs), we restrict the sample to those who have at least a high school degree, and we again drop those whose highest educational field of study is implausible.

We compare our counts of professionals in each field to counts from the Canadian Institute for Health Information's (CIHI) administrative data. The counts of physicians (MDs) and RNs match well. However, there is a marked difference in the count of PNs between the two sources. For all three professions, one small contributor to the discrepancies is that our age restriction (25-64) is narrower than the age groupings in the administrative data. Another reason is that we are counting slightly different groups. In the administrative data, CIHI counts individuals who are employed and licensed to practice. In the census data, we can only see information about the job at which individuals work the most hours – i.e. their 'main job.' This means that we do not capture individuals who work in one of the three professions if they work more hours in a second, different, occupation. For example, we may not capture an MD who mainly works as an administrator but still takes one shift a week at a hospital. Similarly, we may not capture an RN who works as an RN casually or part-time if they work more hours at a different non-RN job. Another difference in scope is that the census captures the respondent's main occupation (or the most recent occupation for those not currently employed), at a point in time, whereas the administrative datasets have somewhat different definitions of "working in the profession". Additionally, as mentioned in the notes to Table 7.4, our sample includes those residents of Canada who are practicing in their main job outside of Canada.

### Annex Table 7.A.1. Comparison of data on physicians based on census and administrative sources, 2006 and 2016

	2006	2016
Canada (Count)		
Census: Working in Trained Field (Age 25-64)	56 425	73 610
CIHI: Registered to Practice with a Licensing Authority	57 835	75 269

Source: Authors' calculations from 2006 and 2016 Canadian Census; and from Supply, Distribution and Migration of Canadian Physicians Reports (CIHI, 2007<sup>[18]</sup>; 2017<sup>[14]</sup>).

To practice in Canada, doctors must be registered with their jurisdiction's licensing authority. CIHI's count of physicians registered to practice is very similar to our count of physicians working in their trained field from the census.

### Annex Table 7.A.2. Comparison of data on nurses (RNs and PNs) based on census and administrative sources, 2006 and 2016

	Panel A: RNs		Panel B: PNs	
	2006	2016	2006	2016
<b>Canada (Count)</b>				
Census: Working in Trained Field (Age 25-64)	231 060	239 400	42 940	62 010
CIHI: Employed in Profession (Under 65)	249 637	271 256	66 678	102 253
CIHI: Employed, Casual (all ages)	27 366	28 848	11 485	14 625
<b>Ontario Only (Count)</b>				
Census: Working in Trained Field (Age 25-64)	84 720	83 850	12 310	17 990
HPDB: Employed in Profession (Age 25-64)		86 906		39 351

Source: Authors' calculations from 2006 and 2016 Canadian Census; and from the HPDB; Regulated Nurses Data Tables (CIHI, 2016<sup>[19]</sup>; CIHI, 2016<sup>[20]</sup>; CIHI, 2017<sup>[21]</sup>).

There is a difference between the census and administrative counts for registered nurses. CIHI counts RN supervisors as RNs whereas the census separates them into two categories (RNs and supervisors). This might explain a large part of the difference. For example, in 2016, the census counts approximately 14 325 nurse supervisors (in addition to the 239 400 RNs). Furthermore, in the census data, we only include nurses over 25. However, nurses regularly graduate and being practicing around age 22. The youngest age group in CIHI's public data tables is 'under 30,' so we cannot see exactly how many under 25-year-olds our census count excludes. We include CIHI's count of casually employed RNs in Annex Table 7.A.2. We believe that some of them may report another 'main job' in the census which means we may not capture this entire group. We also look specifically at Ontario. For Ontario, we can compare the census count of RNs to a count from the Health Personnel Database (HPDB, described in the main body of the text). The Ontario counts are quite similar for both sources in 2016. Differences may reflect the 'main job' reporting issue.

There is a much larger difference between the census and administrative counts for PNs. Again, some of this is probably due to differences in the age restrictions. However, without any age or education restrictions, the census only reports around 74 000 PNs in 2016, which is still much lower than CIHI's 102 253 PNs. We include CIHI's count of casually employed PNs. We believe that some of them may report another 'main job' in the census which means we may not capture this whole group. PNs are more likely to be employed on a part time or casual basis than RNs. Based on the HPDB, in 2016, 32% of PNs worked less than 25 hours a week while only 19% of RNs worked less than 25 hours a week. We may therefore miss a higher proportion of PNs than RNs. Furthermore, PNs may also be misclassified as nurse aides or home care workers more often than a RN would be. These differences likely partly explain why the counts match better for RNs than PNs. Finally, there may be a nomenclature issue in the census reporting. For example, in the province of Ontario, PNs are called 'Registered Practical Nurses' whereas in the rest of the English-speaking provinces, they are called 'Licensed Practical Nurses'. This may have led to some misclassification in the census records. Unfortunately, these various explanations do not appear to fully account for the large difference between the administrative and census counts for PNs. This is an issue that Statistics Canada should consider addressing.



## Notes

<sup>1</sup> Arthur Sweetman holds the Ontario Research Chair in Health Human Resources. The empirical analysis was undertaken in the Research Data Center at McMaster University; we thank the staff for their tremendous assistance. The views expressed in the manuscript are those of the authors and should not be taken to represent the views of the Government of Ontario or Statistics Canada. We thank Andrew Leal for research assistance with the administrative data.

<sup>2</sup> The 2016 long-form census is a 25% sample of the population, whereas the 2006 census is a 20% sample: <https://www12.statcan.gc.ca/census-recensement/2016/ref/response-rates-eng.cfm>.

<sup>3</sup> Information regarding the HPDB can be found at: [http://www.health.gov.on.ca/en/pro/programs/hhrsd/evidence\\_research/health\\_professions\\_database.aspx](http://www.health.gov.on.ca/en/pro/programs/hhrsd/evidence_research/health_professions_database.aspx) (Feb. 20, 2019). These administrative data do not contain a measure of place of birth. All calculations are by the authors.

<sup>4</sup> Canadian physician shortages are frequently, and largely erroneously, attributed to the Barer and Stoddart (1992<sup>[23]</sup>) report; see Evans and McGrail (2008<sup>[22]</sup>) for a retrospective reinterpretation.



**From:**

## **Recent Trends in International Migration of Doctors, Nurses and Medical Students**

**Access the complete publication at:**

<https://doi.org/10.1787/5571ef48-en>

### **Please cite this chapter as:**

OECD (2019), "Brain gain and waste in Canada: Physicians and nurses by place of birth and training", in *Recent Trends in International Migration of Doctors, Nurses and Medical Students*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/c8129cbe-en>

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