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Help Wanted: How to Address Labour Shortages in Healthcare and Improve Patient Access

The existing labour supply and mix of professionals puts limits on the healthcare system's capacity. Enabling new methods and modes of care delivery, expanding scopes of practice and adapting certification/licensing requirements are useful policy tools for addressing health access and labour supply gaps.

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The Study In Brief

To address a pandemic, preserving and maintaining the healthcare system's capacity is critical. This *Commentary* evaluates factors contributing to healthcare labour shortages and investigates the inter-relationships between access to health services, the number of healthcare providers, compensation rates and migration patterns.

Addressing healthcare access challenges likely requires increasing the number of healthcare providers and also addressing inefficiencies in the combination of inputs – the mix of providers, facilities, tools and equipment.

Overall, the results suggest a critical and strategic examination of fee schedules for physician services, with the goal of reducing the average cost per service but strategically increasing remuneration for difficult-to-access services. Nurses and other care providers can increase the efficiency of healthcare delivery through expanding scopes of practice or filling gaps when there is a shortage of family or specialist physicians. However, there are, as well, shortages of nurses and other healthcare providers.

Another example of increasing the efficiency of healthcare services is the shift toward team-based care. A critical feature of both expanding scopes of practice and team-based care is effective communication and knowledge transfer between supervising specialists and care providers.

The time and costs associated with training new physicians make it infeasible to address labour shortages arising from a crisis or an unexpected population need simply through training more of the needed physicians. However, shifting methods and modes of care delivery, or adapting scopes of practice, are tools to address short-term healthcare labour supply gaps. Over the longer term, increasing the efficiency and supply of healthcare labour will require adapting medical education policies, remuneration and entry pathways to practising medical professions, as well as continuing to modernize care delivery methods, coordination and health data accessibility.

Policy Areas: Health Policy; Demographics and Immigration.
Related Topics: Healthcare Delivery and Management; Knowledge, Skills and Training.
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Gaps in access to healthcare have long been a challenge, but became a top priority in the midst of the COVID-19 infectious disease crisis.

A fundamental part of addressing these access challenges is addressing shortages in the labour supply able to provide healthcare services. In response to COVID-19, care delivery methods, hospital procedures and many other areas of healthcare are adapting. Much has been written about where government should invest in new capital to facilitate expanded virtual care, improve infectious disease protocols and preparedness, and make administrative changes. To be able to address backlogs in surgical care and waitlists for continuing long-term care, among other needs, investments in health human resources should be made, as should reforms to policies that affect the healthcare labour supply.

The existing labour supply and mix of professionals puts fundamental limits on the healthcare system's capacity, as does the availability of the necessary infrastructure, tools and equipment for those professionals to provide care. There are several reasons why labour is less discussed but is fundamentally no less important during a crisis. Many aspects of healthcare labour supply are not within the control of governments, and the significant investments in education and years to train new health professionals make it challenging to predict and address shortages.

This *Commentary* evaluates factors contributing to healthcare labour shortages and investigates the inter-relationships between access to health services, the number of healthcare providers, compensation rates and migration patterns. It then provides recommendations to address both short- and long-term imbalances in the supply of healthcare providers.

- Regression analysis of Canadian physician data shows a complex relationship among incomes, number of physicians per capita and the number of healthcare services. In particular, increasing physicians' incomes is associated with fewer services per capita, while a higher number of physicians per capita is associated with more services.
    - Overall the results suggest a critical and strategic examination of fee schedules for services, with the goal of reducing the average cost per service but strategically increasing remuneration for difficult-to-access services. For example, median wait times from referral to first visit with specialists in rheumatology, dermatology, plastic surgery, nephrology, respirology, gastroenterology, ophthalmology, orthopaedic surgery and psychiatry all exceed three months and exceed six months for 25 percent of patients (Figure 1).
- Nurses and other care providers can increase the efficiency of healthcare delivery through expanding scopes of practice or filling gaps when there is a shortage of family or specialist physicians. Some regions of Canada with few physicians have higher-than-average density of nurse practitioners and registered nurses suggesting that this is already occurring where physician labour supply shortages are most prominent.

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Key Concept Explainer

Physician Density and Access to Care: The low supply of physicians, particularly specialists, in Canadian provinces (on a per capita basis) is one hurdle to ease of access to medical care. How to address it? Analysis shows that increasing the remuneration of practicing physicians typically leads to their cutting back on hours or services.

A better way is to increase the supply of doctors. But the strict control of medical school admissions and number of Canadian residency program placements limit physician supply. Expanding the number of residency positions both for Canadian medical graduates and internationally trained ones, particularly in disciplines projected to be in short supply, could help to address long-term physician labour market imbalances. The requirement to be a permanent resident or citizen to qualify for Canadian medical residency programs reduces the potential for international trainees to crowd-out Canadian graduates from completing their training.

- Another example of increasing the efficiency of healthcare services is the shift toward team-based care. A critical feature of both expanding scopes of practice and team-based care is effective communication and knowledge transfer between supervising specialists and care providers.

Due to differences in access, immigration flows and healthcare labour supplies, each Canadian jurisdiction presents a different profile of related policies. As a result, each has different challenges or strengths that should inform policy strategies to address healthcare access gaps and future human resources planning.

The complex relationships among incomes, methods of care delivery and mix of professionals show that there are many ways to increase access to healthcare services. The time and costs associated with training new physicians make it infeasible to address labour shortages arising from a crisis or an unexpected population need simply through training more of the needed physicians. However, shifting methods and modes of care delivery, or adapting scopes of practice, are tools to address short-term health labour supply gaps. Over the longer term, increasing the efficiency and supply of health labour will require adapting medical education policies, remuneration and entry pathways to practising medical professions as well as continuing to modernize care delivery methods, coordination and health data accessibility.

COVID-19 and Healthcare Workers

To address a pandemic, preserving and maintaining the healthcare system's capacity is critical. Healthcare workers are the front line of defence against the worst consequences of a deadly global pandemic. As such, they are at increased risk of being exposed to the virus. For example, healthcare workers in the US and the UK were 3.4 times more at risk of receiving a positive COVID-19 test result than the general community (Nguyen et al. 2020). In May 2020, healthcare workers represented 17 percent of COVID-19 cases in Ontario, despite making up only 7 percent of employment (Pelley 2020, Statistics Canada 2019). In addition, those exposed or infected must isolate to prevent the spread of infection and aren't able to provide care.

The pandemic exposed pre-existing gaps in Canada's healthcare system in terms of preparedness,

labour policies and the risks posed to and by part-timers working in multiple locations with vulnerable patients or residents. Labour shortages and dependence on part-time, lower-wage employees were particular problems in long-term care facilities where the majority of Canada's COVID-19 fatalities have occurred (C.D. Howe Institute Working Group 2020). Restrictions imposed to prevent the spread of COVID-19 limited labour mobility and reduced contact with family visitors for senior residents. Together, they reduced the people available to supply formal and informal care. While reduced labour supply and mobility is particularly acute in the short term due to COVID-19, shortages of care providers pre-date the pandemic and, if not addressed, will become even more problematic as Canada's population continues to age.[1]

Meanwhile, pandemic-related restrictions in access to primary care services, routine and non-urgent treatments/surgeries, have affected more than Canada's seniors and have created a large backlog of services. For example, between March 15 and June 13, 2020, the estimated backlog in Ontario was 148,364 surgeries with an average weekly increase of 11,413 (Wang et al. 2020). So far, the consequences of these delays have had relatively minimal effects on health outcomes (Wyonch 2020). In part because changes were implemented across the country to improve continuity of care. Among them were activation of fee codes for virtual healthcare delivery and expansions in scope of practice for pharmacists in continuing pre-existing prescriptions (Blomqvist and Wyonch 2020).

Although access restrictions have had relatively little negative impact on general population health, the long-term health consequences of delayed services are not yet known. The fiscal pressure resulting from the economic consequences of more general COVID-related restrictions means that future government spending will need to be restrained and the efficient use of resources to strategically address healthcare gaps will become a top priority. Over the longer term, addressing the backlog of delayed services and improving access to healthcare will require addressing underlying imbalances in the health labour supply, inefficiencies in remuneration for services and the mix of health professionals providing care.

Health Professionals in Canada

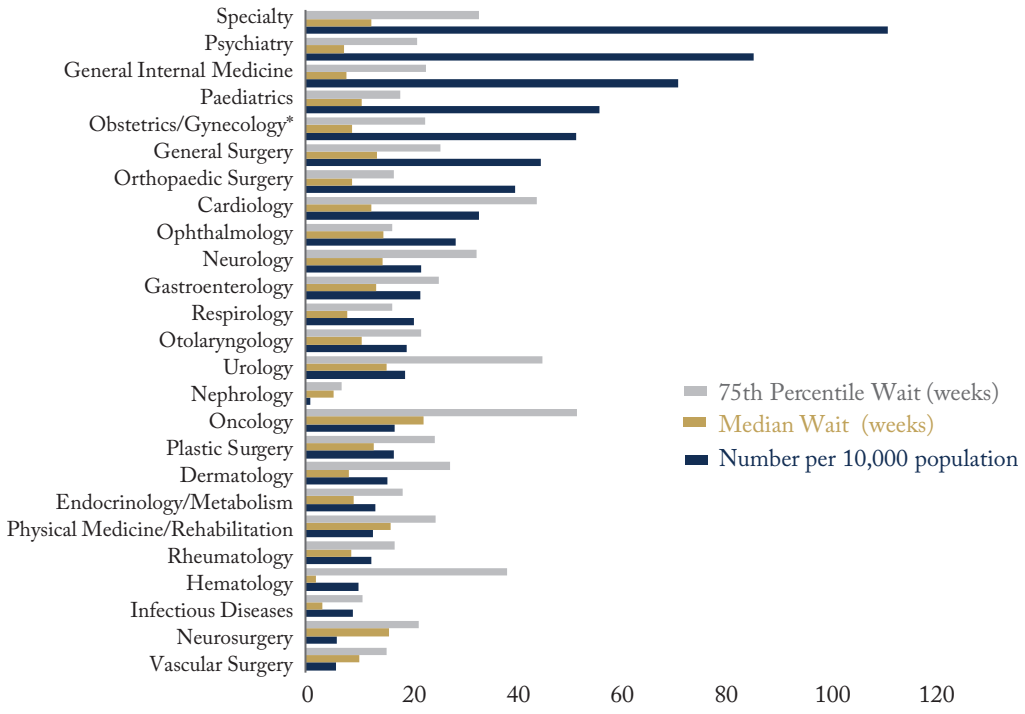
Relative to OECD countries, Canada has an above average number of general practice physicians and nurses, but fewer specialist physicians per capita.[2] The clinically ideal density of medical specialists, or ratio to population, depends on the needs of the population and is extremely difficult to quantify with certainty. There is in Canada, however, a lack of specialist physicians relative to population needs in some critical practice areas (Figure 1). For example, there are only 10.1 infectious disease specialists per 10,000 people throughout the country. While half of such patients are seen within two weeks, a quarter waited 38 weeks (Liddy et al 2020).

Despite psychiatrists being the most numerous among specialists, half of their patients wait at least 12 weeks before being seen following referral. There are only 18 pain medicine specialists in the country, which would seem to be an extremely

1 For example, there are 11.7 licensed geriatricians – the medical specialty that deals with the prevention, diagnosis, treatment, and remedial and social aspects of illness in older people – per 100,000 Canadians over 75. For comparison, there are 2,887 pediatricians in Canada, or 48.8 per 100,000 Canadians under 15 (Drummond and Wyonch 2020).

2 See online Appendix Table A1 for remuneration of health professionals, labour-supply density and population health outcomes data, by country.

Figure 1: Medical Specialties and Patient Wait Time From Primary Care Referral



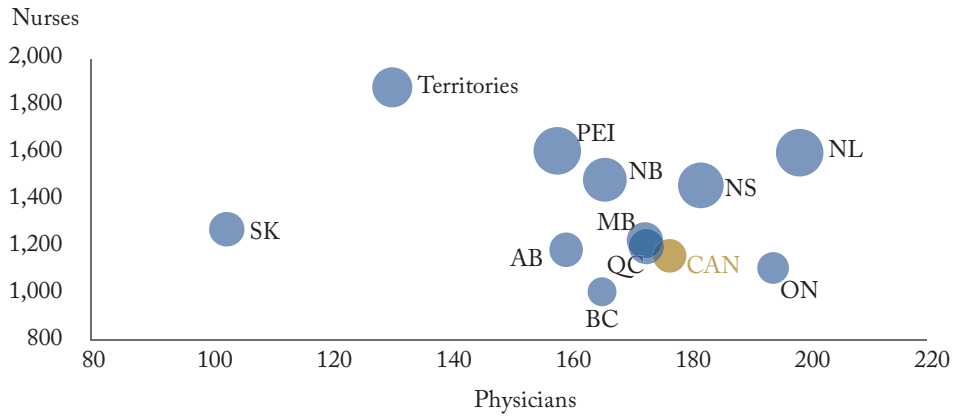
Sources: Canadian Medical Association (2019), Liddy et al. (2020).

small number given the ongoing opioid epidemic.[3] There are no pain medicine specialists whatsoever in the Territories, Saskatchewan, Manitoba, New Brunswick, PEI and Newfoundland and Labrador. Alberta and Nova Scotia have but one. Despite an aging population, there are only 304 geriatric medicine specialists (0.81 per 100,000 inhabitants). They are far outnumbered by paediatrics specialists, 8.81:1.

The ratio to population of physicians, other healthcare providers, and technical health and supporting occupations varies across the country. Saskatchewan and the Territories generally have a lower density of specialist physicians than the Canadian average (Figure 2). Saskatchewan also has fewer general practice physicians relative to its population than other Canadian jurisdictions. For their part, Alberta, PEI and Manitoba have relatively few surgical specialists (online Appendix

3 An estimated 19,400 Canadians were hospitalized and 15,400 died from opioid-related poisoning and overdose between January 2016 and December 2019 (PHAC). More than one in 10 people in Ontario, Manitoba, BC and Saskatchewan were prescribed opioids in 2018. See online Appendix Table A2_for physician density by province and specialty.

Figure 2: Health Workforce per 100,000 Population, by Province



Note: Size of bubbles indicates total health workforce size, including other health professionals and occupations. No data available for nurses' density in Nunavut.

Source: CIHI Canada's Healthcare Providers, Physicians in Canada, Nurses in Canada Datatables (2019).

Table 9), while Ontario and Newfoundland and Labrador have the highest physician density in Canada.

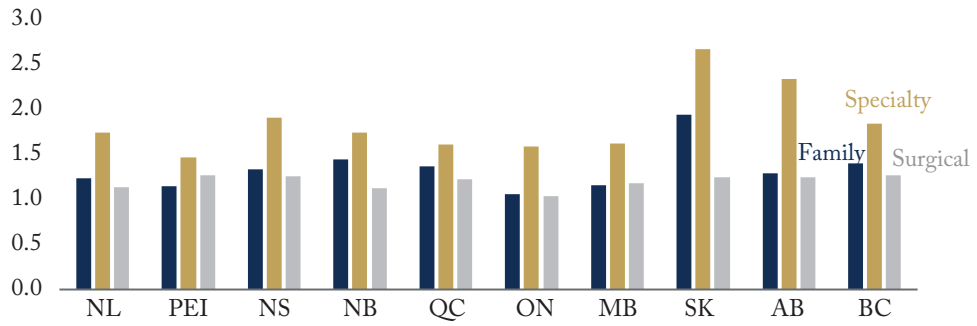
Other regulated health professionals and healthcare staff somewhat balance the differences in physician labour supply. The Territories and PEI have a higher density of nurse practitioners and registered nurses who can provide primary care services and supplement the practices of relatively few specialist physicians. PEI and Manitoba have an above average density of assisting healthcare employment. Nova Scotia has the highest density of healthcare providers (other than physicians and nurses) and technical and supporting health staff.[4]

Beyond the number of healthcare providers, variations in practices and working hours are other important factors in access to healthcare. Data from the Commonwealth Fund International Health Policy Survey show that Canada generally ranks poorly relative to other countries in the survey on access to a regular primary care provider (same, next day, evening or weekend appointments), and for physicians providing alternative arrangements for non-emergency treatment when their practice is closed (CIHI Commonwealth Fund International Policy Surveys 2016, 2019).[5]

As has been pointed out by other research, the national results obscure important interprovincial variations (Busby et al. 2018). In Quebec, physicians offer patients appointments on evenings and weekends at relatively high proportions, yet Quebec residents rank their access to evening and weekend appointments or a regular primary care provider much less favourably. Physicians in Ontario, Quebec and Alberta on average rank among international comparators for providing alternative

4 See online Appendix Table A2 for healthcare workforce density data summary by occupation and jurisdiction.
5 See online Appendix Table A3 for detail.

Figure 3: Ratio, Physicians Working (full or part time) to Full-Time Equivalents



Source: CIHI National Physician Database (2018).

access arrangements for patients. From the general population survey, Quebec and Newfoundland and Labrador fall below international comparators for patient access to care.

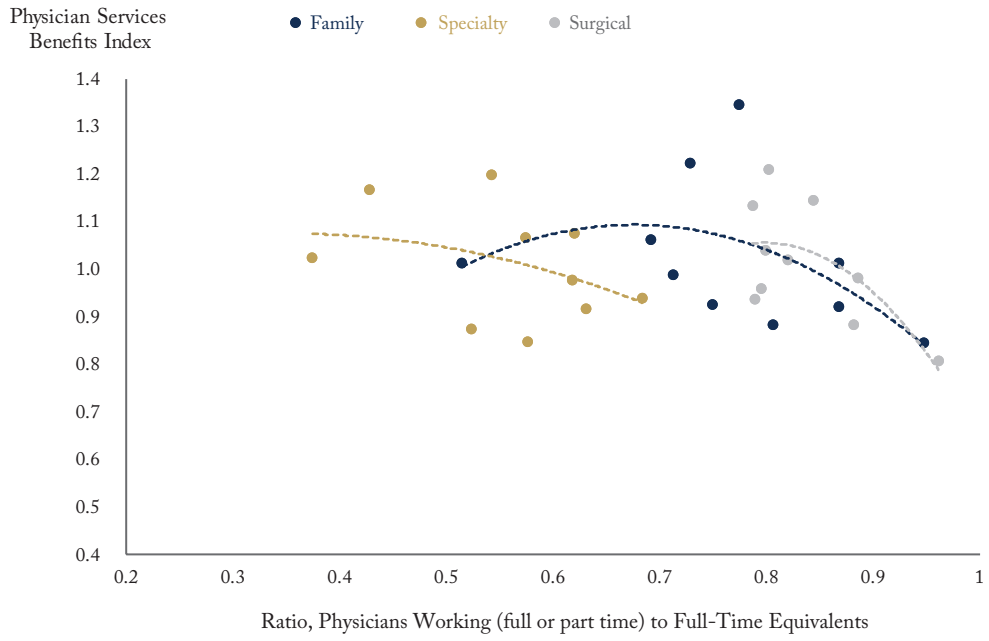
Health Human Resource Management and the Role of Earnings

Addressing challenges in providing access to healthcare involves many aspects of public policy. Increasing access to healthcare services and providers involves complex labour market factors. Entry to most health professions requires significant investments in education and training, as well as passing and maintaining licensing/certification requirements. Since most healthcare services are covered under publicly funded insurance, their costs are predetermined and do not respond to market conditions. Additional complexities come in the form of differing government funding, health employment practices and physician remuneration arrangements. As well, healthcare providers might have other responsibilities or take on additional roles such as teaching, consulting, or taking on administrative or management roles that reduce the time available for clinical practice.

Due to the complex nature of physician remuneration and labour supply decisions, comparing headcounts relative to the population can give misleading results about access to care, since many physicians work part time, some are semi-retired while others take on other roles and might provide minimal clinical care. In an attempt to address this analytical limitation, gross income per physician is used as a measure of output to model the "full-time equivalent" (FTE) number of physicians.[6] Comparing the count of physicians to the Canadian Institute for Health Information's estimated numbers of FTE physicians provides some insights into provincial variations in physician practices (Figure 3). Specialist physicians in Saskatchewan and Alberta appear to work fewer clinical hours than in other provinces: these

6 See Canadian Institute for Health Information (2019b) for data documentation and methodology of these estimates.

Figure 4: Physician Payments and Work Intensity



Note: Work Intensity is estimated by the ratio of full-time equivalent physicians to the number of physicians working (full or part time). Trendlines are polynomial (quadratic).
Sources: CIHI National Physician Database (2018), author's calculations.

provinces have more than twice as many specialist physicians than estimated full-time equivalents. Saskatchewan also has the highest ratio for family physicians. Meanwhile, Ontario family physicians and surgical specialists generally work the equivalent of full-time clinical hours.

A somewhat counterintuitive observation arises when comparing the ratios of physicians to their relative compensation rates, as measured by the physician services benefits index (Table 1). Higher benefit rates for services do not appear to increase the provision of services (Figure 4). For example, Ontario pays the lowest rates for family and surgical physician services, but also has almost equal physician counts and FTE estimates. Saskatchewan pays above average rates but has ratios of physician counts that imply most physicians provide only part-time services and procedures. This is particularly surprising given the province's relatively low physician density and a high proportion of its population reporting no regular primary care provider (CIHI CWF 2016, see online Appendix Table A3).

Normally, one would expect physicians to work more if they are paid more, especially when there are patients in need of treatment. There are, however, counterbalancing effects of increasing wages that make the effect on labour supply decisions ambiguous. People, including healthcare providers, seek a balance, based on their preferences, between working and leisure/lifestyle activities. When the wage rate increases, the increase encourages people to decrease their supply of labour and instead "consume" more leisure. Balancing this "income effect" is the "substitution effect": since wages are higher, the relative cost of spending time on leisure increases, which encourages people to

spend more time on earning income by supplying labour.[7]

For physicians, additional opportunities to earn income outside of medical practice through research, consulting or other roles will further induce trade-offs that are likely to reduce the proportion of hours spent on clinical practice. Research analyzing the relationship between service provision, practice and non-practice income has found that physicians respond to pay increases for an hour of clinical work by decreasing total clinical hours. There are also small reductions in clinical labour in response to increases in non-practice income (Thornton and Eakin 1997).

The weekly average amount of time that Canadian family physicians spent in direct patient care fell by approximately 16 percent between 1982 and 2003 as a result of a decrease in total hours worked rather than a substitution of time from patient care with other professional activities (Crossley, Hurley and Jeon 2009.[8] Meanwhile, research using individual-level physician data from Ontario found that an increase in general and family practitioner (GP/FP) weekly hours of direct patient care is associated with an increase in overall service provision. However, a decrease in billings per hour partially offset the increase (Jeon and Hurley 2007).[9] The authors conclude that, "Although increases in the supply of providers may be important long-run policies, in the near term the most effective means of increasing access would be to increase hours of work and service provision by the existing stock of practising physicians."

Table 1: Physician Services Benefits Index (Nationally weighted all services* indices and all services medians, by specialty and province, 2017/2018)

	Family	Specialty	Surgical
NL	88.26	84.82	88.26
PEI	92.08	93.90	113.37
NS	92.65	87.36	95.96
NB	106.12	106.71	98.05
QC	122.24	107.52	101.95
ON	84.48	91.73	80.69
MB	101.34	97.62	114.49
SK	101.25	102.38	103.90
AB	134.61	116.73	120.92
BC	98.75	119.79	93.65

Note: *Excluding imaging and laboratory services.
Source: CIHI Physician Services Benefit Rates (2017/2018).

To further investigate the relationship between health services per capita, physician remuneration and density, I utilize data from the Canadian Institute for Health Information's National Physician Database. The database contains utilization and payments information for physician services for the 2014/15-to-2017/18 period. To estimate the associated effects of changes to the number of physicians per capita and payments

7 For a more extensive discussion of labour economics theory related to physician labour supply, see Golden, Hannam and Hyatt (2012) and Hurley (2018).

8 Since female FP/GPs provide fewer hours of direct patient care, the growing proportion of female FP/GPs can explain part of the decline in average hours of direct patient care. However, the decline in average hours of direct patient care among male physicians contributes a larger share of the total change (Crossley, Hurley and Jeon 2009).

9 An additional finding from this research concerned the differences between urban and rural physicians. Although the result was not statistically significant, rural physicians already work more hours than urban physicians and practise more intensively. Policies to increase hours of patient care would likely be more effective when targeted at an urban setting.

Table 2: Health Service, Payments and Physician Density Regression Results

Intercept	22,838 ***	7,210 ***	63,410 ***	33,406 ***	37,122 ***	51,040 ***
Density	4,138 ***	4,187 ***	1,037 ***	4,073.6 ***	3,938 ***	920 ***
Average Payment		38.1 ***	9.43			-7.931
Cost per service				-139.95 ***	-143.283 ***	-35.77
Interaction (payment)			8.228 ***			14.01 ***
Interaction (cost per service)					2.079	-32.05 ***
Adjusted R^2	0.928	0.9295	0.9388	0.9316	0.9315	0.9469
	2,9890	2,9580	2,7550	2,9140	2,9140	25650

Notes: services per 100k population includes all billed consultations, assessments and procedures.

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.
See online Appendix for full regression tables. Additional controls included for medical specialty, provincial fixed effects and time trend.

Sources: National Physician Database (2018), author's calculations.

for physician services on the number of health services per capita, I use an ordinary least squares regression.[10] The results show, as expected, that a higher physician density is associated with more health services per capita. For example, one additional full-time physician is associated with about 4,000 more services (Table 2).

Similar to previous research, this analysis also finds a complex relationship between service delivery and remuneration for clinical services (Golden, Hannam and Hyatt 2012, Hurley 2018). Higher costs per service are associated with fewer health services per capita. Higher average incomes, however, are associated with only a slight increase in the number of services. Further investigation of the relationship between the number of physicians and remuneration shows that higher wages, particularly per service, are associated with slightly lower densities of FTE physicians, though the effects are small in magnitude and significance (Table 3).

These results, though not sufficient to draw causal links, suggest that increasing the density of FTE physicians would increase the number of health services delivered per capita. They also suggest that increasing the fees paid for particular services would not likely be an effective means of doing so. A $1 increase in the price of individual medical services is associated with about 1,430 fewer medical services and 0.2 fewer full-time physicians per million Canadians (Table 2 cols. 4,5

10 Additional controls are included for medical specialty, provincial fixed effects and time trend.

Table 3: Association of Payments with Full-time Physician Density, Regression Results

Covariate	Coefficient Estimate (Significance)			
Intercept	97.23 ***	96.337 ***	97.649 ***	101.8 ***
Average Payments ($ thousands)	-0.00516		-0.00486	-0.01406 *
Cost per service ($)		-0.0183 *	-0.0178 *	-0.07912 *
Interaction				0.00009348
Adjusted R^2	**0.7453**	0.7463	0.7466	0.7473

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1.

See online Appendix for full regression tables. Additional controls included for medical specialty, provincial fixed effects and time trend.

Sources: National Physician Database (2018), author's calculations.

and Table 3 cols. 2,3).[11] Higher average clinical incomes are associated with slightly higher service volumes, and there is a positive and significant interaction between average income and physician density. These associations, however, are small relative to the increase in services associated with increasing physician density (Table 2).

Somewhat surprisingly, there is not a strong correlation between average income[12] and physician density across Canada nor in OECD countries. After controlling for jurisdiction, specialty and time trend, both cost per service and total average payments are negatively associated with physician density in Canada. (Lower density does not lead to lower remuneration.) This negative association can be interpreted in a number of ways (Table 3).[13] Jurisdictions with few physicians might offer higher rates of pay in an attempt to increase the number of physicians or the clinical hours worked by the existing physician labour supply. It could also be the case, consistent with Thornton and Eakin (1997) and Jeon and Hurley (2007), that physicians respond to higher wages by reducing total hours worked. Density of physicians and remuneration, however, appear to be almost completely unrelated (in the case of specialists, negatively correlated) across countries (Table 4). The same is not true for nurses, where remuneration, health outcomes and

11 To provide context, in 2017/18 about 275.6 million medical services were performed in Canada.

12 Remuneration is measured in USD purchasing power parity for international comparisons.

13 This analysis is limited in that it does not distinguish between fee-for-service clinical income and other remuneration arrangements beyond including per-service costs distinct from average income and provincial fixed effects in the regression analysis. It is possible that factors related to payment mechanisms beyond dollar amounts could impact physician labour decisions.

Table 4: Health Professionals, Income and Health Outcomes: Correlation Across OECD Countries

	GPs	Specialists	Nurses
Density: Outcomes	0.291	0.103	0.497
Remuneration: Outcomes	0.562	0.371	0.356
Density: Remuneration	0.048	-0.218	0.473

Sources: OECD Health Care Resources (2020), 2017 or most recent available year, author's calculations.

the number per capita are all correlated positively, though not strongly.[14]

Canadian Physicians from Home and Around the World

Addressing gaps in healthcare access requires addressing gaps or shortages in the supply of health professionals able to provide treatments and services while meeting a number of sometimes conflicting objectives.

Healthcare human resource initiatives generally aim to increase efficiency, improve quality and/or improve equity (Zurn et al. 2004). Policies to improve efficiency include those aimed at reducing costs while maintaining similar outputs (service volumes, patient health outcomes) or those that significantly improve quality for marginal additional cost. Policies to improve equity relate to access, regardless of socioeconomic characteristics or location. Policies to improve quality incorporate new treatments, procedures or services into the healthcare system.

Healthcare human resource planners face major challenges in addressing access gaps, particularly in the short term, due to uncertainty about future population healthcare needs, the time and cost associated with training new health providers and the fact that physicians are free agents that can practise wherever they want, as long as they are licensed.[15] Opportunities to earn income outside of clinical practice, the complexity of physician remuneration mechanisms and variable fee structures further complicate matters.

In part due to this complexity, healthcare human resource planners and policymakers have several policy options to influence the supply of healthcare practitioners. Fees and other non-wage benefits such as recruitment bonuses, relocation assistance or tuition reimbursement can increase entry and retention in competing labour markets (Golden et al. 2012). Such incentives can also influence where in a particular province a physician would practise and help address access challenges in rural locations. The number of physicians can also be influenced at the provincial level by changing the number of funded residency positions and the process for

14 An interesting observation about nurses: of the 10 countries that pay nurses more than Canada, only three have worse population health outcomes (US, Denmark, Belgium) and, notably, outcomes from Denmark and Belgium are comparable to Canada, as are the wage rates (only small absolute variations).

15 Some physicians are bound by return-of-service agreements to practise in particular regions for a specified period of time following their training.

licensing internationally trained physicians. Work intensity, as previously discussed, is influenced by the rate and design of compensation mechanisms (salary, fee-for-service, capitation or mixed models).

Evidence presented thus far suggests that Canada would likely improve population health outcomes by increasing the number of healthcare providers but that increasing wages for clinical services would generally not be an effective way to do so.[16] International comparisons show a more straightforward relationship between the number of nurses (and other caregivers) and income and labour supply. These results suggest that policies intended to improve access to care by increasing the number of caring professionals should use different strategies for general and specialist physicians than other caregivers. How then should governments increase the supply of physicians? From a societal perspective, the fastest, cheapest and highest quality option is best. To evaluate different pathways of entry, I compare the time and costs associated with training and licensing new physicians.

Becoming a Canadian Physician: Time and Costs

The general requirements to practise medicine in Canada are a medical degree, a minimum of 12 months of post-graduate clinical training, a Licentiate from the Medical Council of Canada and certification by the Royal College of Physicians and Surgeons or the College of Family Physicians of Canada, with some provinces and territories having additional requirements. Regardless of where a person received their education, these requirements must be met. Comparing the costs associated with initial postsecondary and medical education shows that, on average, foreign students pay lower tuition fees by remaining in their home country or studying outside of Canada (Table 5). The higher tuition fees paid by international students studying in Canada exceed per-student average educational costs, resulting in a net financial gain for Canadian institutions (shown as public gain in Table 5). Conversely, Canadian students generally pay lower tuition fees in Canada than they would if studying internationally.

To qualify for post-graduate clinical training in Canada, applicants must first take the Part I Qualifying Examination of the Medical Council of Canada (MCCQE Part I).[17] Foreign medical school graduates (including internationally educated Canadian citizens) have the additional requirements of completing the National Assessment Collaboration (NAC) exam, an assessment of their practical clinical training and verification of their medical credentials.[18] In some cases, language proficiency exams might also be required, depending on individual university admission requirements for residency programs. For medical school graduates to be eligible to write the NAC and MCCQE Part I, the verification of medical credentials need only be in progress, not completed, and there is no requirement to complete the two in sequence.

Since there are multiple examination sessions throughout the year and the steps to becoming eligible for a Canadian medical residency can be completed concurrently, there are additional costs

16 The economic costs of COVID-19, restrictions imposed to combat its spread and the resulting fiscal position make such increases likely unfeasible and certainly not advisable.

17 Account set-up fee of $298, cost of MCCQE Part 1 is $1,305. Medical students can apply to write the Part I qualifying exam up to 15 months prior to their expected graduation.

18 Fees for the NAC are about $4,245 (administrative fee and application fee) with additional fees for rechecking or appealing the results of the exam. For a detailed list of fees associated with qualifying examinations, see the Medical Council of Canada's Service Fees.

Table 5: Medical Student Costs and Time by Location

	Annual Cost for OECD average		Annual Cost for Canada*		Time
	Domestic to Country	International Student	Domestic Student	International Student	
Undergraduate Education[i]	$2,676	$7,363	$5,286	$20,406	3-4 Years
Medical Degree[ii]	$1,270	$22,356	$16,840	$41,972	3-4 Years
Total Initial Education	$14,446	$115,194	$85,861	$239,309	~ 7.5 years
Public Cost/Gain [iii]			**-$91,889**	**$61,559**	

Sources and Notes:
i OECD Education at a Glance 2019. Indicator C5. How much do tertiary students pay and what public support do they receive? Public Institutions Bachelor's or equivalent.
ii OECD (2019), Recent Trends in International Migration of Doctors, Nurses and Medical Students, OECD Publishing, Paris, https://doi.org/10.1787/5571ef48-en. Table 2.4.
iii OECD Education at a Glance 2019. Indicator C1. How much is spent per student on educational institutions? Total expenditure on educational institutions per full-time equivalent student (2016). Tertiary Education. Author's calculation.
*Estimate of the cost of initial medical education is the average tuition and compulsory fees for Canadian medical schools in 2018. See online Appendix for detailed table.

for foreign medical school graduates in the form of additional fees and requirements. To qualify for a Canadian medical residency, an applicant must be either a citizen or permanent resident.[19] If internationally trained medical graduates (IMGs) complete their clinical training in Canada, there is little distinguishable difference in costs or time required to complete licensing.

However, Canadian medical school graduates (CMGs) have a significant advantage in securing residency positions in Canada (Figure 5). Applicants typically write MCCQE Part II during postgraduate residency training. Following residency training (typically two years for family physicians and an average of five for specialists), physicians must pass a licensing exam and meet any additional provincial requirements for independent practice.[20] IMG training positions usually include return of service agreements, meaning that the IMGs are obligated to practise medicine in a

19 It is very difficult for foreign-trained medical students to enter residency training in Canada. Individual provinces have specialized programs that allow a very small number of foreign-trained physicians or medical students to enter Canadian residency programs. However, entry into any residency positions are solely through the Canadian residency matching service (CaRMS) that also controls entry for the very small number of international medical graduates.

20 Physicians must obtain a licence from the licensing authority in the province or territory in which they practice.

particular area once they complete their training, normally rural or under-serviced regions (Bartman et al. 2020).[21]

Physicians who have completed both educational and clinical training requirements for licensing outside of Canada are required to pass both qualifying examinations and the NAC exam. Proof of postgraduate clinical training is required to write the final qualifying exam for all applicants, whether they are Canadian citizens, permanent residents or new immigrants. Experienced physicians who completed clinical training internationally may be exempt from further training as a requirement of initial licensure for practice if they qualify with individual provincial certification bodies.

Comparing the costs and time to train new physicians to the alternative of experienced foreign physicians becoming licensed to practice in Canada shows clear benefits to encouraging health workforce immigration. The main difference occurs in undergraduate and medical education, as opposed to post-graduate licensing. The higher tuition fees paid by international students generally outweigh the investment costs of providing their education. There is little difference in the cost to apply and write qualifying examinations between international and domestic physicians. Internationally licensed physicians, however, have the benefit of possibly becoming licensed for independent practice sooner. Similarly, IMGs requiring postgraduate training contribute to addressing gaps in care in rural and underserviced regions through return of service agreements, following completion of residency and licensing requirements.

Difficult Match: International Medical Graduates and Canadian Residencies

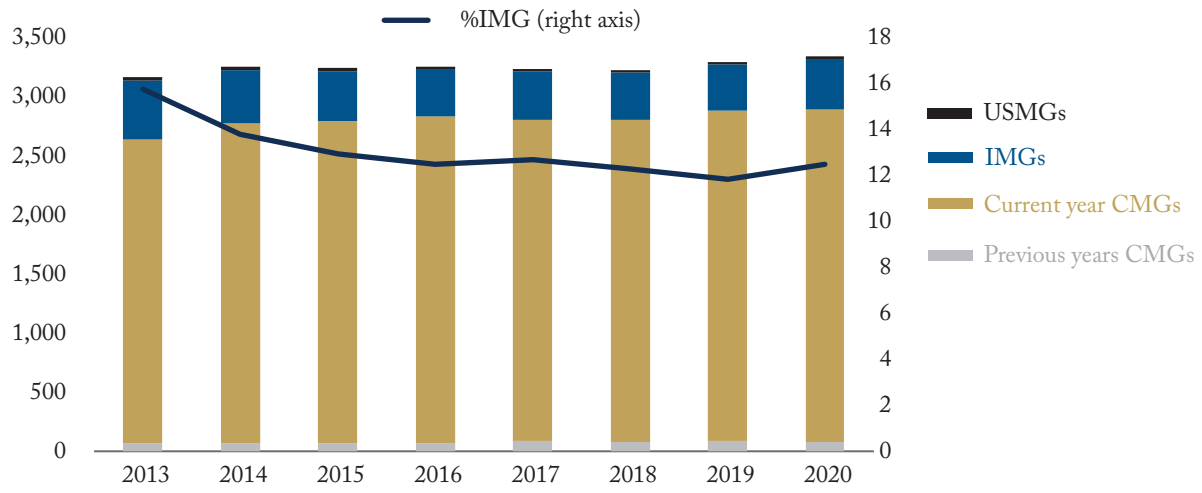
The strict control of medical school admissions and number of Canadian residency program placements limit physician supply. Expanding the number of residency positions both for Canadian medical graduates and internationally trained ones, particularly in disciplines projected to be in short supply, could help to address long-term physician labour market imbalances.

The requirement to be a permanent resident or citizen to qualify for Canadian medical residency programs reduces the potential for international trainees to crowd-out Canadian graduates from completing their training. In fact, the strict limits on admission to Canadian medical schools result in many Canadians studying medicine abroad. In 2010, about 3,500 Canadians were enrolled in medical schools abroad and more than 90 percent of those surveyed wanted to return home for post-graduate training (CaRMS 2010). Meanwhile, about 12 percent of residency positions are filled by IMGs, or fewer than 500 per year (Figure 5).[22] In 2020, 29 percent of IMGs who applied for a Canadian residency were matched compared to 97 percent of CMGs (CaRMS 2020). Research on the success of Canadians who study medicine abroad (CSAs) in obtaining either Canadian or US postgraduate training positions shows that many have difficulty in obtaining a residency. In the 2004–2016 period, 20 percent of Canadians studying medicine abroad entered post-graduate training in Canada, 42 percent in the US and 3

21 For example, IMGs who accept a residency position in Ontario must provide five years of full-time service in an eligible community: those outside major urban centres. Quebec and Alberta are the only provinces that do not require that IMGs enter return-of-service agreements.

22 In the first iteration of residency matches, only Quebec evaluates IMGs and CMGs competitively. All other provinces have a separate stream of positions available to IMGs. In the second iteration of residency matched, most provinces evaluate graduates competitively.

Figure 5: Entry to Medical Postgraduate Training (Residency Positions) in Canada



Note: USMGs refers to US-trained medical school graduates. IMGs refers to internationally trained medical school graduates. CMGs refers to Canadian-trained medical school graduates.

Source: CaRMS 2020.

percent elsewhere. At the time of analysis, about one-third had not secured residency positions in either Canada or the US (Bartman et al 2020).[23]

The large number of Canadian students studying medicine abroad suggests that expanding domestic medical school admissions and the number of residency positions is advisable. Just as international students pay more for their education in Canada, resulting in a net public gain, Canadians studying abroad represent lost economic potential, especially if they do not return to Canada following their studies.[24]

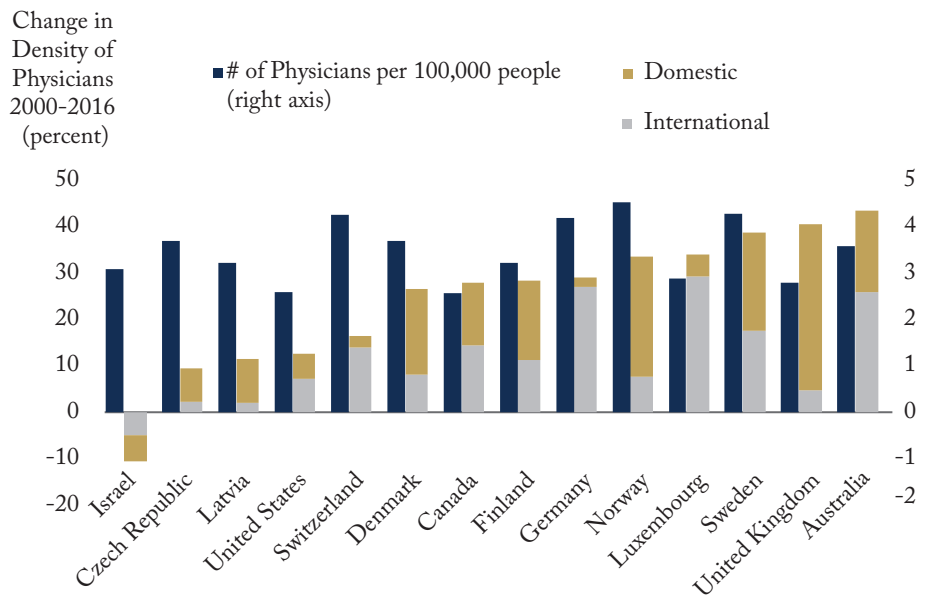
Although medical school tuition varies significantly by location, CSA median debt was about $160,000 in 2010, compared to the CMG median debt of $71,000 in 2007 (CaRMS 2010).[25] Since the majority of CSAs intended to return home, it would be reasonable to increase the number of physicians able to receive their education and post-graduate training in Canada. Furthermore, the limited number of residency positions available to IMGs suggests that Canadians returning from abroad might be crowding out immigrating

23 The ultimate success rate is likely underestimated since some recent candidates may be re-applying. The study cohort included CSAs who applied for both Canadian and US residency programs.

24 90.3 percent of CSAs attended a post-secondary institution in Canada prior to studying medicine internationally. Since their undergraduate education is publicly subsidized, there is a direct economic loss from highly educated Canadians moving abroad.

25 The difference in debt between Canadians who graduated domestically or internationally is roughly equivalent to the public costs of subsidizing the domestic graduate (Table 5).

Figure 6: Growth in Number and Migration of Physicians



Sources: OECD (2019), author's calculations.

physicians and trainees from gaining Canadian medical credentials/certification.[26]

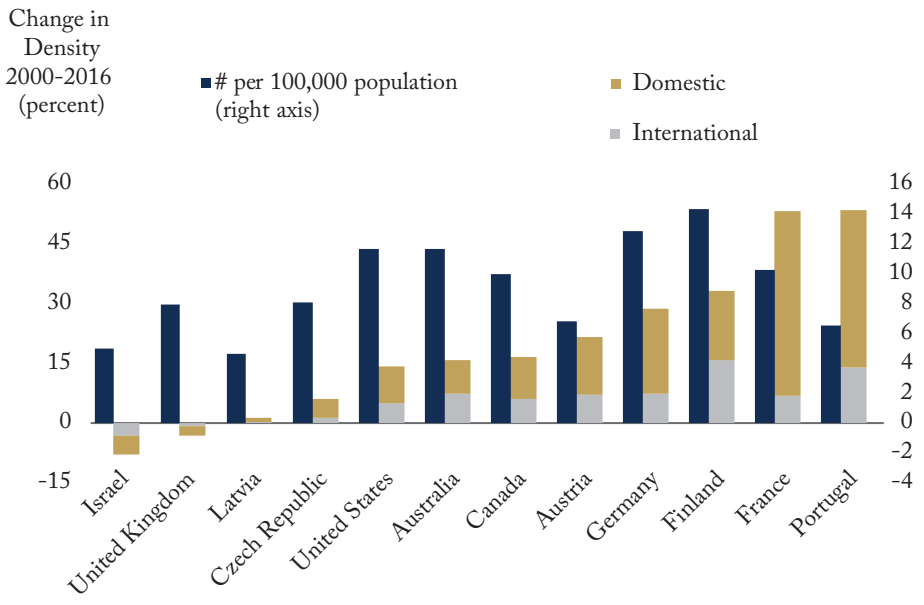
The capacity of medical schools and post-graduate residency training programs are major determining factors in the number of physicians. Each province should critically examine the pathways to entry for practising medicine and make adaptations to the number of positions available as well as the competitive dynamics of securing residency positions.

Migration of Health Professionals

Despite the difficulties in becoming licensed in a new jurisdiction, healthcare providers have become an increasingly global workforce in recent years. From 2000 to 2016, the immigrant physician density in OECD countries has increased on average by three percentage points to 27 percent (OECD 2019). Over the same period, the number of physicians per capita in Canada grew by 27 percent, driven equally by domestic and foreign physicians (Figure 6). In Germany, Luxembourg and Switzerland international physicians

26 With more than 700 CSAs graduating annually and about 90 percent wishing to return to Canada, there are likely more Canadians competing for IMG residency positions than are available in a given year. Fewer than 500 residency positions are matched with IMGs and about 25 residency positions are filled with graduates of US medical schools.

Figure 7: Growth in Number and Migration of Nurses



Sources: OECD (2019), author's calculations.

contributed more than 80 percent of the density increase.

Meanwhile, the number of nurses per capita has increased in most countries over the same time period, with the increase in Canada similar to the international average (Figure 7). However, international professionals contributed less to the growth in nurses than for physicians: they accounted for less than half of the increased density across all countries for which data were available (OECD 2019). In Canada, such international migration has been significant, accounting for more than a third of the increase.

Overall, net migration flows show Canada gained only 128 physicians from international migration from 2000 to 2018 (Table 6).[27] For part of that period, from 2004 to 2016, there was positive net international migration of physicians in Canada. However, from 1990 to 2003, more physicians moved out of the country than moved in. BC, Alberta, Ontario and PEI are the only jurisdictions to benefit from both domestic and international physician migration over the past two decades (Table 6). In Saskatchewan, Manitoba, Quebec and Newfoundland and Labrador there is negative net domestic and international physician migration.

27 Data for 2017 are unavailable, but included in 2018. International migration flows do not include immigrants or foreign-educated graduates who were first licensed to practice medicine in Canada.

Table 6: Cumulative Net Migration Flows of Physicians in Canada, by Jurisdiction, 2000-2018

	International	Domestic	Percent of Physicians Trained Internationally	Percent of Physicians Trained within Jurisdiction
Canada	128		26	73
NL	-3	-500	36	51
PEI	5	4	14	0
NS	5	-264	31	43
NB	-5	-98	25	0
QC	-26	-365	9	84
ON	77	737	30	54
MB	-33	-473	34	51
SK	-63	-726	53	34
AB	34	333	34	39
BC	134	1,369	30	29
YT	-2	-4	21	0
NWT	4	-12	27	0
Nun.	1	-1	18	0

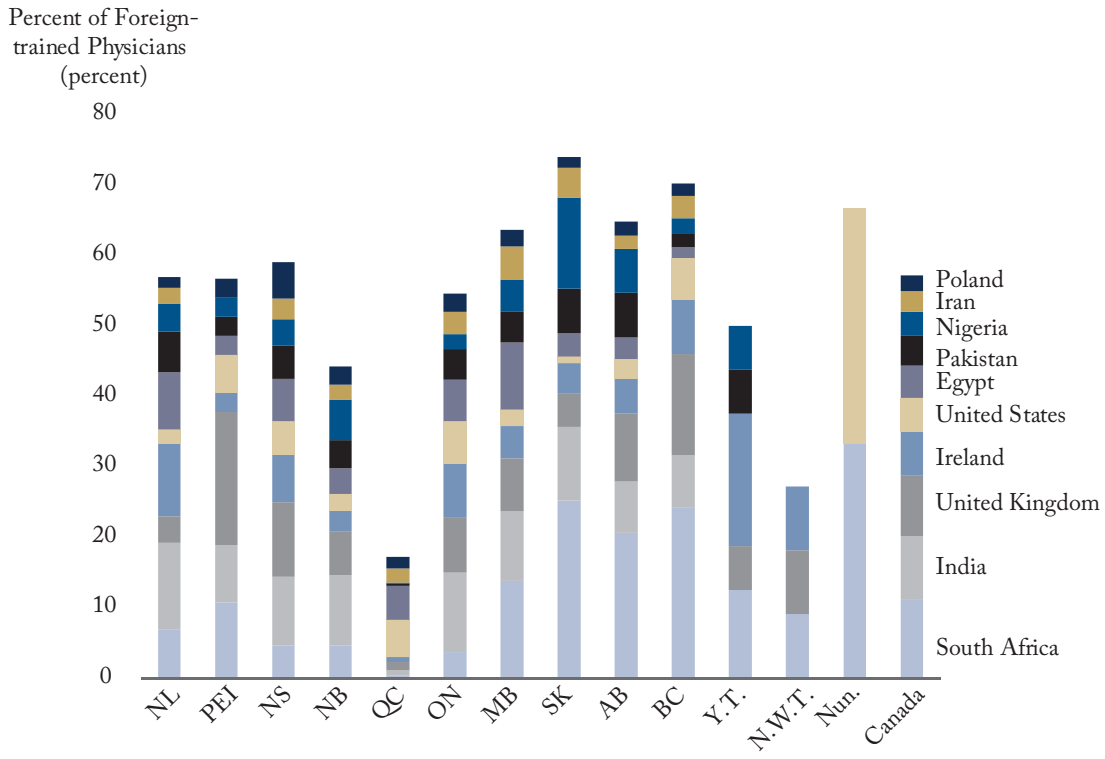
Notes: International net migration statistics are calculated by subtracting the number of physicians moving abroad from the number returning to Canada.

Sources: CIHI, Scott's Medical Database (2018).

Comparing migration flows to the physician labour force in each province shows that there is little to no relationship between domestic or international migration and the proportion of physicians who received their training outside of Canada. Saskatchewan has the highest proportion of foreign-trained physicians and also the largest net migration outflows.[28] This observation suggests that addressing migration outflows would be a better way for the province to improve access to health services than increasing international immigration.

28 A reviewer noted that Saskatchewan and Newfoundland and Labrador have historically been the easiest provinces for non-Canadian physicians to enter. Historically, physicians would immigrate to one of these provinces, work for a few years to obtain their Canadian licence and then leave for another province. This could explain the high outflow of physicians from Saskatchewan and Newfoundland and Labrador.

Figure 8: Foreign-Trained Physicians by Number and Source (top 10 countries)



Sources: CIHI, Scott's Medical Database (2018).

For its part, Quebec has the lowest proportion of foreign-trained physicians – fewer than one in 10 physicians were trained abroad. It also has the highest proportion of physicians trained within the province (84 percent).[29] And while Quebec has also experienced negative domestic and international net migration flows, the outflow has less impact on the number of physicians per capita than in Saskatchewan. The low level of internationally trained physicians in Quebec can be at least partially explained by significantly lower medical school tuition rates for Quebec residents studying at Quebec universities and, possibly, by additional language requirements/barriers. Still, the low proportion of internationally trained physicians suggests an opportunity for Quebec to increase access to healthcare by increasing physician immigration.[30]

29 About one-third of physicians who were educated and work in Canada were trained in Ontario (34.6 percent) and Quebec (32.1 percent).

30 Quebec is the only province to competitively evaluate IMGs and CMGs for residency positions in the first iteration of matches. All other provinces have a separate stream of positions for IMGs from Canadian graduates.

Overall, domestic migration has larger effects on physician labour supply than does international migration. Given the standardization of qualifying examinations across Canada, it is easier to become licensed in a new province/territory than it would be in another country for physicians already licensed in a Canadian jurisdiction. Ontario, Alberta and BC are the only provinces to consistently have positive net domestic migration of physicians. Saskatchewan and Newfoundland and Labrador have the highest outflow of physicians to other jurisdictions in Canada.

Caring as a Team: Improving Access and Reducing Costs

Addressing healthcare access challenges likely requires increasing the number of healthcare providers and also addressing inefficiencies in the combination of inputs – the mix of providers, facilities, tools and equipment. The previous section examined possible policy mechanisms for directly influencing the number of physicians in Canada while this section examines strategies for addressing access challenges by increasing the efficiency of the existing healthcare labour supply. In particular, by expanding scopes of practice for various healthcare providers, increasing efficiency through strategic use of limited specialist expertise and redefining models and modes of care.

The results of this and other analyses suggest that paying higher rates for physician services would have a negative effect on the number of services provided per capita (Table 2). Part of the complexity in determining the relationship between payments for clinical services and physicians' clinical output is due to the underlying complexity of physician remuneration[31] methods and the ability of physicians to earn sometimes significant income from non-clinical work. Non-clinical work could include supervising the practice of others, teaching medical students and providing expert advice to health managers and government policymakers, to name a few. These activities provide value to the healthcare system in more indirect ways, and in some cases it might be optimal for physicians to spend only a small portion of their time on direct patient care. This is particularly the case for specialists in short supply.

Gerontology provides an illustrative example of adapting to labour shortages and the relationship with clinical service hours. There are far too few geriatric specialists to be able to provide care to the number of seniors requiring their services (0.81 per 100,000 people).[32] These seniors instead depend on other specialists and their primary care provider(s), who in turn might not have the expertise to manage a particular patient's needs. If those providers can seek the advice of one of the few gerontologists in the country, the patient can receive similar care to that available if they had access to a specialist.

Similarly, as the management of chronic disease related to aging has become part of routine primary care, medical schools have responded by increasing the focus on elderly care. As a result, many of Canada's geriatric specialists spend much of their time teaching medical students or consulting with other care providers. These new graduates and specialist-empowered primary care providers have a higher capacity to provide what was previously seen as specialist care, expanding the scope of primary care. This has rather obvious positive benefits in

31 See Blomqvist and Wyonch (2019) for an in-depth discussion of physician remuneration methods.

32 Median wait times from referral to first visit with specialists in rheumatology, dermatology, plastic surgery, nephrology, respirology, gastroenterology, ophthalmology, orthopaedic surgery and psychiatry all exceed three months and exceed six months for 25 percent of patients (Figure 1).

terms of access to healthcare, but it also counter-intuitively requires specialists in short supply to reduce direct patient care.

Nurses and other care providers facilitate the increase in the efficiency of healthcare delivery through expanding scopes of practice or filling gaps in access to care when there is a shortage of family or specialist physicians. Some regions of Canada with few physicians have higher than average density of nurse practitioners and registered nurses suggesting that this expansion is already occurring where physician labour supply shortages are most prevalent. However, there are, as well, shortages of other healthcare providers. For example, Canada has one of the lowest ratios of long-term care (LTC) workers to seniors in the OECD; 3.5 workers for every 100 seniors, well below the international standard of 8.2. The Canadian Medical Association estimates that the total annual cost of expanding the LTC workforce to the international standard could range from $9 billion to $14 billion, depending on wage rates (Drummond, Sinclair and Bergen 2020). Labour supply decisions in nursing professions demonstrate a more straightforward association with incomes than physicians; meaning increasing wages would likely be an effective way to increase the density of nurses without significantly reducing the labour supplied by already practising nurses.

In response to COVID-19, many provinces expanded or adapted scopes of practice for many medical professionals to improve continuity of care in the midst of access restrictions. Giving other health professionals – nurses and pharmacists, in particular – more authority to prescribe drugs and make certain treatment decisions could alleviate the consequences of delays or further restrictions in access to treatment (Blomqvist and Wyonch 2020). Rules with respect to scope of practice are controversial, both because it is important to ensure that treatment decisions are made by properly trained professionals and because they can affect incomes in different health professions. To make any such new rules less controversial, they should be made temporary and reviewed at regular intervals as the current crisis proceeds.

Relaxing restrictions on scope of practice aligns with temporary/emergency licensing of medical graduates and retired physicians and other actions already taken to increase the system's surge capacity. If provinces do decide to proceed further along these lines, they should do so quickly so that the new rules are operationally effective in time to help expand surge capacity in the current pandemic. Following the crisis, policymakers should evaluate maintaining expanded scopes of practice for some services and continuing their expansion where appropriate in consultation with healthcare professionals.

Another example of increasing the delivery efficiency of healthcare services that incorporates expanding scopes of practice as well as efficient use of limited specialist expertise is the shift toward team-based care and, more generally, value-based healthcare. Team-based care involves the provision of healthcare services by at least two providers who work collaboratively with patients and their caregivers to accomplish shared goals within and across settings to achieve high-quality, coordinated care (Mitchell et al. 2012). Analyses to date of the quality and cost of team-based care do not yet provide a comprehensive, incontrovertible picture of success. Still, reviews indicate that team-based care can result in improvements in both healthcare quality and health outcomes, and that costs may be better controlled, particularly in transitional care models (Schottenfeld et al. 2016, Blomqvist and Wyonch 2019).

A critical feature of team-based care and expanding scopes of practice is effective, consistent communication and knowledge transfer between

supervising specialists and care providers.[33] It is likely that the appropriate team structure varies by situation: the needs of patients, the availability of staff and other resources, and more. Despite the pervasiveness of people working together in healthcare, the explicit uptake of inter-professional, team-based care has been limited. At the most basic level, establishing and maintaining high-functioning teams takes work. In economic terms, if the transaction costs of team functioning outweigh the benefit to team members, there is little incentive to transition to team-based care. Some of the specific costs that may be restraining forces include lack of experience and expertise, cultural silos, deficient infrastructure and inadequate or absent reimbursement (Keller 2013, Blomqvist and Wyonch 2019).

Although there are numerous examples of moving toward team-based care in Canada – Ontario Health Teams,[34] Alberta Primary Healthcare Integration Network and Accountable Care Units in Saskatchewan hospitals,[35] for example – the evidence of their effectiveness, though generally positive, remains mixed in some cases. One analysis of Canadian accountable care organizations found two primary challenges to their effectiveness and expanded implementation: access to and use of electronic medical records, especially across regional boundaries or disciplinary silos, and continuing challenges in achieving care coordination (Peckham et al. 2018).

Improving the accessibility and comprehensiveness of medical health records will require both investment in the appropriate infrastructure and policy changes to enable data linkages and sharing among providers while maintaining appropriate security and privacy of individual data. The COVID-19 pandemic has highlighted that critical health data suffer from one or more of the following challenges: timeliness, completeness, or the ability to integrate with other data. These issues inhibit health system responses to the pandemic's most pressing system and policy issues, including the recovery plan (Wyonch and Maqbool 2020). With few exceptions, however, the data issues align with previously expressed longer-term data needs. Filling the data gaps will address a broader set of purposes and create a stronger data foundation.

While adapting practices, policies and funding mechanisms to increase the digitization of healthcare has been ongoing – and challenging – for many years, the pandemic has spurred a digital healthcare revolution in Canada. As of February 2020, fewer than 25 percent of family physicians in Canada made themselves available by email and only 4 percent provided video visits (Vogel 2020). By June 2020, virtual healthcare represented more than 70 percent of the ambulatory care provided by hospitals and doctors' offices across the country (Bhatia et al. 2020).

The rapid shift to virtual care delivery was in response to the risk of COVID-19 infection and transmission but had a number of benefits for both patients and providers in terms of improving access,

33 See Wagner et al. (2017) and Schottenfeld et al. (2016) for further discussion of core principles and innovative practices for effective team-based care.

34 See Blomqvist and Wyonch 2019 for an extensive discussion of primary care patient enrolment models, physicians' remuneration and health teams in Ontario.

35 Saskatchewan's program is focused on hospital in-patient wards with the goal of reorganizing care delivery to be team based and designed to achieve "effective clinical microsystems (Stein et al. 2015)." An evaluation of outcomes during a Regina unit's first six months found reductions in code blue calls, complaints to the client advocate, length of stay (down 18 percent) and time spent in the emergency department. It also reported improvements in a variety of evidence-based care processes and clinical outcomes. Over this same period, admissions to the unit rose by more than 8 percent. For more information, see Stein et al. (2015) and Taylor et al. (2017).

reducing the costs of contact[36] and maintaining continuity of care in the midst of disruption. Virtual healthcare has the potential to improve access to some services in rural and remote regions with shortages of healthcare providers. To maintain the improvements in digital healthcare delivery, policy at all levels needs to consider the issues of equity, population health management and integration. Bhatia et al. (2020) recommend using a series of three questions to consider what care is needed, whether it can be delivered virtually and/or physically, and how it should be delivered. New regulations and system management tools will be necessary to facilitate better coordination of care and expanded implementation of team-based and virtual care solutions.

Discussion and Policy Recommendations

COVID-19 has forced countries around the world to evaluate their healthcare systems to adapt to the pandemic's challenges. The crisis has resulted in significant restrictions on access to healthcare in the short term, while the long-term implications are unknown. In addition, healthcare workers exposed to COVID-19 need to self-isolate to prevent the spread of further infection. Restrictions limiting part-time workers to one location/facility have further diminished labour supply available to provide routine and crisis healthcare. Even prior to the crisis, the provinces generally do not rank favourably among international comparators in terms of access to a regular primary care provider, wait times for an appointment, alternative care arrangements and appointment bookings outside regular business hours (online Appendix Table A3).

Addressing access challenges in healthcare likely requires increasing the number of providers and also addressing inefficiencies in the combination of inputs – mix of healthcare providers, facilities, tools and equipment. Increasing the supply of physician labour presents a complex puzzle for health human resource planners. The results of this and other analyses suggest that paying higher rates for physician services would have a negative effect on the number of health services provided per capita (Table 2).

Evaluating the differences in the cost and time associated with training new doctors and re-licensing international ones show clear public benefit in encouraging immigration of both medical students and foreign physicians. Migration flows, both domestic and international, currently only benefit a few provinces with other jurisdictions losing more physicians than they gain over time (Table 6). Due to differences in access, immigration flows and health labour supplies, each jurisdiction presents a different profile. As a result, each has different challenges or strengths that should inform policy strategies to address health human resource gaps (Table 7).

Addressing shortages in the labour supply of other health providers follows similar reasoning to that of physicians. The barriers to entry in the form of education and licensing requirements for nursing, pharmacy or other regulated health professions are still quite significant, meaning that there are likely still significant benefits to encouraging the immigration of these skilled professionals. Across OECD countries, the migration of nurses has contributed to growth in domestic labour supplies but at lower proportions than for physicians. Nursing professions also demonstrate a more

36 For patients, there is no time or cost to travel to appointments, no time spent in waiting rooms and no need to arrange childcare or time off from work. For providers, virtual visits provide access to patients without potential for exposure to COVID-19 or other transmissible diseases, reduced use of personal protective equipment and less time and supplies used to clean examination rooms between patients.

Table 7: Physician Labour and Migration, Observations and Policy Recommendations, by Province

Newfoundland and Labrador	• High density of nurses and physicians per capita and compares favourably on access to a regular primary care provider but not timeliness of appointments or access to care during non-standard hours, relative to other provinces (online Appendix Table A3).
Prince Edward Island	• Benefits from domestic and international migration of physicians but lower proportion of physicians trained internationally than other provinces. • Higher density of nurse practitioners, assisting and technical health workers, average density of physicians relative to other provinces. • Lower than average service benefits rate.
Nova Scotia	• Positive international and negative domestic net migration of physicians suggests that retaining physicians should be a priority for health human resource initiatives.
New Brunswick	• Generally comparable to national averages for most comparisons considered in this analysis. No obvious gaps in health providers relative to other provinces. • With negative net internal and external migration, physician retention should be a priority. Already higher-than-average benefits rates suggest that increasing incomes would not be an effective method of both increasing the density of physicians and volumes of health services per capita.
Quebec	• Low proportion of foreign-trained physicians suggests an opportunity to improve access via international immigration. • Higher than average benefits rates for family physicians suggests that reducing physicians' incomes could increase service volumes of primary care providers.
Ontario	• Already benefits from domestic and international migration of physicians. • Lowest physician services benefits rate in Canada. • Lowest density of registered nurses, technical and assisting health workers but high density of RPNs and nurse practitioners, suggests a possible imbalance in the mix of health professionals, favouring health professions with higher barriers to entry. • In addition, has the second lowest total health workforce density, further suggesting an imbalance towards highly trained professionals and a need to grow the technical and supporting health labour force.
Manitoba	• Negative net international and domestic migrations suggests that recruitment and retention of physicians should be a priority. • Does not compare favourably to other provinces or countries for alternate arrangements for non-emergency care and access to appointments on weekends suggesting that access could be improved by encouraging physicians to provide services outside standard office hours. • Similar density of health professionals to the national average but has significantly more assisting health workers.
Saskatchewan	• Presents a puzzle: high service benefits rate (though not compared to Alberta), fewer family and specialist physicians per capita, high domestic and international outflow of physicians, highest proportion of foreign-trained physicians and also the highest ratio of physicians relative to full-time equivalent estimates. • High pay rate and ratio of physicians to full-time equivalents (FTE) suggests a way to increase healthcare services per capita is decreasing remuneration levels. • High proportion of foreign-trained physicians and high domestic outflows suggest a policy priority should be retaining labour and possibly recruitment from other Canadian jurisdictions.

Table 7: Continued

Alberta	• Benefits from both internal and external migration. • Has the highest services benefits rate in the country and also a high ratio of specialist physician counts to FTE suggesting that remuneration rates could be reduced without negatively affecting service volumes. In the case of specialists, reducing remuneration rates might increase clinical service volumes.
British Columbia	• Largest beneficiary of both internal and external physician migration. • Cumulative net international migration exceeded the Canadian total from 2000 to 2018. • Lowest total density of healthcare providers and relatively few nurses compared to other provinces.
Territories	• Low density of physicians per capita but significantly higher density of nurses to somewhat address the shortage. The challenges of delivering healthcare services in these regions extend well beyond recruitment and remuneration rates for physicians. The low population density, challenging environmental conditions and high cost of living make addressing healthcare access gaps a significant challenge. • Given the challenges and inefficiencies related to providing specialist care in remote and sparsely populated regions, a combination of expanded scopes of practice with oversight or advice provided remotely by specialists and enabling patients to travel to specialists for physical treatment or examination will be necessary to address access gaps.
Canada	• Relative to other countries, Canada has a high density of family physicians and a low density of specialists (30th out of 32 countries), suggesting that physician labour initiatives should focus on specialist physicians, particularly those in short supply (Figure 1). • Despite a high density of family physicians, international survey results show that Canada does not compare favourably to other countries in terms of access to primary care providers, timeliness of appointments and availability of online bookings or alternate arrangements for non-emergency care outside regular hours. The relationship between physician earnings and service volumes suggests that lowering remuneration rates for physicians' services could be an effective way to increase the clinical output of the existing health labour supply.

Source: Author's compilation.

straightforward association with incomes, meaning increasing wages would likely be an effective way to increase their density.

Nurses and other care providers can similarly increase healthcare delivery efficiency through expanding scopes of practice or filling gaps in access to care when there is a shortage of family or specialist physicians. Some regions of Canada with few physicians have higher than average density of nurse practitioners and registered nurses suggesting that this is already occurring where physician labour supply shortages are most prominent. Another example of efficiency increase is the shift toward team-based care. A critical feature of both is effective communication and knowledge transfer between supervising specialists and care providers.

Collectively, the various aspects of healthcare access, labour supply and association with incomes examined in this *Commentary* show a need to grow the health labour force as well as to modernize the delivery and management of the healthcare system. The complex relationships among incomes, methods of care delivery and mix of professionals show that there are many ways to increase access to healthcare services. For example, to enable expansions in team-based healthcare delivery and the associated potential to improve quality and access in addition to reducing costs, governments should invest in data infrastructure. The goal: comprehensive and accessible digital healthcare records. They should work across jurisdictions to improve information-sharing abilities while maintaining

appropriate security and privacy of patients' medical information.

The time and costs associated with training new physicians make it unfeasible to address labour shortages arising from a crisis by simply training more of the needed physicians and care providers. Instead, enabling new methods and modes of care delivery, expanding scopes of practice and adapting certification/licensing requirements are useful policy tools for addressing health access and labour supply gaps in the short term.

Over the longer term, provinces should evaluate healthcare human resource planning tools and incorporate links to internal and external migration, adaptations in scopes of practice and changes to remuneration mechanisms or levels. Immigration of physicians and medical students should be encouraged as there are clear public benefits to doing so and analysis suggests that increasing the density of physicians could be an effective way to increase the number of health services per capita (Table 2). Since the number of residency positions and the competitive dynamics for filling them are determined by the provinces, each should link the expansion of residency positions to projected gaps in the physician labour force and evaluate more general expansion of the number of positions. It would also be advisable to critically examine the fee schedules for services with the goal of reducing the average cost per service while strategically increasing remuneration for difficult-to-access services.

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