



# THE SCHOOL OF PUBLIC POLICY

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## MASTER OF PUBLIC POLICY CAPSTONE PROJECT

Dollars Lost, Skills Wasted: Measuring the Economic Consequences of Foreign Credential  
Non-Recognition in Alberta's Healthcare Sector

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# THE SCHOOL OF PUBLIC POLICY

## Capstone Approval Page

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## Abstract

The Government of Alberta is seeking to attract internationally trained doctors to fill capacity shortages in Alberta's healthcare sector. Upon arrival, immigrants face barriers in having their foreign credentials recognized to be able to practice medicine which results in unemployment and underemployment of internationally trained doctors. They encounter high costs and long waits for re-accreditation resulting in lost wages, significant out-of-pocket costs, and sometimes abandonment of their credentials altogether. My analysis seeks to quantify the private and social cost of re-accrediting an internationally trained doctor as compared to accrediting a domestically trained doctor through medical school. Further, I calculate the Internal Rate of Return (IRR) to Alberta of resources allocated to accrediting internationally trained doctors as compared to domestically trained doctors. My results show that conservatively, at the minimum, Alberta receives between a 6% to 8% return on investment for internationally trained doctors. Conversely, on the high end, Alberta sees a 5% to 6% return on investment for domestically trained doctors. Through recommended government initiatives to minimize the costs and barriers faced by internationally trained doctors, Albertans stand to receive an even higher social benefit by supporting the re-accreditation of internationally trained doctors.

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## List of Acronyms

<b>ACESC</b>	Alliance of Credential Evaluation Services of Canada
<b>AIMG</b>	Alberta International Medical Graduate Program
<b>AIMGA</b>	Alberta International Medical Graduate Association
<b>AMA</b>	Alberta Medical Association
<b>CPSA</b>	College of Physicians and Surgeons of Alberta
<b>ECA</b>	Educational Credential Assessment
<b>FRPA</b>	Fair Registration Practices Act
<b>GMENAC</b>	Graduate Medical Education National Advisory Committee
<b>HPA</b>	Health Professions Act, RSA 2000, c H-7
<b>IMG</b>	International Medical Graduate
<b>IRCC</b>	Immigration, Refugees and Citizenship Canada
<b>IRR</b>	Internal Rate of Return
<b>LMCC</b>	Licentiate of the Medical Council of Canada
<b>LSIC</b>	Longitudinal Survey of Immigrants to Canada
<b>MD</b>	Medical Doctor
<b>NPV</b>	Net Present Value
<b>OOP</b>	Out of Pocket
<b>PCA</b>	Preliminary Clinical Assessment
<b>PRA</b>	Practice Readiness Assessment
<b>SPA</b>	Supervised Practice Assessment
<b>SRO</b>	Self-Regulating Organization
<b>SROI</b>	Social Return on Investment

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## Introduction

*“You know, some people say that the safest place to have a heart attack in Alberta might be in the back seat of a taxi – chances are it’s a doctor driving.” (Shory, 2011)*

Alberta’s healthcare system is facing growing demand and continuously looking for strategic opportunities to increase its skilled medical workforce. Meanwhile, the barriers to foreign credential recognition are going unaddressed, resulting in the unemployment or underemployment of skilled immigrants who were specifically selected for their internationally attained qualifications and expertise. The result is a mismatch on both ends: immigrants whose skills and earning potential are being hampered while the province faces staffing capacity shortfalls and an untapped skilled workforce. The process of re-accreditation for internationally trained doctors is expensive, long, restrictive, and does not support the applicant. Conversely, investing in the re-accreditation of internationally trained doctors can yield many positive effects to society, including increased healthcare capacity, better health outcomes for society, labour efficiency, and greater prospects for immigrants and their families.

## Background

### Healthcare

Structural cracks in the health care system have resulted from the effects of the COVID-19 pandemic, the mental health and opioid crisis, surging wait times for tests and surgeries, an increase of family doctors leaving the province, and staff burnout. Although funding, staffing, and systemic-level issues have been brewing for decades (Toy & Black, 2022), emergency department wait times have hit six-year highs (Canadian Institute for Health Information (CIHI), 2023), over 650,000 Albertans do not have a family doctor (Alberta Medical Association, 2023), and doctors are warning of a “capacity crisis” (Saleh et al., 2023). Alberta’s physician shortage comes parallel to an issue in utilizing our skilled

immigrants: those specifically selected as immigrants to Canada for their knowledge and experience as physicians, though bureaucratic and financial barriers inhibit their participation in our healthcare workforce.

During the recent capacity crisis caused by the COVID-19 pandemic, the Ontario government enabled internationally trained doctors and nurses to come to the aid of the healthcare system by authorizing 30-day licenses (Brockbank, 2020). This temporary policy adjustment impacted 13,000 foreign-educated doctors and 6,000 foreign-educated nurses who were not previously able to work in their fields in Ontario (Brockbank, 2020). Though governments do recognize the problem of underutilization of human capital, with acknowledgement of the problem such as the Pan-Canadian Framework for the Assessment and Recognition of Foreign Qualifications (Employment and Social Development Canada, 2015) and A Foreign Qualification Recognition Plan for Alberta (Alberta, 2010), there remains over a thousand underemployed foreign-educated physicians (discussed later) and a massive shortage in Alberta's healthcare system. Over the period of 2022-2031, there are expected to be 48,900 new job openings for general practitioners and family physicians in Canada, resulting from the expansion of demand and replacement demand; only 29,400 newly graduated or immigrated physicians are expected to fill these spots, leaving a 40% vacancy rate (Employment and Social Development Canada, 2023).

The Government of Alberta is currently funding programs to attract international doctors and nurses, providing financial incentives (Alberta, 2023a), express entry, and spending money on select workforce strengthening programs such as bridging programs for internationally educated nurses (Alberta, 2023a). Nevertheless, the bottleneck remains: after arrival, international healthcare workers face barriers to credential recognition. Foreign doctors and nurses may be subjected to large fees and financial hardship, long delays due to wait and processing times, or face such barriers that they are unable to have their credentials recognized altogether.



## Immigration and Licensure

The landscape of immigrant credentialing touches on several regulatory areas: immigration, educational equivalency, and Professional Regulatory Organizations (PROs). The process is arduous, complicated, and expensive. A foreign physician immigrating with the goal of practicing in Alberta has two potential immigration pathways: Express Entry via the Federal Skilled Worker Program or the Alberta Advantage Immigration Program for skilled workers with select in-demand skills. All immigration pathways recommend the retention of an immigration lawyer due to the complex nature of the paperwork and legal landscape, which is the first of many imposed costs of the immigration process itself. The processing time for an economic class immigration application in 2023 ranges from five months (Skilled Workers Federal) to 62 months (Quebec Business Class) with most classes averaging over a year; however, up to a year beforehand is spent gathering documents, completing language proficiency exams, and acquiring third-party Education Credential Assessments for documentation purposes (Canada, 2023). The economic immigration programs specifically select highly skilled immigrants based on education, work experience, age, and language skills, to contribute to the Canadian economy and enhance Canadian society, expanding and strengthening the sectors into which they plan to enter. In 2021, Canada accepted 139,459 immigrants through federal high-skilled worker programs (Canada, 2022b), and in 2022, Canada accepted 8,600 international applicants intending to work in the health sector (Canada, 2022a). The inbound supply of internationally trained physicians to Canada is substantial. In contrast, the number of Canadian medical school graduates is approximately 2,900 per year (Canadian Medical Association, 2019).

Once the internationally trained doctor is accepted through one of the aforementioned programs, they must queue to have their foreign credentials assessed. In order to begin the process, their medical degree must appear on the World Directory of Medical Schools (World Directory of

Medical Schools, n.d.). Depending on the jurisdiction from which the internationally trained doctor is arriving, Alberta's new pilot project with the College of Physicians and Surgeons of Alberta (CPSA) may allow them access to an accelerated route for licensure. Eligibility is limited and approved jurisdictions include certain schools in Australia and New Zealand, Hong Kong, Singapore, South Africa, Switzerland, the United Kingdom, and the United States (College of Physicians and Surgeons of Alberta, 2023). The accelerated route, which allows eligible International Medical Graduates (IMGs) to waive a single three-month portion of the credentialing process, is further discussed below. All those seeking licensure, including any applicant eligible for an expedited process, must first apply to the Medical Council of Canada (MCC) to become a Licentiate of the Medical Council of Canada (LMCC). This process involves credential recognition, passing the Medical Council of Canada Qualifying Examination (MCCQE1), and having completed at least 12 months of postgraduate training. In 2021, the MCC removed the second exam (MCCQEII), meaning that applicants only had to sit one exam (Royal Bank of Canada, 2023b). Licensing through the MCC has a significant price tag, with a \$2,365 application fee, \$5,000 examination fee, \$215 degree verification, a translation fee of \$181 per page, and \$137 for the Education Credential Assessment report (Canada2036, 2022). Additional fees may apply depending on individual circumstances. The LMCC process serves to validate the qualification at the national level but does not guarantee acceptance of that credential to practice in their field provincially.

The accreditation process varies by industry, and professionally regulated industries through self-regulating organizations (SROs) provide a centralized path for accreditation. Immigrants seeking foreign credential recognition face additional hurdles in industries that are either unregulated or without a designated regulatory body, through a decentralized process with no defined pathways (Houle & Yssaad, 2010). Both centralized and decentralizing accreditation systems impose challenges on their applicants, though the decentralized approach creates navigational challenges and barriers for newcomers who may not have language skills or are unable to navigate a system that is entirely foreign

to them. Fortunately, in healthcare, various provincial SROs exist for nearly every occupation (e.g., College of Registered Nurses of Alberta, Alberta College of Pharmacy) as a means to control standards while serving the interests of the profession and its members.

Following licensure by the MCC, there are other steps that the internationally trained doctor must take. To apply for residency or the Practice Readiness Assessment (expedited route), they must take the National Assessment Collaboration exam. A “Route to Licensure” diagram can be found in Appendix A. The LMCC designation gives them license to practice medicine in Canada, though they must apply to the CPSA for registration to practice (College of Physicians and Surgeons of Alberta, n.d.-b). Depending on the status of the internationally trained doctor (whether they have not yet completed residency, completed residency but not practiced independently, or have practiced independently), they may need to complete a residency program in Alberta. Residency programs in Alberta are very competitive; fewer than 30 per cent of Canadian doctors trained abroad are matched to residency positions (Tasker, 2023). The applicant must first apply to be matched to a program, pass a clinical externship, and complete the Multiple Mini Interview to assess their general knowledge and abilities as they relate to the culture and society in which they will be practicing. Those applying to the Practice Readiness Assessment have a lengthy process of registration and supervised assessments to complete. The CPSA registration process can cost up to approximately \$18,000 or more, depending on the complex unique circumstances of the applicant (discussed later) (College of Physicians and Surgeons of Alberta, n.d.-a). The fee schedule for CPSA registration can be found in Appendix B.

For domestically trained physicians, the process is more defined but also has a longer time investment as it pertains to entering the Canadian healthcare workforce. An individual interested in becoming a doctor must first enter an undergraduate degree that will teach them foundational science and enable them to be a competitive applicant to medical schools; undergraduate degrees in science subjects are recommended (University of Alberta, 2023c). Following a bachelor’s degree that averages

four years, the individual must write the Medical College Admission Test (MCAT), then apply and complete medical school. The University of Calgary's medical doctor (MD) program takes three years to complete and the University of Alberta's MD program takes four years to complete. Following medical school, the individual must pass the MCCQE1 exam and then complete a residency program that will take between two and six years depending on the specialty (University of Alberta, 2023a).

Success in foreign credential recognition varies by many factors, such as primary languages spoken and the highest level of education achieved, though one of the greatest factors for credential recognition for physicians was the last country of practice. Immigrants arriving from the United States, United Kingdom, Australia, and New Zealand had the highest rates of credential recognition, followed by immigrants from Western Europe (except France, which ranks in the bottom three for credential recognition, after the Philippines and South Korea) (Houle & Yssaad, 2010). In April 2023, the College of Physicians and Surgeons of Ontario amended their registration policies to enable U.S.-trained doctors to practice immediately in Ontario, without a requirement for supervision and assessment (College of Physicians and Surgeons of Ontario, 2023). This move acknowledges the similarities between American and Canadian training programs, standards, and the close economic relationship between the two countries. Additionally, Ontario has opened a pathway for U.S. physicians who have recently completed their residency and will now be able to practice under supervision in Ontario while awaiting their U.S. Board Exams. Further changes include removing the supervision and assessment requirements for family physicians arriving from Australia, Ireland, the United Kingdom, and Australia, who have obtained certification from the College of Family Physicians of Canada, enabling them to immediately begin their independent practice. These innovative solutions in Ontario leverage the high talent available among immigrant physicians in Canada and remove barriers to staffing their healthcare sector while reducing "brain waste".

A study by Houle and Yssaad (2010) used the 2000 to 2005 Longitudinal Survey of Immigrants to Canada (LSIC) to track the foreign credential and work experience recognition process of a cohort of 7,716 immigrants. The study found that within four years after landing in Canada, only 28% of immigrants with foreign credentials were able to have them recognized; however, of the 28% who had them recognized within four years, 47% received recognition within six months. The odds also differed by gender: within four years after landing, one-third of men had their credentials recognized as compared to 22% of women. There were several other factors that affected the odds of recognition, such as the category of immigration. Immigrants under the Skilled Worker category, who are specifically selected for their education, work experience, and other labour market attributes, had the highest chance of credential recognition at 38%. Immigrants from regulated occupational groups, including applied sciences (e.g., engineers) and health, had the highest chance of having their work experience recognized, at 50% and 48% respectively. Nevertheless, there were regional differences by province, with Alberta having the lowest probability of credential recognition (23%). Altogether, doctors likely had the best odds to have their credentials recognized, despite the counterbalance of Alberta's lowest rate of credential recognition. The study does not note an average time of recognition for credentials, though it notes that the odds of recognition decreased the more time passed after arrival.

The issue of non-recognition of foreign credentials runs parallel to the problem of non-recognition of foreign work experience. Canadian employers have a bias toward Canadian work experience, with some placing lower emphasis on foreign experience and sometimes not recognizing the experience altogether (Houle & Yssaad, 2010). Although there are no formal bodies charged with recognizing international work experience in the same way as there are for certain regulated professions, this problem has been identified at the government level as a barrier to employment for immigrants. The Ontario Human Rights Commission have identified six barriers in this respect: employers not recognizing work experience or credentials, language and communication difficulties,

employers not helping with integration and job-related learning opportunities, being rejected for positions because they are thought to be overqualified, requirements for “Canadian experience,” and outright discrimination (Ontario Human Rights Commission, 2023). The Ontario Human Rights Commission has stated that the requirement for Canadian experience is prima facie discrimination and is only to be used in very limited circumstances. It may take longer for a qualified international doctor to find work, despite having recognized credentials, due to the barrier in recognizing their work experience. Much of the same barriers and public opinion that exists on the recognition of foreign work experience also relates to foreign credential recognition, such as concern about upkeeping Canadian standards, language barriers, bias in favour of domestic applicants (the xenophobic notion that “immigrants take away Canadian jobs” (County of Simcoe, 2014)), and outright discrimination.

In Canada, immigrants with degrees in the medical field are six times more likely to work in jobs that do not require their skills than other immigrants (Royal Bank of Canada, 2023a). Of internationally trained doctors arriving in Canada, 11% choose to not pursue credential recognition as they believe the credentials would not be accepted or would not meet Canadian standards (Houle & Yssaad, 2010). This barrier also exists among those who would have met the standards but found the process too burdensome, expensive, or long. It is arguably in Canada’s best interest to not accept credentials that would be considered below Canada’s standards for healthcare. Nevertheless, Alberta has introduced bridging programs for international nurses whose skills do not meet Canadian standards (Bridge to Canadian Nursing) (Alberta, n.d.), and such programs exist in a variety of sectors, though no such program exists in medicine. With the current healthcare crisis and staffing shortage, Alberta’s internationally trained high-skilled talent is being turned away. While estimates vary, there may be as many as 13,000 medical doctors in Canada who are not practising because they have not completed a two-year residency position according to the Internationally Trained Physicians’ Access Coalition (Tasker, 2023). 90% of those who are Canadian born who studied medicine are working as physicians. In

contrast, only 55% of those who are internationally educated work as doctors, and 33% are employed in occupations that are completely unrelated to either medicine or health care (Boyd & Schellenberg, 2014). The underutilization of foreign talent creates labour inefficiency, costs the Canadian economy, impacts the standard of care for those without access to a family doctor or on wait lists, and impacts the immigrant and their family.

The problem of credential recognition is more severe based on certain factors. Female immigrants and visible minority groups have higher rates of partial credential recognition than their male and non-visible minority counterparts, who have higher full credential recognition rates (Houle & Yssaad, 2010). Refugees are least likely to have their credentials recognized as compared to other classes of newcomers. Those coming from the United States or the United Kingdom have the highest success rates, and those with strong English-language skills held an advantage. Nevertheless, 98% of immigrants whose health education was being underutilized self-reported that they could speak English or French, and 82% reported that they could also speak another language and therefore provide a vital linguistic and cultural resource for ethnic communities (Statistics Canada, 2020).

### Government of Alberta Initiatives

The issue of foreign credential recognition for doctors is split between federal and provincial jurisdictions, leaning heavier on the provincial side. Section 91(25) of the Constitution Act gives the federal government power of citizenship, and Section 95 gives concurrent powers for immigration to both the provincial and federal governments, with the federal government having paramountcy (Canada, 1982). Nevertheless, under sections 92(7) and 93, the provincial government has jurisdiction over health and education respectively, which gives it the power to train and credential physicians as well as manage its healthcare workforce. As such, the provincial government legislates in the area of managing physician supply, attracting talent to its healthcare workforce, and the steps to licensure.

Most of the provincial government's initiatives focus inwards, on strengthening the existing workforce and fixing existing gaps such as the urban-rural disparity in healthcare provision, though the new 2023 Health Workforce Strategy (Alberta, 2023a) includes some forward-looking international objectives. The document references actions to date that have streamlined the credential recognition process through the Fair Registration Practices Act (FRPA), which enables the Minister of Skilled Trades and Professions to review the registration and assessment practices of SROs such as the College of Physicians and Surgeons of Alberta (CPSA) which has the delegated authority to set their own registration and licensure practices. The other action to date on the foreign credential recognition file is the CPSA's pilot project for an alternative assessment process for IMGs, which enables qualifying medical school graduates from select countries to access a condensed Practice Readiness Assessment (PRA) which waives a three-month Preliminary Clinical Assessment requirement; however, this pilot has limited eligibility based on the IMG's jurisdiction and only removes one step of a lengthy process continues to be years long. Further, as this pilot targets only IMGs, there has been no movement on streamlining foreign credential recognition for practicing international physicians who have completed residency and have previous work experience.

The Government of Alberta Ministry of Skilled Trades and Professions' Budget 2023 Business Plan includes a performance metric tracking the average processing time, in business days, for domestic applicants who apply to a regulatory body in Canada (Alberta, 2023b). This metric includes only domestically trained applicants, including out-of-province applicants, but excludes internationally trained applicants. The performance indicator shows an improvement from 2016 to 2020 (13 business days to 6 business days) for out-of-province applicants and 16 business days to 6 business days for all domestically trained first-time applicants. The exclusion of goals and performance metrics to track processing time for international applicants reinforces the focus on domestic initiatives to improve the licensing process. Simultaneously, the lack of goals or performance indicators regarding internationally



trained doctors' licensing ensures a lack of government data through which to track performance on improving outcomes in this space, despite goals to recruit more international doctors.

Looking at a case study in another sector, the Government of Canada recently introduced a new program that would allow United States immigrants who hold an H1-B visa to apply to work in the Canadian tech industry. Holders of the H1-B visa face uncertainty, as they would need to leave the United States within 60 days of losing their job and may have trouble finding work, and advocates state that they provide poor pathways to permanent residency (Boudjikianian, 2023). The program provides them with a three-year open work permit and had a high rate of take-up, reaching its 10,000-applicant cap in under two days. This tells a tale of both opportunity and caution. In an effort to scale up the Canadian tech industry, the government has created dedicated programs to attract talent and increase capacity in the sector. The healthcare sector is experiencing severe and structural problems in retaining talent, and current government plans include discussions on attracting and retaining talent. The success of the program launch and such a massive flock of interested applicants shows that unused talent, or "brain waste", will gravitate toward other opportunities. Though the barriers faced by H1-B visa holders differ from those of foreign-educated doctors, they are parallel in that high-skill international workers whose talents are being wasted will leave for a jurisdiction that provides them with a better opportunity. Such is a concern in Alberta's healthcare sector where 1,060 internationally trained doctors are unemployed or underemployed due to various barriers in credential recognition and are at risk of a mass exodus, a "brain drain", should a better opportunity present itself in another jurisdiction.

## Methodology

To calculate the social and private costs of the non-recognition of foreign credentials for physicians in Alberta, I first calculate comparable costs under the scenarios of domestically training a physician through medical school as compared to reaccrediting an internationally trained doctor. For

ease of reference, the calculations and resulting figures have been slotted into Table 1; however, this table should not be used to aggregate or estimate the sum of costs. The listed costs are incurred by different bodies and at different levels (e.g., individual, social). Further, not all costs can be quantified due to their abstract and ambiguous nature (e.g., the value of lives lost while waiting on wait lists) or due to limitations in the availability of data, and as such, have not been included in this table. Such costs or figures are denoted with either a “\*” or “discussion.” After the calculation of individual costs in Table 1, I use an IRR model to calculate the return on investment of international medical graduates versus domestic medical graduates using their estimated average lifetime income, costs, and foregone wages. The costs, benefits, and time horizons used for this estimate are denoted in Table 2, and results are shown in Figures 2 and 3, and Table 3.

## Findings

### Private and Social Costs of Credential Non-Recognition

In the table below, panel (A) shows the costs incurred by the individual and by society for the domestic training of physicians and the foreign re-accreditation of physicians. The “domestically trained” column shows the cost on a per-person basis of producing a doctor within Alberta, which is done through medical school. The “foreign accredited” column shows the cost on a per-person basis with the status quo (without any policy intervention) of passing an internationally trained doctor through the Alberta re-accreditation process so that they are able to practice medicine. This cost is shown at two levels: the cost that the individual will pay or lose out of pocket (“Individual Cost”), and the cost (“Society Investment”) that is invested in them by society through government funds (e.g., medical school operational costs, accreditation program infrastructure, staffing, etc.). Costs borne by the internationally trained doctor or their country of origin before arriving in Canada are not considered. In panel (B), costs to society and social costs are considered. The costs in panel (B) are less direct costs

than those in panel (A) and not directly attributable to an individual. “Society Cost” pertains to measurable losses, such as lost tax revenue to both provincial and federal governments due to underemployment. “Social Costs” are unquantifiable impacts to society and soft costs.

**Table 1:** *Domestic versus Foreign Costs at the Individual, Societal, and Social Levels*

Panel (A)

<b>Current</b>	<b>Domestically Trained</b>	<b>\$</b>	<b>Foreign Accredited</b>	<b>\$</b>
Individual Cost	Medical School Costs (OOP, total 4 years)	\$ 164,679	Lost Wages During Reaccreditation (total 4 years)	\$ 209,410
	Accreditation Costs (OOP)	\$ 7,461	Accreditation Costs (OOP)	\$ 10,000
Society Investment	Invested in Medical School (per year)	\$ 43,106	Invested in Accreditation (AIMG Assessment)	\$ 55,366

Panel (B)

<b>Scenarios</b>	<b>Status Quo</b>	<b>\$/#</b>	<b>Foreign Employment to Capacity</b>	<b>\$/#</b>
Society Cost	Lost Tax Revenue	\$ 1,532,985,654	Lost Tax Revenue	*
Social Cost	Reduced Capacity/Efficiency	*	Reduced Capacity/Efficiency	0
	Wait List/Times	discussion	Wait List/Times	discussion
	Reduced Surge Capacity	discussion	Reduced Surge Capacity	discussion
	Family Doctor Shortage	164 to 948	Family Doctor Shortage	0

The out-of-pocket (OOP) cost of completing medical school for domestic students in 2023 is \$164,679 (MD Financial Management, 2023). This number is an average for the University of Calgary Doctor of Medicine program (three years) and the University of Alberta Doctor of Medicine program (four years); the only two medical schools in Alberta. The value included in the table is an average from several sources, as the cost estimates vary by source. Costs included in this value are tuition (beginning in the 2023 school year, with an estimated 3.5% inflation in each subsequent year), mandatory/non-

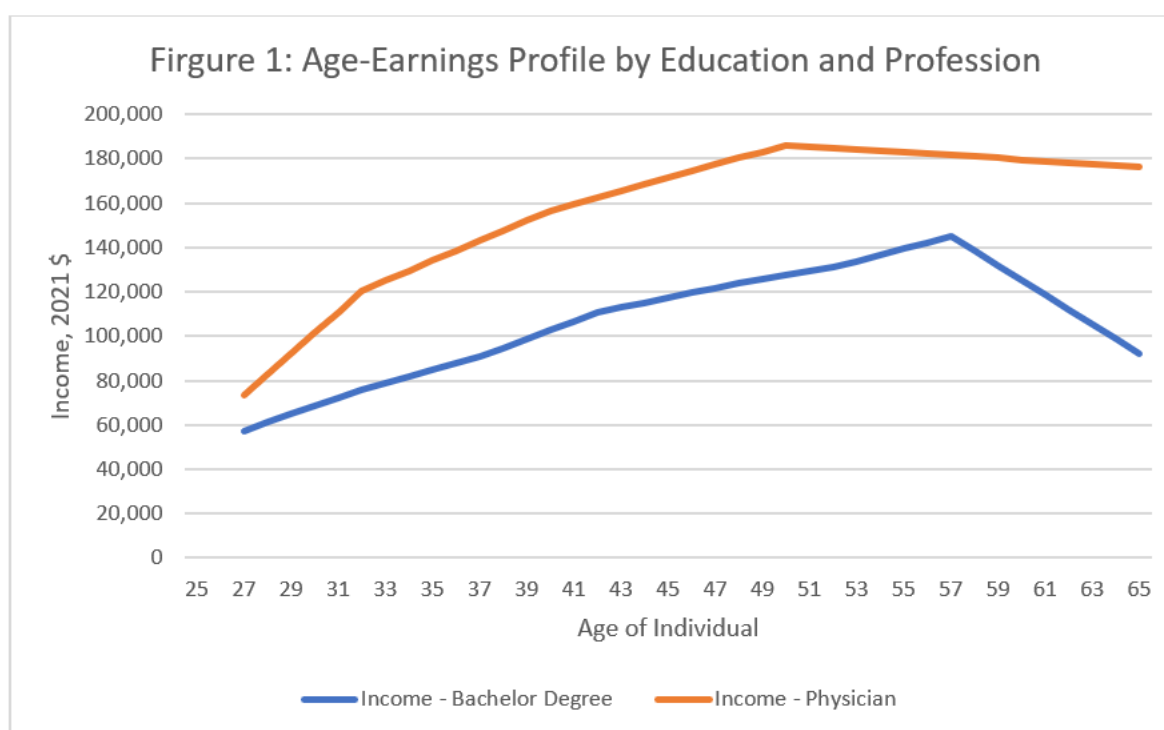
instructional fees, books and supplies, living expenses, transportation, medical association fees, electives, and residency matching and prep costs. The average of costs was taken from the University of Alberta fee guide (University of Alberta, 2023b), the University of Calgary fee guide (University of Calgary, 2023), ALIS Alberta (Alberta, 2023c), and a third-party cost-advising website (MD Financial Management, 2023). It is important to note that the cost of medical school for domestic students in this section only measures costs directly payable by the student and does not include the cost invested by the institution or by the government. This number is significantly lower than the total costs invested into domestically training a future doctor and serves to illustrate costs borne by the individual only.

“Lost wages during re-accreditation process,” totaling an approximate out-of-pocket cost of \$209,409.61, is calculated by using the earnings profile of individuals with a bachelor level degree or above, assuming that is the internationally trained physician’s next highest degree if their medical degree is not recognized. The full calculations table can be found in Appendix C. The age-earnings profile data is per age group in five-year increments, though I have made it continuous by connecting income points by year of age instead of age group. Lost wages accounts for the wage differential that has been foregone by the individual: the difference between their potential earnings as a physician in Alberta (Statistics Canada, 2022) and their earnings without a recognized medical degree (Statistics Canada, 2019), falling back onto their undergraduate degree as their highest recognized degree (Emery et al., 2006) in Alberta as a proxy for not having their credentials recognized, as well as years of residency pay. This differential is then accounted for all the years between the average age of arrival to Canada. The study by Emery, et al. (2006) notes that the working life expectancy of IMG applicants in Canada could be as much as a decade shorter than for Canadian medical school graduates, who most frequently enter medical school between ages 20 to 24 (Dhalla et al., 2002). That study further notes that the median age of applicants to the AIMG program in reference years 2001 to 2004 was 39, and the median age of selected applicants was 37.

The calculation of lost wages is based on the age of arrival, and as such, I assume a one-year allowance after the immigrant arrives in Canada, during which they apply to AIMG, bringing the average age of arrival to 36. Though this specifically considers IMGs and excludes immigrant physicians who previously worked in their fields before immigrating, for the purpose of availability of data, the IMG age will be used. The average length of time in years that it takes on average to get their credentials recognized (though the Houle and Yssaad study did not state an average length of time for credential recognition, based on odds of recognition previously discussed, 4 years will be used as the average (Houle & Yssaad, 2010)). The average income for physicians is based on Statistics Canada income data and may be underestimated. This may be because Statistics Canada uses NOC codes that group physicians with veterinarians, the latter having a significantly lower average income than the former; the median veterinarian salary in Alberta in 2022 was \$96,817 (Employment and Social Development Canada, 2022). Further, Statistics Canada does not define “employment income,” and in the case of physicians, the reported income may be based on fee-for-service payments and may not include other potential income streams such as worker compensation and private payers (e.g., automobile insurance) (Alberta, 2012). The Canadian Institute for Health Information (CIHI) lists the average gross clinical payment per physician in Alberta in 2018-19 as \$391,000 (CIHI, 2019). It is important to note that this number assumes that the immigrant will be available to work immediately after arrival at the reduced (bachelor’s level) wage and that they will immediately climb to average medical degree earning potential immediately after recognition, both of which are ideal but unlikely scenarios. Therefore, this is a conservative estimate, and the actual lost wages are likely significantly higher. Despite the average age of immigration, based on the increase of average wages over the working lifetime and the increase in the differential, an immigrating doctor who comes to Canada earlier in their career will incur less lost wages than one who immigrates later in their career.

Figure 1 shows the expected average gross income by year of age, in 2021 dollars, for a physician working full-time in Alberta (in orange) and an individual with a bachelor's degree working full-time in Alberta (in blue). The average income of a physician in Alberta increases throughout their career to a peak at age 50, at which point the average income begins to decrease. This career income peak comes sooner than it does for an individual with only a bachelor's degree: despite a lower income than a physician throughout their entire career, their peak occurs at approximately age 57, which is the narrowest gap between the two career's income prospects since the beginning of their respective careers.

**Figure 1: Age-Earnings Profile by Education and Profession**



The accreditation cost for a domestically trained doctor (through medical school) is \$7,461 at the high end, for those entering family medicine. This figure does not include costs involved with medical school or residency matching; this cost is only for post-residency registration for independent

practice and involves the following costs: an account to apply to the CPSA (\$310); a review of eligibility (\$416); the MCCQE1 exam (\$1,330); the CPSA registration fee (\$800), CPSA practice permit fee (\$2,200), and if the applicant chooses to enter family medicine, then also a \$2,405 fee for the Therapeutics Decision Making Exam (College of Physicians and Surgeons of Alberta, n.d.-a). If the individual is not entering family medicine and does need to write this exam, the accreditation costs fall to \$5,056. This cost also assumes that they do not need to write an English Language Proficiency exam as they have finished a Canadian medical school, and also assumes that they pass their certifying exam, so they do not need to apply to the Provisional Register or complete a three-month Supervised Practice Assessment.

A 2023 study found that most internationally trained doctors actively trying to apply for licensure spent over \$10,000 for their accreditation process(Wang et al., 2023). The study does not consider the costs of applying for residency, which is mandatory for IMGs. International doctors with past experience and IMGs that apply to practice medicine in Alberta must apply for independent practice through the CPSA. Applicants for independent practice in Alberta who are not licentiates of the Medical Council of Canada (LMCC), certified by the College of Family Physicians of Canada, or have a specialist certification awarded by the Royal College of Physicians and Surgeons of Canada, that is to say, they are beginning their Canadian accreditation process, would incur accreditation costs nearing \$20,000, depending on their specialty (College of Physicians and Surgeons of Alberta, n.d.-a). Current accreditation costs include, but are not limited to, an account through the CPSA's Provisional Register and a subsequent review of eligibility (\$310 and \$416 respectively; an English Language Proficiency exam (up to \$550); the Medical College of Canada Qualifying Exam (\$1,330); a family medicine specialization exam (\$2,405); various assessment, permit, and registration fees (totalling \$3,650); and a Competency Assessment fee for eligible IMGs (\$10,000). Additionally, \$185 is charged per document that the MCC needs to verify. In a scenario where an IMG will be entering family medicine and is eligible

for a competency assessment, they will spend \$18,661 at minimum. As the competency assessment is only for eligible IMGs, I will assume the average accreditation cost for an IMG is \$10,000, as in the Wang study. It is important to note that fees will differ between IMGs entering a residency program in Canada and international doctors with past work experience.

The final section in panel (A) of Table 1, “Society Investment”, is the total amount invested into domestic training and re-accreditation independent of what the individual must pay. For medical school, the amount of tuition paid by the individual does not represent the total amount invested into their education as only a portion of operating expenses are paid for through tuition, with government funds, grants, donations, and other sources backfilling the remainder. The calculations are shown in Appendix D. The cost listed in this table and the appendix, \$43,105.97, is likely an underestimation of society’s investment in medical school expenditure per student, which is discussed later. Similarly, the expenditure of accreditation is funded by the government above and beyond what individuals pay for their assessments. This expenditure figure, \$55,366.16, is specific to IMGs applying for the AIMG program and is likely an overestimate of the actual cost and also discussed later.

In panel (B) of Table 1, two scenarios are considered: “status quo” and “foreign employment to capacity.” I assume that under the “foreign employment to capacity” scenario, Alberta has an excess supply of internationally trained reaccredited doctors as compared to our full capacity of physician employment in Alberta. This assumption is based on Alberta having 1,060 internationally trained doctors who are not currently able to work as doctors and 164 to 948 vacancies (discussed later) in 2023. The number of unemployed and underemployed doctors is calculated from a Statistics Canada analysis of the 2016 Census regarding adults with a health education but not working in health occupations (Statistics Canada, 2020). Data from 2016 shows that there are 8,830 internationally educated immigrants in Canada that have an education in health and are either unemployed, underemployed outside of their field, or underemployed in their fields. These include nurses, physicians, pharmacists,



medical technicians, and other occupations. The approximate breakdown of Canadian unemployed and underemployed internationally educated immigrants in health is 12% for physicians, and as such, the same can be extrapolated for Alberta's total figure. As such, approximately 1,060 internationally educated doctors in Alberta are unemployed or underemployed. Over the period 2022-2031, 40% of new job openings for general practitioners and family physicians will be unfilled in Canada (Employment and Social Development Canada, 2023). There is also a further assumption that most of these are able to be reaccredited and meet the Canadian standards of competency. Therefore, all vacancies can be filled with internationally trained doctors who specialize in their matched fields (i.e., family physicians fill spots in family medicine). Under this hypothetical scenario, if Alberta's physician workforce is employed at full capacity, there would be no reduced capacity and no vacancies in family medicine.

The "lost tax revenue" figure, \$1,532,985,654, uses 2021 tax brackets, both provincial and federal, as one set of income data is from 2021 and the other has been adjusted to 2021 dollars. Though there are tax credits, exemptions, and other tax deductions, these are not included in the calculations. Full calculation tables can be found in Appendix E. This calculation is performed on the wage differential between an individual with the income prospects of a bachelor's degree (who was unable to be accredited and therefore their highest degree is a bachelor's) and someone with a medical degree. This is then multiplied by the number of individuals who are unable to work as doctors in Alberta, showing the tax revenue lost to the province and the federal government from the underemployment of these individuals. As this calculation uses the age-earnings profile, the result of lost tax revenue is a loss over a working lifetime for the individual, not for a single year. Further, though the capacity may not exist in Alberta's healthcare sector to employ every unemployed/underemployed internationally educated physician, the lost tax revenue accounts for all of them due to the possibility of mobility of labour, expansion of capacity, and increased labour efficiency. For such reasons, it is not possible to calculate the lost tax revenue under the foreign employment to capacity scenario, as it cannot be known how

many internationally trained doctors may be left unemployed/underemployed after capacity has been reached, if any.

The family doctor shortage under the status quo is calculated using the Graduate Medical Education National Advisory Committee (GMENAC) recommended physician-to-population ratio (Merritt Hawkins, 2018). Although GMENAC's ratio is dated as it was released in 1980, it is among the most used. GMENAC's physician-to-population ratio is 25.2 family doctors per 10,000 population. Other prominent measures considered, such as the Solucient ratio (22.5 family doctors per 10,000 population) and the Cooper ratio (30.4 family doctors per 10,000 population) result in higher and lower family doctor shortages respectively, and GMENAC is a mid-point between the two. The aforementioned ratios can be found in Appendix F. Using the GMENAC ratio, the recommendation is 3968.25 patients per family physician. Further, using the figure of 650,000 Albertans without a family doctor (Alberta Medical Association, 2023) and dividing it by the recommended ratio of patients per family physician, the result is a shortage of 164 family physicians in Alberta. Alternatively, this number can also be calculated by finding the current ratio of patients per family doctor in Alberta (only counting Albertans with a family doctor), which is approximately 686 patients per family doctor. Applying that same ratio to the 650,000 Albertans without a family doctor means that Alberta has a shortage of 948 family doctors. Although different ratios will yield different results, the real number of family doctors needed to perfectly fill the need is not a static number, and changes with evolving population need. As such, the family doctor shortage likely falls within the large range between 164 and 948. The calculation table can also be found in Appendix F.

Certain figures cannot be quantified in the above table, such as how the various scenarios may impact wait lists and wait times, or surge capacity. These factors impact the well-being of society, including the reliability of the healthcare system, accessibility, and efficacy. In a 2005 Supreme Court of Canada decision in *Chaoulli v. Quebec (Attorney General)*, Judge McLachlin wrote that "access to a

waiting list is not access to health care (Supreme Court of Canada, 2005).” She went on to write that “patients die as a result of waiting lists for public health care.” Between April and September of 2022, only 27% of knee replacement patients had surgery within the recommended period of six months, a decrease from 62% in 2019. CIHI data shows that the wait times for cancer surgeries also increased (Canadian Institute for Health Information, 2023; CIHI, 2023). Many are waiting to see a specialist, and an Angus Reid poll shows that only 18% of Canadians with a family doctor are able to get an appointment within a day or two (Kappler, 2022). Though Albertans have free-of-charge access to primary health services, the current system is not effective for all. Improving the ability of internationally trained doctors to work in and benefit their communities creates a crucial impact on social well-being. It enables shorter wait times, the potential for increased surge capacity as was necessary during the COVID-19 pandemic, and the reliability of increased access to physicians. Increasing the presence of physicians is especially important in areas outside of Calgary and Edmonton, where communities may experience inconsistent access to medical professionals.

## Internal Rate of Return

The model used to determine the Internal Rate of Return (IRR) of a domestically trained doctor as compared to an internationally trained and reaccredited doctor comes from a 2006 paper by Emery, Crutcher, Harrison, and Wright (Emery et al., 2006), which is referred to as the “Emery model” throughout. The Emery model uses 1990’s and early 2000’s data to measure the return on resources allocated to IMGs that lead to licensing as a Canadian physician, and how it compares to the resources allocated to training a Canadian physician domestically through medical school. As the data used in the model is now dated, I re-calculate the return using recent data, and similar methods; however, in portions where the data is no longer published or is no longer relevant, I use alternative methods to find

data to inform the model. The Emery model uses certain calculations based on Rathje’s model (Rathje, 2000), which I also use and reference throughout.

The IRR is the discount rate that would make the Net Present Value (NPV) of all cash flows equal to zero. This would mean that the present value of all benefits an individual is to earn over their lifetime, such as salary in this case, would equal costs incurred. For scenarios considered, we are looking at the difference in education level and increase of associated earnings over their lifetime, with the cost of acquiring their education and credentials such as medical school, residency, and AIMG assessments, as well as foregone earnings of the educational credential that is their “next best,” in this case being a bachelor’s degree. With the NPV set to zero (or the costs being equal to the benefits), we can calculate the rate of return to the investment. This can also be referred to as the Social Return on Investment (SROI) because it measures extra-financial value for society.

**Table 2:** *Costs and Benefits Used to Calculate the Internal Rate of Return*

Costs:

	<b>Domestic</b>	<b>Foreign</b>
Education/Evaluation	\$ 43,106 for each of four years of medical school	\$ 55,366 assessment expenditure of AIMG program (one year)
Residency Training	\$ 125,274 per year for two years, expenditure of AIMG program on resident training	\$ 125,274 per year for two years, expenditure of AIMG program on resident training
Foregone Earnings	Difference in earnings between a fulltime individual working as a medical doctor and an individual with a bachelor’s degree as their highest education.	

## Benefits:

Salary Paid to Resident	Year 1: \$ 58,934 Year 2: \$ 65,232	
Earnings with Medical Degree	Average earnings profile by year of age for a Canadian working as a medical doctor	
Time Horizons	Age 26-65	Age 36-65
Scenarios Considered	With and without resident's salary included  Bachelor's earnings for foregone earnings	With and without resident's salary included  100% and 75% probability of successful AIMG completion  Bachelor's earnings for foregone earnings

Emery's model references Rathje's calculation of costs invested in education for a domestically trained physician, which uses the operational expenditure by the institution to determine the cost invested per student. In using operational expenditure, the cost invested in educating a student is more accurately reflected than through tuition costs, as tuition represents only a portion of operational funding, with the rest being contributed through other streams such as government funding and donors. The operational expenditure enables a full picture of how much it costs to educate one student per year. Rathje's calculations use operational funding denominated by faculty. This data is no longer available, and as such, assumptions must be made that operational expenditures for each student are equal, although Rathje does note that medical schools typically have a higher expenditure per student than most other faculties.

There are only two medical schools in Alberta: The University of Calgary Cumming School of Medicine (three-year program) and the University of Alberta Faculty of Medicine and Dentistry (four-year program). Most medical programs around the country are four-year programs, and I will be using four years for cost calculations. Expenditure per student differs between the two schools. All figures are

for enrolment totals in the year beginning 2022 and the operational funding in the year ending 2023. The total operating cost at the University of Calgary is \$1,509,905,000 divided by a total enrolment of 36,543 students, bringing the per-student operational expenditure to \$41,319. The total operating cost at the University of Alberta is \$1,878,156,000 divided by a total enrolment of 42,270 students, bringing the per-student operational expenditure to \$44,432. The weighted average of these two is \$43,106, which represents the per year, per student operational expenditure on domestic education. This is the assumed tuition cost paid by a domestically trained student entered in Table 2.

Due to the unavailability of data regarding AIMG expenditure, the AIMG assessment expenditure figure was taken from Emery's model (\$37,595) and converted to 2021 dollars for consistency, resulting in a one-year expenditure of \$55,366. This is the tuition cost I assume is incurred by a foreign student seeking accreditation in Alberta that is entered in Table 2. This figure may no longer accurately reflect the AIMG expenditure on assessment, as their paper noted the possibility of economies of scale which were reflected each year the program grew and accepted more applicants. As operational changes, inflation, and economies of scale have all impacted this figure, \$55,366 is likely an overestimation of actual expenditure on assessment per AIMG applicant. Additionally, due to the unavailability of data regarding AIMG expenditure, the AIMG residency training expenditure figure is taken from Emery's model (\$85,064) and converted to 2021 dollars for consistency, resulting in an expenditure of \$125,274 per year for two years of residency training. It is likely that this figure is no longer representative of the expenditure by the AIMG program due to factors noted above, and as such, likely represents an overestimation of expenditure on residency training for both foreign and domestic applicants. Emery's model uses AIMG training expenditure for both domestic and international scenarios, so I have done the same for consistency.

The foregone earnings calculation uses Statistics Canada's average earnings data and is equal to the average income for an individual holding a bachelor's degree. I am assuming that without the

medical degree, both domestic and international applicants' next highest degrees achieved would be a bachelor's degree as this is required at a minimum in order to apply to medical school. The Emery model uses data for an individual with high school as their highest education for the AIMG applicant and with a Bachelor of Science degree as the highest education for the Canadian medical graduate. Data for specific university majors was not available, and as such, I used data for a bachelor's degree in its stead. I used a bachelor's as the highest education for both scenarios as the assumption would be that without having achieved their medical degree (domestic) or had their medical degree recognized (foreign applicant), their next highest completed education would be a bachelor's degree. The data is for Alberta, a university degree at a bachelor level or above, the reference year 2016 (which I converted to 2021 dollars), and a single data point was provided for each of the following age ranges: 25 to 29, 30 to 34, 35 to 39, 40 to 44, 45 to 49, 50 to 54, 55 to 59, and 60 to 64. Average points between the given data were derived through averaging. The average income of an individual with a bachelor's degree increases throughout their career and peaks at approximately age 57.

IMGs working toward licensure in Alberta must undergo an application and registration process, followed by an assessment of whether they must enter a residency program or the expedited PRA pilot (Alberta International Medical Graduate Association, 2023). For the purposes of this calculation, we assume that the IMG must undergo a residency program, which is usually two to six years or more and does not qualify for the PRA pilot. I will use the same number of years for both IMG and Canadian medical graduate residencies, two years. Medical residents in Canada get paid for their residency. In year 1, they earn \$58,934 and in year 2, they earn \$65,232 (Canadian Resident Matching Service, 2022). These are the resident salaries entered in Table 2. Canadian medical school residents and IMGs get paid the same salaries. This is the second lowest resident salary in Canada, after Quebec.

Earnings with a medical degree were calculated with data from Statistics Canada employment income by occupation (published in 2021 dollars) (Statistics Canada, 2022). The data is specifically for

Alberta full-time work during the year, for NOC code 3110 (physicians and veterinarians), and a single data point was provided for each of the following age ranges: 25 to 29, 30 to 34, 35 to 44, 45 to 54, and 55 to 64. Average points between the given data were derived through averaging.

The time horizons considered to calculate the rate of return are ages 26 to 65 for domestically trained graduates (Canadian medical school graduates) as this represents the approximate age at which a domestic applicant intending to pursue a medical career would enter medical school. For AIMG applicants, the time horizon is 36 years to 65 years as they have undergone medical school in different countries and potentially practiced medicine there as well. They are likely to arrive in Canada in their 30s. This also considers time expended during the immigration process. The time horizon used to calculate the return for domestic graduates is longer as they tend to begin their medical career via medical school in their twenties. Contrarily, internationally trained applicants have a comparable starting age, but the return on investment calculation does not begin for our purposes until they enter Canada, which would be in their mid-thirties, and as such, have shorter time horizons. The result of a shorter time horizon for foreign applicants, especially in this circumstance where the majority of costs are front-loaded and the benefit stream runs for the remainder of their working careers, is that their working careers are shorter than domestic graduates.

Both domestic and foreign scenarios were calculated with and without the resident's salary included as one of the benefits. Both also used prospective earnings for an individual with a bachelor's degree as foregone earnings, as explained above. For the AIMG applicant, a scenario was also considered where the applicant has a 75% probability that they complete their resident training, and as such, benefits post-residency are weighted by 0.75.



**Figure 2: Costs and Benefits to Society for a 36-Year-Old AIMG Applicant in 2021**

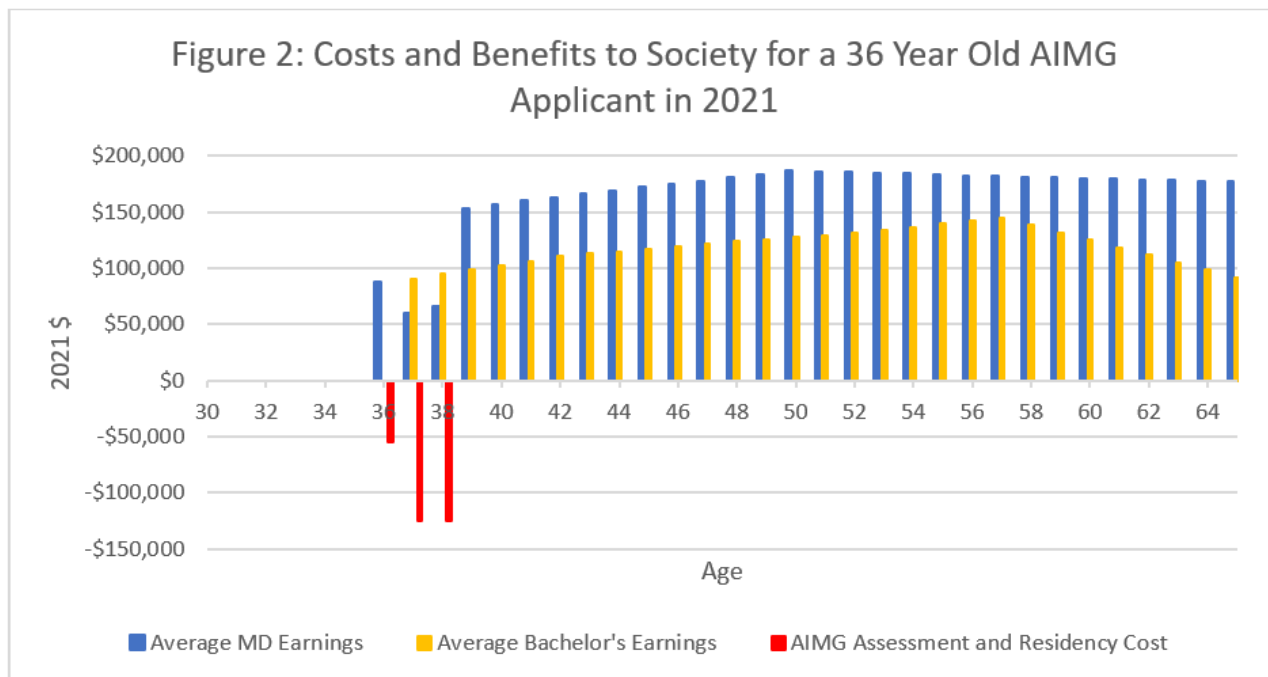


Figure 2 shows the costs and benefits to society for an international AIMG applicant, applying at age 36. For costs (red), it includes one year of AIMG expenditure on assessing the candidate and, assuming acceptance, two years of AIMG expenditure on residency training. These costs are likely overestimated as data is not available for current expenditure by the AIMG program, and as previously mentioned, there are likely operational savings and economies of scale that have reduced the per-applicant expenditure compared to the 2002-03 expenditure. In 2002-03, there were eight successful applicants, and this year, there are 40 spots per then-Minister Copping during Budget 2023 estimates (Legislative Assembly of Alberta, 2023). Due to the lack of data, I had to convert the numbers in the Emery model to 2021 dollars for consistency. In blue, the international applicant's sum of benefits is depicted: the first year prior to acceptance into residency, we assume that they are able to earn a salary at their then-highest earning potential, a bachelor's degree earning potential. The next two years, they earn a resident's salary, and the fourth year onwards, they earn a physician's salary. In yellow, their

foregone earnings are depicted which are the earnings attributable to a bachelor's degree. The first year's benefits (bachelor's salary) appear inflated as compared with the following two years, which is partly because of the high earning potential of a bachelor's degree at this stage of an individual's career, presuming their earning potential has been increasing since entering the workforce in their 20s. Further, the two years of residency appear to have an especially low income due to the low salaries paid to residents. Residents in Alberta are paid \$58,934 for their first year of residency and \$65,232 for their second year, with incremental increases each year of residency. Alberta pays the second lowest resident salaries, after Quebec (Canadian Resident Matching Service, 2022), and residents work an average of 70 hours per week, with a maximum of 100 hours per week and 26 hours per shift (Pattani et al., 2014). This salary may be proportionate to an individual newly entering the workforce without a medical degree, as seen in Figure 3 where the resident salary falls only slightly below the salary for a bachelor's degree. At this point in an international applicant's career, their earning potential is significantly higher than the resident salary they are paid, though as residents, they have all the responsibilities of a physician-in-training.

**Figure 3: Costs and Benefits to Society for a 26-Year-Old Alberta Medical Student in 2021**

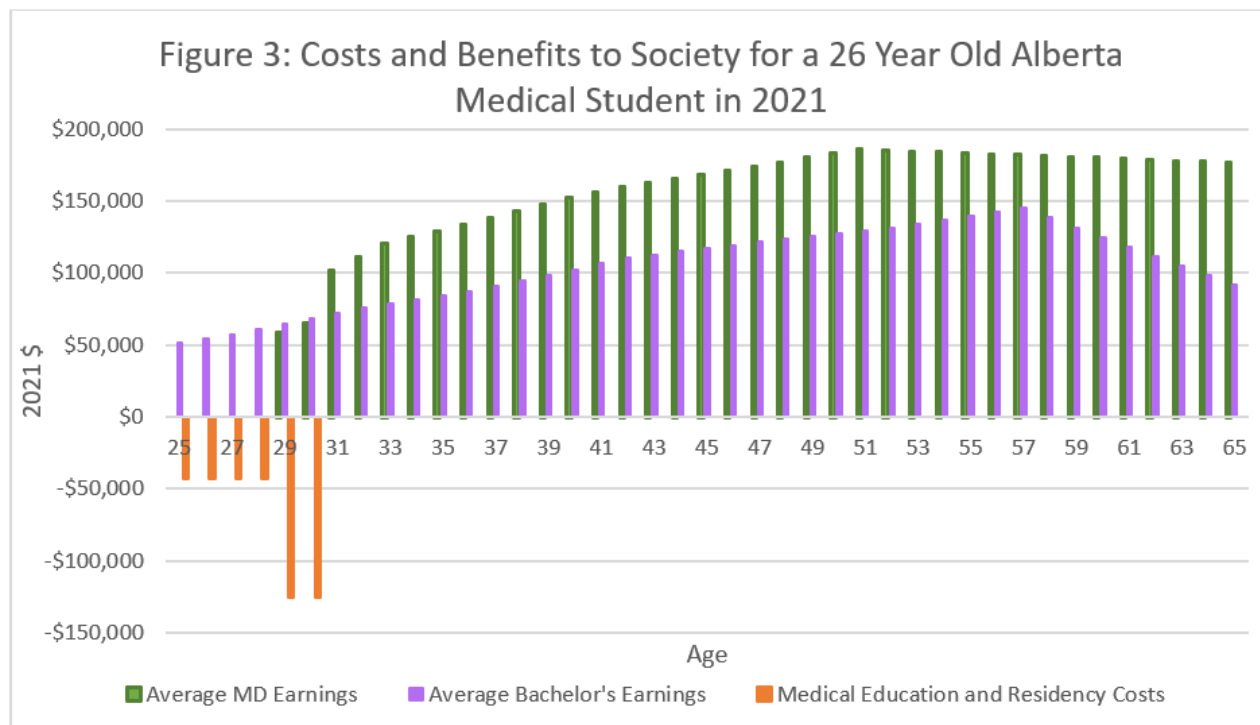


Figure 3 shows the costs and benefits to society for a domestic student entering medical school, and subsequently, the medical field, at age 26 after they have finished their undergraduate degree which is not included in the calculations. The costs (orange) include four years of medical school operational expenditure and two years of residency expenditure. The medical school expenditure is not out-of-pocket tuition costs, but rather the operational cost invested by the university into each student's education. As data was missing for a by-faculty breakdown, I had to calculate the per-student breakdown with the assumption that the university spends on each student and each faculty equally; however, the expenditure on medical students is higher than other faculties (Rathje, 2000) which means that this cost is certainly underestimated. The residency training cost is equal in the foreign applicant and the domestic applicant scenario, and likely overestimated as mentioned above due to a lack of data and economies of scale. Benefits are represented in green, which shows the first two years of a resident's salary followed by a physician's salary. Foregone earnings for a bachelor's degree are

represented in purple. The starting salaries at the beginning of the applicant's career are low as they newly enter the workforce, and it is proportionate to the resident salaries they earn prior to earning a physician's salary. Despite the proportionality of the residency salaries in the domestic scenario as compared to the foreign scenario, the salaries show an undervaluation of the hours worked as a medical resident and the responsibilities that they hold. As a domestic graduate starting at a younger age, the individual has a longer career lifetime in which to earn income.

**Table 3: Internal Rates of Return for Training Physicians Through the AIMG Program and Canadian Medical Schools**

	<b>Assumptions</b>	<b>Real Annual Rate of Return (IRR) (%)</b>
36-year-old AIMG applicant	Excludes resident salary	5.5%
	Includes resident salary	8.1%
	75% success rate, excludes resident salary (weighing the post-residency annual income gains by 0.75)	4.1%
26-year-old Canadian medical graduate	4 years med school, excludes resident salary	4.8%
	4 years med school, includes resident salary	5.9%

Table 3 shows the internal rates of return from training physicians either through the AIMG program (foreign) or Canadian medical schools (domestic) for 36 years olds and 26-year-olds respectively. The internal rate of return (IRR) for 36-year-old foreign applicants, excluding resident salaries, is approximately 6%. The IRR increases to 8% when resident salaries are included. In contrast, the IRR for the domestic applicant without including resident salaries is 5% and with resident salaries is 6%. As previously mentioned, it is likely that the foreign scenario is underestimated due to a lack of data on AIMG expenditure, and the domestic scenario may be overestimated due to a lack of data on the by-faculty breakdown of university operational expenditure. A scenario was also included to calculate the

IRR in the case of the 36-year-old AIMG applicant with a 75% success rate in the program, where the IRR then falls to 4%.

The difference in the IRRs is not as large as in the original Emery paper for a few possible reasons. The under- or over-estimation of costs and benefits in this calculation due to lack of data means that my scenarios considered have very conservative assumptions. Further difference may be as a result of different foregone salary assumptions. Emery's model considered the foregone salary for domestic applicants as the equivalent of an individual with only a high school degree, and the foregone salary for foreign applicants the equivalent of a Bachelor of Science degree. My assumption varies in that both scenarios' foregone salary is that of a bachelor's degree, as they are a prerequisite for entry to medical school. Despite these differences in assumptions between Emery's results and my results, they both show the same broad conclusion: the IRR is higher for international applicants as compared to domestic. The results for a 36-year-old AIMG applicant in the paper by Emery is 9.1% excluding resident salary and 13.2% including resident salary. My results were more conservative, largely due to lack of data, although it is possible that more available data in the future would yield a higher IRR for the internationally trained scenario. My results can be regarded as the lowest IRR for investing in internationally trained doctors, while the average IRR may be higher and more closely resemble Emery's results.

Emery used a benchmark rate of return of 4.25% against which to compare the IRRs. This was the observed real rate of return to capital in Canada for the period 1964-1998. Compared to this rate, the AIMG scenario fares stronger, especially with the inclusion of resident salaries at 8%. This calculation is sensitive to assumptions, as the scenario of the 75% success rate for the AIMG program falls to a 4% rate of return. The higher rate of return for the AIMG program shows that the return to society for investing in an international medical graduate is lower than the cost of investing in a domestic medical student, despite the over-estimation of cost for IMGs and underestimation of cost for domestic

students. This means that the IRRs are likely even more disparate, showing the greater return for investing in IMGs, and the savings to be gained for Albertan society from the expansion and full utilization of this program. Further, the new expedited pathway for IMGs has the potential to reduce the cost invested by society, as it bypasses the need for residency and enables IMGs to enter the healthcare workforce sooner. Altogether, whereas it may take a minimum of six years for a new domestically trained physician to enter the healthcare workforce, internationally trained physicians are able to fill the labour need in under three years, producing more immediate solutions to physician shortage problems.

## Policy and Discussion

### Policy Recommendations

Alberta's stringent and rigid standards for doctors entering our health workforce are important to upkeep, but the excessive cost burden imposed on international doctors is extreme, creates massive financial barriers, and may be a deterrent to qualified doctors seeking to practice in Alberta. This is especially significant and actionable at a time when Alberta is facing a growing shortage of qualified doctors, especially family doctors. The government has set policy to attract healthcare workers from around the world, including countries where applicants may not have the financial ability to pay the upfront costs involved in reaccreditation. Aside from the financial and time barriers involved in reaccreditation, further policy solutions are needed to address issues in discrimination, language skills, and program funding and accessibility.

In 2017, Employment and Social Development Canada held a joint conference with Immigration, Refugees and Citizenship Canada, the Province of Nova Scotia, and the Fair Registration Practices Act Review Office of Nova Scotia, together with a number of stakeholders, on the topic of eliminating barriers to foreign qualification recognition (Employment and Social Development Canada, 2018).

Additionally, other relevant organizations such as the Internationally Trained Physicians Access Coalition and the Alberta International Medical Graduate Association have advocated for policy solutions to reduce barriers and bridge the gap for foreign physicians seeking licensure in Canada. Policy recommendations range from targeting the problem of excessive wait times and costs, the underutilization of foreign-trained doctors, and various supports to ensure bridge the gap and smooth the process for incoming skilled immigrants.

1. Expand the number of residency training seats in the AIMG program.

In 2023, Alberta has 40 AIMG seats, yet it had 15 unfilled family medicine residency training positions after the second round of matching (French, 2023b). Only Canadian medical graduates are eligible to match in the second round. The Government of Alberta announced that they will increase the number of residency training spaces for IMGs up to 70 over the next several years (French, 2023a), which will improve prospects for international applicants. Funding must consistently increase in order to ensure the number of seats continues to grow with increasing demand for doctors in Alberta. This is especially important as IMGs are able to enter the workforce quicker than Canadian medical graduates, and the return on investment for IMGs is beneficial for Alberta. Increasing AIMG seats will also serve to increase the diversity of the physician workforce and provide more equality of opportunity to immigrating medical graduates (Internationally Trained Physicians Access Coalition, n.d.).

2. Increase government investment to reduce processing times and timelines for reaccreditation, implement performance indicators, and decrease costs for immigrating physicians.

The Ministry of Skilled Trades and Professions tracks performance metrics for average processing time in business days for domestic applicants who apply to a regulatory body in Alberta, as well as out-of-Alberta domestic applicants. This tracking ensures government accountability to maintain an acceptable standard of speed, as well as enables the public to identify if this is an area of public

concern and the severity of that concern. There is currently no performance tracking for international applicants to regulatory bodies in Alberta in the Business Plan, and the burden of implementation and maintenance of this indicator falls on the government that has delegated the authority to the SROs. To begin addressing the issue of processing times, the information must first be made publicly available.

There are legislative mechanisms within the Act and Regulations to correct the problem of excessive wait times. The CPSA has delegated authority under the *Health Professions Act, RSA 2000, c H-7 (HPA)* and the *Physicians, Surgeons, Osteopaths and Physician Assistants Profession Regulation, Alta Reg 200/2020*. Section 131 of the *HPA*, “Council regulations”, enables the regulation-making authority for colleges, which allows them internally create requirements for registration and practice permits for their profession. The Regulations relate the *HPA* self-governing powers directly to the CPSA. They can set their own fees and direct their own timelines. Legislative interventions would require a balancing act between the interest of the applicant and ensuring that the college retains enough authority to self-direct its activities. Section 135.1 and section 135.5 of the *HPA* allow the Minister of Health through the Lieutenant Governor in Council to make changes to the college’s standards of practice or bylaws should he find them deficient or not in the public interest. The Minister may use this power to compel the college to provide a full written justification of the decision at each stage to the applicant upon request, and a description of the appeal process. The Minister may also require a cap on fees and a target time limit for processing applications that 90% of applicants must fall under. This ensures tight timelines while allowing flexibility to deal with outlier cases, increasing transparency, capping fees, and reducing timelines.

### 3. Access to microloans.

Immigrants face high up-front costs during their immigration, including moving, lawyers, documentation, and housing costs. Additionally, upon beginning their licensure process, they face



further front-loaded costs for accreditation including examinations, assessment fees, and translation fees, all the while foregoing their full wage potential. Though skilled immigrants must demonstrate a level of financial independence as part of their application, the process of moving may cost them almost half of their savings (Falconer, 2021). Further, they arrive without a Canadian credit history, which can create challenges in affording immediate costs or accessing credit. With access to microloans to finance their accreditation, training, and other costs, the financial barriers to pursuing reaccreditation are reduced. Immigrants who accessed microloans for their reaccreditation saw higher relative incomes, equal to a raise of 26%; without financing, their incomes lag compared to other immigrants and Canadians (2021). Moreover, society is able to benefit from investing in the start-up costs of highly trained immigrants. A study assessing the social rate of return from providing microloans to immigrants seeking Canadian accreditation has found that the average return is 33% (Emery & Ferrer, 2015). Access to microloans for immigrating doctors seeking licensure reduces financial burden and improves outcomes for the immigrant and the community.

4. Create bridging programs for internationally trained physicians.

Alberta's 2023 Health Workforce Strategy has committed to spending \$3.5 million to develop new bridging programs for internationally educated nurses and expand seats in existing bridging programs, as well as develop a bursary (Alberta, 2023a). These programs ensure that nurses have the right knowledge and skills required to be certified as a nurse in Alberta. Bridging programs include orientation to the profession, gap-filling programs, opportunities for Canadian work experience, and occupation-specific language training, all of which have been identified as challenges by the joint conference on eliminating barriers to foreign credential recognition (Employment and Social Development Canada, 2018). The Ontario Bridge Training Program was identified as a best practice, which includes soft skills training and technical skill support (Ontario, 2019). Bridging programs allow internationally educated immigrants in regulated professions to fill the knowledge and technical skills

gap between their previous practice and their new Canadian practice. Without such programs for immigrating physicians, they may face rejection from licensure or a requirement for full re-education. This enables internationally educated physicians to meet Canadian standards and provides them with a route to licensure where one may not otherwise exist.

5. Increase joint-government investment in wraparound and support programs for new immigrants.

The joint conference identified the instability of funding for pre-arrival programs as a challenge (Employment and Social Development Canada, 2018). They describe that program funding increases when there is an influx of immigrants but may not continue after arrival. The volatility of funding creates uncertainty about the future of programs and causes the effective closure of others. A key strategy in ensuring the stability of program funding is the alignment of federal and provincial funding and joint working groups on program design, delivery, and expected outcomes. Collaboration between the provincial and federal governments can also increase the efficiency of program delivery, reduce duplication, and improve program access.

Support programs that support the settlement immigrants are key to their success. Access to English and French language learning programs is crucial for the social, cultural, and economic integration of immigrants. In addition to programs that benefit all immigrants, specific programs have been identified as a benefit to workforce integration for immigrants in certain industries: industry-specific language training improves confidence as well as increases the likelihood of employment. The ability to communicate with job-specific language improves the employer-employee relationship, facilitates discussion of work-related tasks and accommodations, improves workplace communication, and gives them an opportunity to display their technical skills to their employer. Job- or industry-specific

language training is a key support program needed to help the employment prospects and workplace integration of immigrating physicians.

6. Centralize information and arrival support.

Information for a detailed route to licensure, expected costs, and timelines is currently not available on federal or provincial government websites, and is minimally available on the CPSA website. Centralizing this information, making it easily accessible in simple English and French, and providing resources is the role of the government, especially as it seeks to increase the inflow of international physicians. This information must include different scenarios that may apply (e.g., for IMGs, licensed doctors who have completed residency, doctors arriving with education from non-recognized medical schools) and be a hub that can provide a wholesome overview of the next steps and expectations. Moreover, it is important that there is a variety of communication tools available, such as APEGA which offers a website, email, social media, and a call centre for those who do not have internet access.

It is important that the applicant have a full picture of application time and costs. Cost calculators can be a useful tool to help identify unexpected fees such as language tests, translation, and notary public fees. Providing all this information on an easily navigable government website enables immigrants to be aware pre-arrival of all the steps necessary, budget appropriately, and potentially allow them to begin their journey pre-arrival.

## Limitations and Issues for Future Consideration

The unavailability of certain data has created challenges in assembling an accurate and current analysis of costs to both the individual and society. Public availability of data is crucial for an informed public that can then identify systemic failures. In areas where certain figures have been estimated, such as the number of foreign-trained doctors who are unemployed/underemployed, various sources are in

contradiction to one another. Other data limitations include the aging of important data that has ceased being published by Statistics Canada in the last one to two decades, and budget and funding figures that are not published despite coming from government funds. The latter causes issues of accountability, as funding for programs and organizations by the government is an issue of public account, and it is the burden of policymakers and legislators to be held to account for government decisions. Should more data become available in the future, costs, benefits, and IRR can be reassessed for a more accurate image of impact.

Beyond the data showing that investing in internationally trained doctors is beneficial to Alberta society and that it enables a solution to staffing shortages, the next consideration is how to best allocate resources. Future consideration must be given to how investing government funds yields the best results for the public while carrying out the responsibility of providing opportunities to domestic prospective physicians to get an education and practice medicine. From an economist's perspective, the government would reallocate funding until the marginal benefit to society from an additional dollar spent on domestically trained doctors is equal to the marginal benefit of an additional dollar spent on improving or accelerating accreditation processes for internationally trained doctors. The challenge may be in quantifying and measuring the benefit from either scenario.

The healthcare crisis has many sides. The more specific problem of physician shortages has numerous proposed solutions. Removing barriers to credentialing internationally trained doctors is a pathway to address the physician shortage, though it should not be interpreted as a proposed comprehensive solution. The underutilization of skilled labour is its own crisis that equally needs to be addressed through the identification and dismantling of barriers to foreign credential recognition. Despite the provincial government's efforts to attract talent to Alberta, a bottleneck forms after arrival when the same highly sought-after skilled immigrants must now undergo foreign credential recognition and find themselves unable to practice in their fields. A parallel issue for future consideration is the non-

recognition of foreign work experience and how it plays a role in barriers to full labour force participation of skilled immigrants. Finally, an important future consideration is ethical in nature: the brain drain that affects source countries from which Alberta recruits skilled talent.

## Conclusion

Alberta's healthcare system is pleading for physicians while simultaneously denying those ready to join and make meaningful contributions. Internationally trained doctors immigrate to Canada, specifically selected for their high skills and experience, and then face an uphill battle for credential recognition. Consequently, they become unemployed or underemployed, face a loss of wages and may never reach their earning potential, and spend exorbitant amounts on credential recognition that they may be denied. Alberta's communities continue to face family doctor shortages, growing wait lists, and rural emergency room closures. All the while, governments seek to attract international talent while overlooking the bottleneck of credential recognition post-arrival.

Governments may be hesitant to fund programs that appear to benefit the immigrant acquisition of Canadian jobs. Nevertheless, this is a crucial strategy for attracting talent in times of a shortage: it benefits all Albertans directly or indirectly via the availability of a family doctor or shorter wait times, and most importantly, 'new Canadians' are Canadians. They deserve the fairness, opportunities, and support allotted to all those who call themselves Canadians. Immigrant doctors provide culturally diverse care in ethnic communities, deliver a necessary service to those with language barriers, and bolster diversity and inclusion. In enabling internationally trained physicians to practice medicine, all Albertans experience an improved standard of care.

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## Appendices

### Appendix A: Route to licensure diagram for International Medical Graduates in Alberta prepared by the Alberta International Medical Graduate Association (AIMGA)

#### ROUTES TO LICENSURE



**ALBERTA  
IMGs**

#### GETTING STARTED

**1**

Register with the Medical Council of Canada  
(physiciansapply.ca)

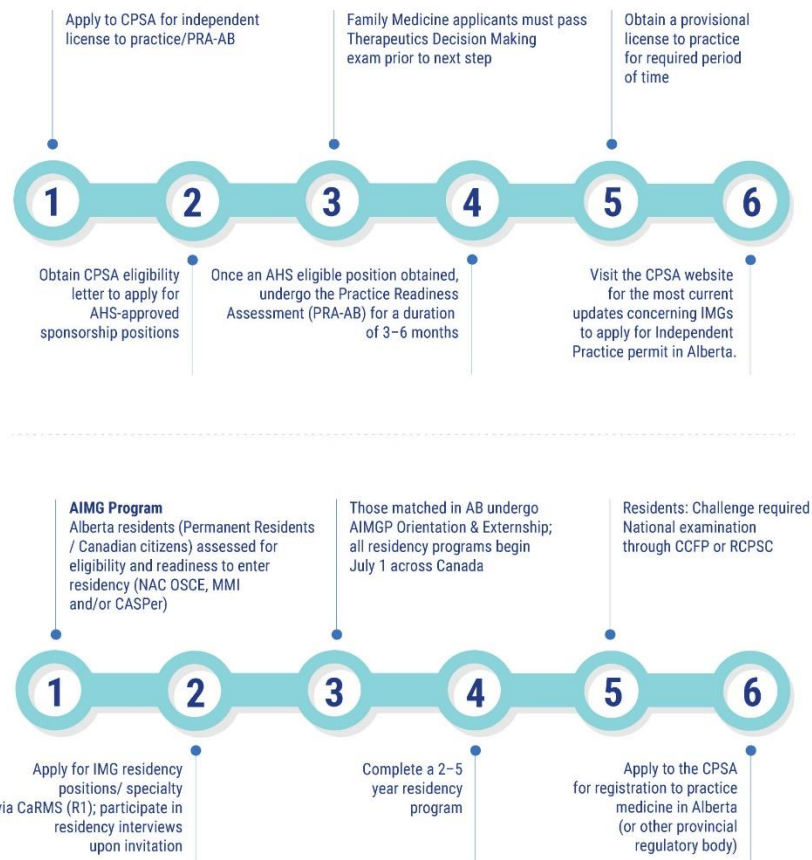
**2**

Prepare to apply to CPSA and/or AIMG Program/ CaRMS

**YES**

Do you meet the CPSA's requirements for direct entry into practice (Full, Special Register, or Provisional/PRA)?

**NO**



## Appendix B: Fee Schedule for CPSA registration

<b>Registration Process</b>	<b>Fee</b>
physicianapply.ca account	\$ 310
Review of registration eligibility through physicianapply.ca	\$ 416
English Language Proficiency Exam	\$ 550
MCCQE Part 1 Exam	\$ 1,330
Therapeutics Decision Making Exam (if entering Family Medicine only)	\$ 2,405
PCA/SPA Assessment Permit Fee	\$ 100
Practice Readiness Assessment Orientation (IMGs only)	\$ 550
CPSA Registration fee upon successful application	\$ 800
CPSA Practice Permit Fee	\$ 2,200
Competency Assessment Fee (eligible IMGs only)	\$ 10,000
Non-Canadian credentials for MCC to verify (per document)	\$ 185

The above fee schedule is for all applicants for registration to the CPSA. Certain fees will not apply depending on individual circumstances. For example, IMGs who are ineligible for the Competency Assessment (expedited route) will not pay the \$10,000 fee. Applicants who are already a Licentiate of the Medical Council of Canada may have already taken their MCCQE1 and will not need to pay the fee during registration. Additionally, IMGs incur costs that Canadian medical graduates do not, such as the English Language Proficiency Exam, and non-Canadian credential verification fees.

## Appendix C: Lost Wages

Bachelor's Degree		Physician		Wage Differential	\$ Difference
Age	Income (2021 \$)	Age	Income (2021 \$)		
27	57,411.91	27	73,400		
28	61,107.46	28	82,800		
29	64,803.01	29	92,200		
30	68,498.57	30	101,600		
31	72,194.12	31	111,000		
32	75,889.67	32	120,400		
33	78,849.14	33	124,925		
34	81,808.61	34	129,450		
35	84,768.08	35	133,975		
36	87,727.55	36	138,500	Wage Differential (Age 36)	\$ 50,772.45
37	90,687.02	37	143,025	Wage Differential (Age 37)	\$ 52,337.98
38	94,670.95	38	147,550	Wage Differential (Age 38)	\$ 52,879.05
39	98,654.88	39	152,075	Wage Differential (Age 39)	\$ 53,420.12
40	102,638.80	40	156,600	<b>Sum of Lost Wages</b>	<b>\$ 209,409.61</b>
41	106,622.73	41	159,560		
42	110,606.66	42	162,520		
43	112,855.59	43	165,480		
44	115,104.51	44	168,440		
45	117,353.44	45	171,400		
46	119,602.36	46	174,360		
47	121,851.29	47	177,320		
48	123,700.20	48	180,280		
49	125,549.10	49	183,240		
50	127,398.01	50	186,200		
51	129,246.91	51	185,540		
52	131,095.82	52	184,880		
53	133,895.28	53	184,220		
54	136,694.74	54	183,560		
55	139,494.21	55	182,900		
56	142,293.67	56	182,240		
57	145,093.13	57	181,580		
58	138,467.71	58	180,920		
59	131,842.30	59	180,260		
60	125,216.88	60	179,600		
61	118,591.47	61	178,940		
62	111,966.05	62	178,280		
63	105,340.63	63	177,620		
64	98,715.22	64	176,960		
65	92,089.80	65	176,300		



## Appendix D: Operating Expenditure per Medical Student

<b>University of Calgary</b>	
University of Calgary (U of C) Total Enrolment (2022)	36,543
U of C Faculty of Medicine Enrolment (2022)	492
Total Operating Cost (Year End 2023)	\$ 1,509,905,000.00
Operating Expenditure Per Student	\$ 41,318.58
Total Operating Expense on Medical Students	\$ 20,328,743.12

<b>University of Alberta</b>	
University of Alberta (U of A) Total Enrolment (2022)	42,270
U of A Faculty of Medicine Enrolment (2022)	663
Total Operating Cost (Year End 2023)	\$ 1,878,156,000.00
Operating Expenditure Per Student	\$ 44,432.36
Total Operating Expense on Medical Students	\$ 29,458,656.92

Weighted Average Operating Expenditure Per Student	\$ 43,105.97
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## Appendix E: Lost Tax Revenue

Provincial and Federal Tax Brackets for the tax year 2021

<b>Alberta Tax Rates and Brackets</b>	
<b>Tax Rate</b>	<b>2021 Brackets</b>
10%	Up to \$131,220
12%	\$131,220.01 to \$157,464
13%	\$157,464.01 to \$209,952
14%	\$209,952.01 to \$314,928
15%	\$314,928.01 and up

<b>Federal Tax Rates and Brackets</b>	
<b>Tax Rate</b>	<b>2021 Brackets</b>
15%	Up to \$49,020
20.50%	\$49,020 up to \$98,040
26%	\$98,040 up to \$151,978
29%	\$151,978 up to \$216,511
33%	\$216,511 and up

The above 2021 provincial and federal tax brackets are used to calculate lost tax revenue in the tables below. Below, taxes owed over the lifetime career for an individual working full time in Alberta with earning projections of a bachelor's degree are calculated first, in 2021 dollars. Then taxes owed over the lifetime career for a doctor working full time in Alberta are calculated, in 2021 dollars. Finally, the difference in taxes owed between the full employment scenario of doctor and the underemployment scenario of a bachelor's degree are calculated. That is the lost tax revenue for an individual over their lifetime career, on average. That is then multiplied by the approximate number of underemployed doctors in Alberta, resulting in the total lost tax revenue resulting from the underemployment of doctors in Alberta who are unable to work in their fields.

Provincial and federal taxes owed over career lifetime for individual with a bachelor's degree level income, with income in 2021 dollars and 2021 Alberta and Canada (federal) tax brackets.

Bachelor's Degree	2021	Alberta Tax		Federal Tax			Total Provincial Tax Owed	Total Federal Tax Owed
		10%	12%	15%	20.50%	26%		
Age	Income							
27	\$ 57,411.91	\$ 5,741.19	\$ -	\$ 7,353.00	\$ 1,720.34	\$ -	\$ 5,741.19	\$ 9,073.34
28	\$ 61,107.46	\$ 6,110.75	\$ -	\$ 7,353.00	\$ 2,477.93	\$ -	\$ 6,110.75	\$ 9,830.93
29	\$ 64,803.01	\$ 6,480.30	\$ -	\$ 7,353.00	\$ 3,235.52	\$ -	\$ 6,480.30	\$ 10,588.52
30	\$ 68,498.57	\$ 6,849.86	\$ -	\$ 7,353.00	\$ 3,993.11	\$ -	\$ 6,849.86	\$ 11,346.11
31	\$ 72,194.12	\$ 7,219.41	\$ -	\$ 7,353.00	\$ 4,750.69	\$ -	\$ 7,219.41	\$ 12,103.69
32	\$ 75,889.67	\$ 7,588.97	\$ -	\$ 7,353.00	\$ 5,508.28	\$ -	\$ 7,588.97	\$ 12,861.28
33	\$ 78,849.14	\$ 7,884.91	\$ -	\$ 7,353.00	\$ 6,114.97	\$ -	\$ 7,884.91	\$ 13,467.97
34	\$ 81,808.61	\$ 8,180.86	\$ -	\$ 7,353.00	\$ 6,721.67	\$ -	\$ 8,180.86	\$ 14,074.67
35	\$ 84,768.08	\$ 8,476.81	\$ -	\$ 7,353.00	\$ 7,328.36	\$ -	\$ 8,476.81	\$ 14,681.36
36	\$ 87,727.55	\$ 8,772.76	\$ -	\$ 7,353.00	\$ 7,935.05	\$ -	\$ 8,772.76	\$ 15,288.05
37	\$ 90,687.02	\$ 9,068.70	\$ -	\$ 7,353.00	\$ 8,541.74	\$ -	\$ 9,068.70	\$ 15,894.74
38	\$ 94,670.95	\$ 9,467.09	\$ -	\$ 7,353.00	\$ 9,358.44	\$ -	\$ 9,467.09	\$ 16,711.44
39	\$ 98,654.88	\$ 9,865.49	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 159.87	\$ 9,865.49	\$ 27,611.07
40	\$ 102,638.80	\$ 10,263.88	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 1,195.69	\$ 10,263.88	\$ 28,646.89
41	\$ 106,622.73	\$ 10,662.27	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 2,231.51	\$ 10,662.27	\$ 29,682.71
42	\$ 110,606.66	\$ 11,060.67	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 3,267.33	\$ 11,060.67	\$ 30,718.53
43	\$ 112,855.59	\$ 11,285.56	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 3,852.05	\$ 11,285.56	\$ 31,303.25
44	\$ 115,104.51	\$ 11,510.45	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 4,436.77	\$ 11,510.45	\$ 31,887.97
45	\$ 117,353.44	\$ 11,735.34	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 5,021.49	\$ 11,735.34	\$ 32,472.69
46	\$ 119,602.36	\$ 11,960.24	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 5,606.21	\$ 11,960.24	\$ 33,057.41
47	\$ 121,851.29	\$ 12,185.13	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 6,190.94	\$ 12,185.13	\$ 33,642.14
48	\$ 123,700.20	\$ 12,370.02	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 6,671.65	\$ 12,370.02	\$ 34,122.85
49	\$ 125,549.10	\$ 12,554.91	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 7,152.37	\$ 12,554.91	\$ 34,603.57
50	\$ 127,398.01	\$ 12,739.80	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 7,633.08	\$ 12,739.80	\$ 35,084.28
51	\$ 129,246.91	\$ 12,924.69	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 8,113.80	\$ 12,924.69	\$ 35,565.00

52	\$ 131,095.82	\$ 13,109.58	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 8,594.51	\$ 13,109.58	\$ 36,045.71
53	\$ 133,895.28	\$ 13,122.00	\$ 321.03	\$ 7,353.00	\$ 20,098.20	\$ 9,322.37	\$ 13,122.00	\$ 36,773.57
54	\$ 136,694.74	\$ 13,122.00	\$ 656.97	\$ 7,353.00	\$ 20,098.20	\$ 10,050.23	\$ 13,122.00	\$ 37,501.43
55	\$ 139,494.21	\$ 13,122.00	\$ 992.90	\$ 7,353.00	\$ 20,098.20	\$ 10,778.09	\$ 13,122.00	\$ 38,229.29
56	\$ 142,293.67	\$ 13,122.00	\$ 1,328.84	\$ 7,353.00	\$ 20,098.20	\$ 11,505.95	\$ 13,122.00	\$ 38,957.15
57	\$ 145,093.13	\$ 13,122.00	\$ 1,664.78	\$ 7,353.00	\$ 20,098.20	\$ 12,233.81	\$ 13,122.00	\$ 39,685.01
58	\$ 138,467.71	\$ 13,122.00	\$ 869.73	\$ 7,353.00	\$ 20,098.20	\$ 10,511.21	\$ 13,122.00	\$ 37,962.41
59	\$ 131,842.30	\$ 13,122.00	\$ 74.68	\$ 7,353.00	\$ 20,098.20	\$ 8,788.60	\$ 13,122.00	\$ 36,239.80
60	\$ 125,216.88	\$ 12,521.69	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 7,065.99	\$ 12,521.69	\$ 34,517.19
61	\$ 118,591.47	\$ 11,859.15	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 5,343.38	\$ 11,859.15	\$ 32,794.58
62	\$ 111,966.05	\$ 11,196.61	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 3,620.77	\$ 11,196.61	\$ 31,071.97
63	\$ 105,340.63	\$ 10,534.06	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 1,898.16	\$ 10,534.06	\$ 29,349.36
64	\$ 98,715.22	\$ 9,871.52	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 175.56	\$ 9,871.52	\$ 27,626.76
65	\$ 92,089.80	\$ 9,208.98	\$ -	\$ 7,353.00	\$ 8,829.31	\$ -	\$ 9,208.98	\$ 16,182.31
							\$ 413,115.64	\$ 1,047,257.02
							Total Taxes owed - Bachelor	\$ 1,460,372.67

Provincial and federal taxes owed over career lifetime for individual working as a doctor, with income in 2021 dollars and 2021 Alberta and Canada (federal) tax brackets.

Doctor	2021	Alberta Tax			Federal Tax			Total Provincial Tax Owed	Total Federal Tax Owed
		10%	12%	13%	15%	20.50%	26%		
Age	Income								
27	\$ 73,400.00	\$ 7,340.00	\$ -	\$ -	\$ 7,353.00	\$ 4,997.90	\$ -	\$ 7,340.00	\$ 12,350.90
28	\$ 82,800.00	\$ 8,280.00	\$ -	\$ -	\$ 7,353.00	\$ 6,924.90	\$ -	\$ 8,280.00	\$ 14,277.90
29	\$ 92,200.00	\$ 9,220.00	\$ -	\$ -	\$ 7,353.00	\$ 8,851.90	\$ -	\$ 9,220.00	\$ 16,204.90
30	\$ 101,600.00	\$ 10,160.00	\$ -	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 925.60	\$ 10,160.00	\$ 28,376.80

31	\$ 111,000.00	\$ 11,100.00	\$ -	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 3,369.60	\$ 11,100.00	\$ 30,820.80
32	\$ 120,400.00	\$ 12,040.00	\$ -	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 5,813.60	\$ 12,040.00	\$ 33,264.80
33	\$ 124,925.00	\$ 12,492.50	\$ -	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 6,990.10	\$ 12,492.50	\$ 34,441.30
34	\$ 129,450.00	\$ 12,945.00	\$ -	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 8,166.60	\$ 12,945.00	\$ 35,617.80
35	\$ 133,975.00	\$ 13,122.00	\$ 330.60	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 9,343.10	\$ 13,452.60	\$ 36,794.30
36	\$ 138,500.00	\$ 13,122.00	\$ 873.60	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 10,519.60	\$ 13,995.60	\$ 37,970.80
37	\$ 143,025.00	\$ 13,122.00	\$ 1,416.60	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 11,696.10	\$ 14,538.60	\$ 39,147.30
38	\$ 147,550.00	\$ 13,122.00	\$ 1,959.60	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 12,872.60	\$ 15,081.60	\$ 40,323.80
39	\$ 152,075.00	\$ 13,122.00	\$ 2,502.60	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 14,049.10	\$ 15,624.60	\$ 41,500.30
40	\$ 156,600.00	\$ 13,122.00	\$ 3,045.60	\$ -	\$ 7,353.00	\$ 20,098.20	\$ 15,225.60	\$ 16,167.60	\$ 42,676.80
41	\$ 159,560.00	\$ 13,122.00	\$ 18,895.68	\$ 272.48	\$ 7,353.00	\$ 20,098.20	\$ 15,995.20	\$ 32,290.16	\$ 43,446.40
42	\$ 162,520.00	\$ 13,122.00	\$ 18,895.68	\$ 657.28	\$ 7,353.00	\$ 20,098.20	\$ 16,764.80	\$ 32,674.96	\$ 44,216.00
43	\$ 165,480.00	\$ 13,122.00	\$ 18,895.68	\$ 1,042.08	\$ 7,353.00	\$ 20,098.20	\$ 17,534.40	\$ 33,059.76	\$ 44,985.60
44	\$ 168,440.00	\$ 13,122.00	\$ 18,895.68	\$ 1,426.88	\$ 7,353.00	\$ 20,098.20	\$ 18,304.00	\$ 33,444.56	\$ 45,755.20
45	\$ 171,400.00	\$ 13,122.00	\$ 18,895.68	\$ 1,811.68	\$ 7,353.00	\$ 20,098.20	\$ 19,073.60	\$ 33,829.36	\$ 46,524.80
46	\$ 174,360.00	\$ 13,122.00	\$ 18,895.68	\$ 2,196.48	\$ 7,353.00	\$ 20,098.20	\$ 19,843.20	\$ 34,214.16	\$ 47,294.40
47	\$ 177,320.00	\$ 13,122.00	\$ 18,895.68	\$ 2,581.28	\$ 7,353.00	\$ 20,098.20	\$ 20,612.80	\$ 34,598.96	\$ 48,064.00
48	\$ 180,280.00	\$ 13,122.00	\$ 18,895.68	\$ 2,966.08	\$ 7,353.00	\$ 20,098.20	\$ 21,382.40	\$ 34,983.76	\$ 48,833.60
49	\$ 183,240.00	\$ 13,122.00	\$ 18,895.68	\$ 3,350.88	\$ 7,353.00	\$ 20,098.20	\$ 22,152.00	\$ 35,368.56	\$ 49,603.20
50	\$ 186,200.00	\$ 13,122.00	\$ 18,895.68	\$ 3,735.68	\$ 7,353.00	\$ 20,098.20	\$ 22,921.60	\$ 35,753.36	\$ 50,372.80
51	\$ 185,540.00	\$ 13,122.00	\$ 18,895.68	\$ 3,649.88	\$ 7,353.00	\$ 20,098.20	\$ 22,750.00	\$ 35,667.56	\$ 50,201.20
52	\$ 184,880.00	\$ 13,122.00	\$ 18,895.68	\$ 3,564.08	\$ 7,353.00	\$ 20,098.20	\$ 22,578.40	\$ 35,581.76	\$ 50,029.60
53	\$ 184,220.00	\$ 13,122.00	\$ 18,895.68	\$ 3,478.28	\$ 7,353.00	\$ 20,098.20	\$ 22,406.80	\$ 35,495.96	\$ 49,858.00
54	\$ 183,560.00	\$ 13,122.00	\$ 18,895.68	\$ 3,392.48	\$ 7,353.00	\$ 20,098.20	\$ 22,235.20	\$ 35,410.16	\$ 49,686.40
55	\$ 182,900.00	\$ 13,122.00	\$ 18,895.68	\$ 3,306.68	\$ 7,353.00	\$ 20,098.20	\$ 22,063.60	\$ 35,324.36	\$ 49,514.80
56	\$ 182,240.00	\$ 13,122.00	\$ 18,895.68	\$ 3,220.88	\$ 7,353.00	\$ 20,098.20	\$ 21,892.00	\$ 35,238.56	\$ 49,343.20
57	\$ 181,580.00	\$ 13,122.00	\$ 18,895.68	\$ 3,135.08	\$ 7,353.00	\$ 20,098.20	\$ 21,720.40	\$ 35,152.76	\$ 49,171.60
58	\$ 180,920.00	\$ 13,122.00	\$ 18,895.68	\$ 3,049.28	\$ 7,353.00	\$ 20,098.20	\$ 21,548.80	\$ 35,066.96	\$ 49,000.00
59	\$ 180,260.00	\$ 13,122.00	\$ 18,895.68	\$ 2,963.48	\$ 7,353.00	\$ 20,098.20	\$ 21,377.20	\$ 34,981.16	\$ 48,828.40
60	\$ 179,600.00	\$ 13,122.00	\$ 18,895.68	\$ 2,877.68	\$ 7,353.00	\$ 20,098.20	\$ 21,205.60	\$ 34,895.36	\$ 48,656.80
61	\$ 178,940.00	\$ 13,122.00	\$ 18,895.68	\$ 2,791.88	\$ 7,353.00	\$ 20,098.20	\$ 21,034.00	\$ 34,809.56	\$ 48,485.20
62	\$ 178,280.00	\$ 13,122.00	\$ 18,895.68	\$ 2,706.08	\$ 7,353.00	\$ 20,098.20	\$ 20,862.40	\$ 34,723.76	\$ 48,313.60

63	\$ 177,620.00	\$ 13,122.00	\$ 18,895.68	\$ 2,620.28	\$ 7,353.00	\$ 20,098.20	\$ 20,690.80	\$ 34,637.96	\$ 48,142.00
64	\$ 176,960.00	\$ 13,122.00	\$ 18,895.68	\$ 2,534.48	\$ 7,353.00	\$ 20,098.20	\$ 20,519.20	\$ 34,552.16	\$ 47,970.40
65	\$ 176,300.00	\$ 13,122.00	\$ 18,895.68	\$ 2,448.68	\$ 7,353.00	\$ 20,098.20	\$ 20,347.60	\$ 34,466.36	\$ 47,798.80
								\$ 1,038,660	\$ 1,647,865
								Total Taxes Owed - Doctor	\$ 2,686,525

Difference of taxes owed over the career lifetime of an individual with a bachelor’s degree subtracted from taxes owed over the career lifetime of a doctor, resulting in the lost owed taxes (lost tax revenue)

<b>Difference in Lifetime Taxes Owed</b>	
Physician Lifetime Owed	\$ 2,686,524.60
Bachelor Lifetime Owed	\$ 1,460,372.67
Lost Tax Revenue - Individual	\$ 1,226,151.93
Number of Unemployed/Underemployed Physicians - Alberta	1060
Total Lost Tax Revenue	\$ 1,299,721,049.94

## Appendix F: Cooper, Solucient, and GMENAC physician-to-patient ratios

Various ratios have been developed to determine ideal physician-to-patient ratios. The Graduate Medical Education National Advisory Committee (GMENAC) is considered the most prominent, but also is dated as it was released in 1980. Other ratios that have been developed include the Cooper ratio, developed by Dr. Cooper from the University of Pennsylvania, and the Solucient ratio from the consulting firm Solucient. These ratios have the caveat that it is important to perform a complete analysis of local demographics as well as existing medical staff. The table below shows the recommended physician-to-patient ratios for family doctors and general surgery, per 100,000 population.

	<b>GMENAC</b>	<b>Solucient</b>	<b>Cooper</b>
<b>Family Medicine</b>	25.2	22.5	30.4
<b>General Surgery</b>	9.7	6.0	7.9

Next, I converted the physician-to-patient ratio into a patient-to-physician ratio to determine how many patients each physician should have, the following table shows the calculations.

<b>Measure</b>	<b>Physicians</b>	<b>Population</b>	<b>Ratio of patients per family physician</b>
<b>GMENAC</b>	25.2	100,000	3,968
<b>Solucient</b>	22.5	100,000	4,444
<b>Cooper</b>	30.4	100,000	3,289

Using the GMENAC ratio above and the number of Albertans without a family doctor (650,000), I determine the doctor shortage based on GMENAC.

<b>Albertans without a family doctor</b>	650,000
<b>GMENAC Ratio</b>	3,968
<b>Doctor Shortage per GMENAC</b>	163.8

Despite the proposed GMENAC ratio, Alberta has a lower ratio of patients per family physician. To determine the current ratio of patients per family physician, I subtract the number of Albertans who do not have a family physician from Alberta's total population which is the number of Albertans with a family doctor. That number is then divided by the number of physicians in Alberta, giving a much lower actual ratio of patients per family physician in Alberta (686 patients per physician). Using that same ratio for Albertans without a family physician, Alberta has a shortage of 948 family physicians.

<b>Number of Albertans with a family doctor</b>	3,721,000
<b>Current ratio of patients per family doctor in Alberta</b>	685.9
<b>Deficit of family doctors using Alberta's current ratio</b>	948

## Appendix G: Resident Salary Comparison Across Canada

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
<b>British Columbia</b>	\$ 65,332	\$ 72,818	\$ 79,302	\$ 85,319	\$ 91,711	\$ 97,877	\$ 104,271	
<b>Alberta</b>	<b>\$ 58,934</b>	<b>\$ 65,232</b>	<b>\$ 70,259</b>	<b>\$ 75,291</b>	<b>\$ 81,584</b>	<b>\$ 86,615</b>	<b>\$ 93,577</b>	<b>\$ 101,114</b>
<b>Saskatchewan</b>	\$ 61,635	\$ 67,217	\$ 72,794	\$ 78,348	\$ 83,860	\$ 89,359		
<b>Manitoba</b>	\$ 62,663	\$ 69,370	\$ 74,410	\$ 80,134	\$ 85,863	\$ 91,586	\$ 97,192	\$ 104,784
<b>Ontario</b>	\$ 62,228	\$ 68,328	\$ 73,383	\$ 79,503	\$ 84,534	\$ 89,337	\$ 92,767	\$ 97,877
<b>Quebec</b>	\$ 49,258	\$ 54,358	\$ 59,458	\$ 64,558	\$ 69,658	\$ 74,758	\$ 74,758	\$ 74,758
<b>Newfoundland and Labrador</b>	\$ 69,175	\$ 74,779	\$ 79,848	\$ 85,137	\$ 90,868	\$ 96,998	\$ 102,842	
<b>Nova Scotia, New Brunswick, PEI</b>	\$ 69,867	\$ 75,527	\$ 80,646	\$ 85,988	\$ 91,777	\$ 97,968	\$ 103,870	\$ 110,897

The table above shows the resident salaries paid during each year of residency across Canada. Alberta pays the second lowest rate of salaries, after Quebec, in Canada. In addition to salaries, all residents in Canada also get annual vacation of four weeks, health insurance, and certain other stipends and leave allowances.