Picking $1000 Bills Off of the Sidewalk: Social Rates of Return to Investment in Skills Assessment and Residency Training of International Medical Graduates in Alberta

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ABSTRACT:

Governments and physician organizations in Canada have identified current and anticipated future shortages of physicians. The creation of opportunities for licensure for the sizeable population of unlicensed International Medical Graduates (IMG) residing in Canada can alleviate some of the shortage of medical manpower. We examine whether expenditures on IMG skills assessment, training and licensing are a socially desirable use of resources. We estimate the financial rate of return to Alberta taxpayers from resources allocated to the Alberta International Medical Graduate Program (AIMG), started in 2001. Our estimates show that resources allocated to providing skills assessment and residency training opportunities for IMGs generate real annual rates of return of 9 to 13 percent.
Through the 1980s and early 1990s, Canada was thought to have a surplus in physician supply that was identified as a problem for governments interested in containing health care costs.\(^1\) Thus, as part of a policy environment aimed at controlling health care costs by controlling the growth of physician supply, several measures were taken to reduce the intake of International Medical Graduates in Canada.\(^2\) Licensing of IMGs became more restrictive in the early 1990s.\(^3\) As a consequence of population growth in Canada and policies implemented in the early 1990s to control the growth of physician supply, Chan (2002) estimated that the ratio of total physician services to population in Canada declined to its 1987 level after reaching a peak in 1993. Chan estimated that one fifth of the total decline in the growth physician manpower in the 1990s could be attributed to a decreased intake of international medical graduates after 1993. If reducing the intake of IMGs was so effective for reducing physician supply, then it follows that policies aimed at improving the integration of qualified IMGs into the Canadian physician workforce should be an effective way to alleviate some of the current and expected shortages of physicians in Canada (Crutcher 2002, Crutcher and Dauphinee 2004).

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\(^2\) Evans (1998, 758) indicates that restricting IMG opportunities to practice medicine can actually be dated as early as 1975. He argues that 1964 recommendations to increase the numbers of physicians in Canada to yield a stable physician to population “set off a 25-year increase that did not plateau until the 1990s. The current level of physician supply can thus be traced to an erroneous population forecast in 1964. This was obvious as early as 1975, when physician immigration was sharply curtailed. It was politically much easier, however, to keep out foreigners than to shrink established medical schools.”

\(^3\) Chan (2002, 35) indicates that the numbers of IMGs entering Canada on special visas for postgraduate training was reduced. Recommendations were made to close the Medical Council of Canada’s overseas testing facilities and to require immigrants to Canada to sign a declaration agreeing that there would be no guarantee of medical practice in Canada.
There are opportunity costs to Canadians in expanding physician supply by means of IMG workforce integration policies and practices. Such costs include developing administrative infrastructure and enhancing educational capacity to create orientation and training opportunities for IMGs. Two alternative policy directions to address physician workforce shortages are to increase the annual intake of students into Canadian medical schools or to substitute nurse practitioners for scarce physician manpower. However, such alternative policy directions do not address the health human capital potential of the sizeable population of unlicensed IMGs currently residing in Canada.  

In an environment where resources that are allocated towards IMG training and licensing are not available for other uses like expanding Canadian medical school capacity, the important policy question that has so far not been answered is whether resources allocated to IMG assessment, training and licensing is a socially desirable use of resources.

Would the money be better spent elsewhere? To address this question we estimate the financial rate of return to Alberta taxpayers from resources allocated to the Alberta International Medical Graduate Program (AIMG). The AIMG program was created in 2001 to identify IMGs who are qualified for residence training in Canada and to provide

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5 The July 2004 Report of the CMA Ad Hoc Policy Working Group on the Physician Workforce estimates that there are as many as 4000 people in Ontario who have obtained an MD degree outside of Canada and who hold a “pass” result on the Medical Council of Canada Evaluating Exam, hence are eligible for post-MD training in Canada. While the depth and breadth of the IMG resource pool is not fully known, the characteristics of a subset of these physicians have been described in Crutcher, Banner, Szafran and Watanabe (2003).

7 This income based approach excludes the non-pecuniary benefits that may arise from IMGs providing service to immigrant communities, particularly where the ability to communicate with patients in languages other than English is important.
family medicine residency positions for IMGs in Alberta per year at an annual cost of $680,000 in 2001. Our economic evaluation of the social returns to AIMG program shows that providing residency training opportunities for IMGs is a high return use of public funds. Compared to the alternative use of funds of expanding medical school training opportunities for Albertans, we find that investing in the residency training of IMGs yields more than double the rate of return.

The AIMG Program

The Alberta International Medical Graduate (AIMG) program was established by Alberta Health and Wellness in 2001. It arose as part of the Alberta Government response to a report from the Provincial Physician Resource Planning Committee (PRPC) in 2000 that identified an anticipated shortfall of physicians in Alberta of 1,329 FTEs (610 general practice, 719 specialist) by 2005. Caves (2000) estimated that there were 160 unlicensed IMGs in Alberta, 20 of whom had successfully completed the Medical Council of Canada Evaluating Exam and were eligible for residency training. Prior to the creation of the AIMG program, IMGs had virtually no access to clinical skills assessment and limited access to the postgraduate training they required to be licensed for medical practice. IMGs are only eligible for the second round of the Canadian Residency Matching Service (CaRMs) which has only a small percentage of residency positions available after Canadian medical graduates fill most positions in the first round of the process. The IMG community became increasingly vocal and organized, and their collective voice was a key influence on the AIMG program formation. The AIMG program accepted its first applicants in January 2001. Although the program initially planned for 4 AIMG sponsored Family Medicine residency program positions, this was
increased to 11 family medicine positions for the first group of AIMG residents, given funding availability and perceived training capacity.

The AIMG program is a provincially funded program through Alberta Health and Wellness. The governing steering committee has representation from the University of Alberta, the University of Calgary, the College of Physicians and Surgeons of Alberta, the Rural Physician Action Plan, Capital Health Region, as well as representation and secretariat support from Alberta Health and Wellness. All AIMG residency positions are above and beyond residency positions which are part of the national residency matching service (CaRMS).

The AIMG Selection Process includes a standardized review of credentials, medical school transcripts, English language proficiency (TOEFL / TSE), performance on national examinations (MCCQE Part I), letters of reference, and a personal statement. There is also standardized assessment of clinical skills (an OSCE exam, with the performance standard being set at the level of a graduating Canadian medical student). Candidates also participate in a set of two behaviorally-anchored interviews prior to a final comprehensive file evaluation. Of 49 complete applications to the AIMG program in 2001, the top ranked 11 candidates obtained a fully funded residency position at the University of Calgary or University of Alberta. These applicants underwent a two month clinical orientation process prior to the commencement of residency training on July 1, 2001. As of July 2004, 16 doctors have graduated from the AIMG program and are now practicing.
The Social Rate of Return of the AIMG Program for Albertans

A standard way for an economist to value the returns to society from investment in the human capital of unlicensed IMGs in Alberta is to use an income based approach. If we assume that the wages/earnings of workers reflect their productivity (value of what they produce for society), then the earnings of an individual reflects the value of their labour services to society.\(^7\) The lack of recognition of credentials, and/or doubts about their clinical skills combined with a systemic inability to assess these skills, precludes many IMGs from obtaining employment as physicians. IMGs typically work in occupations that generate lower incomes than those of practicing physicians.\(^8\) The gain to society from providing residency training opportunities to facilitate the IMGs obtaining a medical license would be represented by the gain in income that IMGs earn as physicians over that which they would have earned in their next best alternative occupation. This assumes that there is a demand for physicians hence with a license the IMGs would receive the “market wage” for physicians. This would appear to be a reasonable characterization of the Alberta health sector given the PRPC findings that showed for 2000 an existing and growing need for physician manpower. Clearly, if the qualifications of the IMGs are adequate, their services are in demand.

If we wish to assess the value of a medical degree or of an IMG obtaining a medical license, we need to assess the value of the stream of net benefits that they will produce from now until they retire compared to the value of the costs of training/credentialing which are incurred in the present. The costs to society of providing residency training for IMGs include the direct resource costs of the training and the net

\(^8\) As much as half of the Alberta un-licensed IMGs are currently not employed at all; only a handful work in areas related to their medical training. The average annual earnings of the un-licensed IMGs who reported working at least part-time in 2002 were $16,455.
foregone earnings of the medical resident. As a dollar received in the future has a value of less than one dollar today due to the opportunity cost of money, the costs and benefits of the investment in an IMG are converted into present value terms. The present value of a dollar received in \( t \) years, is the amount of money that you would have to invest today at interest rate \( r \) to receive the one dollar in \( t \) years. The net present value (NPV) of an investment that will generate benefits \( B_t \) in each period \( t \), and costs \( C_t \) in each period, is the simple sum of the Present Value of \( B_t - C_t \) from the year in which the project begins to the date at which the project ends, year \( T \). Typically, a value for \( r \) is assumed for the calculation that represents the risk free, market rate of return to alternative investments (e.g. if you invested in long term government bonds instead of the AIMG program):

\[
NPV = \sum_{t=1}^{T} \frac{B_t - C_t}{(1 + r)^{-t}}
\]

In the context of the AIMG program, the NPV of the services of an AIMG resident is the sum of the present value of benefits minus costs from the year in which the AIMG applicant is selected to the year in which they are expected to cease medical practice. For purposes of comparison, we also consider the NPV for a Canadian Medical Degree. The horizons that we consider are ages 36 to 65, and 45 to 65, for AIMG applicants and ages 25 to 65 for Canadian medical graduates. If the NPV for the project is a positive number at the assumed interest rate, then the project is deemed to be worthwhile. If the NPV is negative, then the benefits are not large enough to generate the benchmark rate of return for the funds invested in the project.
An alternative way to use the NPV formula to evaluate an investment project is to calculate the Internal Rate of Return (IRR) to the investment. Instead of assuming a value for \( r \) to calculate the NPV of the project, the costs and benefits are combined according to the NPV formula, and an algorithm is used to determine the interest rate that would yield an NPV of 0 for the project:

\[
IRR = r^* \quad \text{where } r^* \text{ satisfies } \quad NPV = \sum_{t=1}^{T} \frac{B_t - C_t}{(1 + r^*)^{-t}} = 0
\]

The IRR is interpreted as the real annual rate of return to the investment which is directly comparable to annualized rates of return to other investments like stocks, bonds, real estate or IRR’s from other projects.

To do this calculation, a pre-tax age-earnings profile is generated for someone working as a physician for the \( B_t \) values. The \( C_t \) values include two components; training and education costs, and the opportunity cost of an individual working as a physician which is the earnings that they would have in their next best non-physician occupation. The latter component reflects that from a societal perspective, we are interested in the gain in value of output produced.

For the age-earnings profile for persons holding a medical degree in Canada, we use Rathje’s (2000, Table 5.8) estimated earnings equation for male university graduates in Alberta. Rathje’s estimates are derived from the 3% public use samples of the 1986, 1991 and 1996 Censuses of Canada. She uses 9,653 observations of earnings, age and level and type of University degree for males working full-time for at least 26 weeks in Alberta. Rathje’s age-earnings profile for males holding a medical degree in Alberta (the
higher line in Figure 1) suggests that in 2002 before-tax earnings of medical graduates in Alberta rise from $46,537 at age 25 to a peak of $91,840 at age 47 and decline to $58,454 at age 65. These income estimates may be somewhat conservative estimates of physician earnings in Alberta.⁹ Alberta Health and Wellness statistics reported on the AMA website reveal that in 2000-2001, the average annual payment to family physicians in Alberta was $161,596. Using an estimate that overhead costs are approximately 40% of this amount, which suggests an average annual before tax income of a physician in Alberta for 2000-01 is $96,958 which is higher than the peak earnings suggested by the Census data.

Estimating the alternative earnings profile for IMGs not employed as physicians requires that an assumption be made about the nature of work they do and the level of education required for that work. We use Rathje’s (2000, Table 5.8) earnings equation and select the age-earnings profiles for males with a high school education as their highest level of schooling depicted by the lower line in Figure 1. This essentially assumes that IMGs are treated as having no university credentials in the Alberta labour market. Estimated average earnings rise from $27,397 at age 25 to a peak of $54,068 at age 47 and then decline to $34,413 at age 65. In all likelihood, these earnings estimates overstate the actual earnings of unlicensed IMGs in Alberta. From a 2002 survey of IMGs in Alberta performed by the Alberta Network for Immigrant Women, the average annual income for the 53 IMGs in 2000-01 was $7,405, and $16,455 for those IMGs that were employed. Also, in this IMG sample, the implied unemployment rate is over 50%.

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⁹ Rathje’s sample excludes self-employed individuals. In Alberta, most physicians have their own practices and bill on a fee for service basis and are thus, self-employed. The reported incomes from being an employee may be lower than what individuals actually earn through their own practices.
but Rathje’s (2000) earnings equation assumes that an individual is employed full-year full-time.

In our calculations of the IRR for a Canadian Medical Degree, we use the same age-earnings profiles for physicians described above, but for the alternative earnings profile, we use the average incomes of individuals holding a B.Sc. (middle line in Figure 1) since a B.Sc. is a common qualification held by applicants accepted to medical school. The resource costs required to train a Canadian medical student are from Rathje (2000, Table B3). Rathje estimates that annual university operating expenditures attributable to a medical student in Alberta is $96,050 in 2002. We assume that after three years of medical school, the individual begins two years of residency training.

The resource costs associated with the AIMG program which can be separated into two parts; assessment and selection to an AIMG resident position and the costs of the residency training. The assessment and selection resources are directly comparable to the resources allocated to a student in a Canadian Medical School as the output both streams is a ‘residency ready’ graduate.

The expenditures of the AIMG program per successful applicant on evaluation and clinical orientation of applicants were $37,596 in 2002-03. Thus, for the cost of training one Canadian medical student for one year, the AIMG program identifies 2.5 residency ready doctors. Given that it takes 3 or 4 years to produce one Canadian Medical Graduate ready for residency training, the same resources in the AIMG program identify 7.5 to 10 residency ready physicians. The AIMG program is a cost effective way of increasing physician supply.
For both Canadian Medical School graduates and successful AIMG applicants, determining the true resource cost of a residency training program is complex as residents not only require teaching resources, they are also supplying medical services. Because they are students, medical residents pay tuition fees, and as they are also service providers, they receive a resident’s salary. Tuition fees are not included as costs to society since they are really just apportioning the cost of the residency program between the student and the rest of society. For the purposes of calculation we use the AIMG expenditures per residency position (described below) to represent the resource costs of residency positions for Canadian medical school graduates\(^\text{10}\)

The successful AIMG applicants enter a two-year Family Medicine residency program, the positions of which are funded by the AIMG program. The annual cost of an AIMG funded residency position in 2002-03 was $85,064. The residents’ salaries are paid by the regional health authorities in Alberta, and in 2002-03, these salaries are $43,124 for the first year of residency and $46,868 for the second year of residency. These salaries are not costs for society as they are incomes that represent the value of the resident’s services. Thus, the resource cost of the AIMG residency program could be as little as the net difference of AIMG expenditures and the salary paid to the AIMG resident, assuming that the resident’s salary reflects the value of the services that they provide. We perform calculations with and without residents’ salaries.

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\(^{10}\) The funding required for an AIMG residency position may understate the full resource cost of residency training relative to a graduate of a Canadian medical school. While Canadian family medicine program directors have described the increased program burden of providing training for IMGs, to date this burden has not been quantified and is not accounted for in our calculations. The AIMG program does provide some additional support during the AIMG resident’s training if required, this support is both in the form of remedial training opportunities and faculty development.
Figures 2 and 3 summarize the streams of costs and benefits for a 36 year old AIMG applicant and a 25 year old entering a three year medical program. Figure 2 shows a scenario where $37,596 is spent to identify a 36 year old IMG as residency ready. In that year, the IMG has the alternative occupation earnings associated with a high school graduate. At ages 37 and 38, the AIMG resident foregoes the earnings of a high school graduate, but earns a resident’s salary. They also require the expenditures of $85,064 per year for the two year residency program. From ages 39 to 65 they work as physicians and their earnings are represented by the age-earnings profile of Canadians aged 30 to 55 holding medical degrees. This assumes that any prior experience as physicians has no value for Canada and they are entering work at age 39 as “new grads”. Figure 3 shows a scenario where a 25 year old holding a B.Sc. enters a three year medical program. Thus for ages 25, 26 and 27, they forego the earnings of a B.Sc. holder and generate resource costs for medical training of $96,050 for each of three years. At ages 28 and 29 they enter two year residency programs that result in resource costs of $85,064 per year but they earn the resident’s salaries for those years. From ages 30 to 65, they have the average earnings of a medical degree holder for each year of age for those ages.

With the data and the age-earnings profiles, described above we calculate Internal Rates of Return for a Canadian entering medical school in 2002, and an AIMG applicant in 2002. Figure 4 shows the IRRs for Alberta from the AIMG program for 36 and 45 year old applicants These are real annual rates of return. If the resident’s salaries are ignored, the social rate of return for Alberta from identifying a 36 year old IMG for the residency program is 9%, and 8% for a 45 year old applicant. If residents’s salaries are included in the calculation, for the 36 year old AIMG applicant, the IRR rises to 13%.
Compared to alternative financial investments where a common benchmark rate of return is 4.25%, these are high returns to the AIMG program. Consider also that the social rates of return to Canadian medical training for a 25 year old medical student in 2002 are 4% if resident’s salaries are excluded and 5% if they are included.

Conclusions:
The economic analysis in this paper supports the policy initiatives to include IMG workforce integration strategies as part of the overall strategy for meeting Canada’s physician manpower needs. While the majority of the increase in physician numbers in Canada to address the growing shortage will come from a costly expansion of Canadian medical school spaces, this need not be the sole approach for producing doctors in Canada. For the same resources that are needed to train one medical student to enter residency training, the AIMG program identifies 10 ‘residency-ready’ IMGs. The rate of return to Albertans from the licensing of an AIMG for practice as a family physician is between 9 and 13 percent which is a clearly desirable and socially accountable use of public resources.

References:


Cave, Andrew J. 2000. “Unlicensed International Medical Graduates (IMGs) Survey 2000 – Short Report,” Mimeograph, Department of Family Medicine, University of Alberta (September 26, 2000).


Figure 1: Age-Earnings Profiles for Individuals with Medical Degrees, B.Sc.'s and High School Diploma's, Canada
Figure 2: Costs and Benefits for Society of an IMG Residency Position

Foregone Earnings = Opportunity Cost for society of IMG working as physician

Benefits for Society of IMG Practicing as a Physician

Identify as Qualified Applicant

Applies to AIMG Program at age 36
Enters Two Year AIMG Residency Program at age 37
Begins work as Physician at Age 39 -- I assume productivity of 30 year old Physician from Earning profile
Retires at age 65

Direct Costs of AIMG Program

Foregone Earnings AIMG
Benefit AIMG
AIMG Program and Residency Costs
Figure 3: Costs and Benefits from a Medical Education in Canada

- Foregone Earnings of BSc = Opportunity Cost for Society of Medical Education
- Benefits for Society of Medical Education

Enter Three Year Medical Program at Age 25
Begin Two Year Residency at Age 28
Begin Earnings as Physician at Age 30
Retire at Age 65
Figure 4: Internal Rates of Return to AIMG Program and Canadian Medical Degrees, 36 and 45 Year Old AIMG Applicants, 25 Year Old Medical Students, with and without Residency Income

- AIMG (A) -- 36 Year Old Applicant, excludes resident’s salary
- AIMG (B) -- 36 Year Old Applicant, includes Resident’s Salary
- AIMG (C) -- 45 Year Old Applicant, excludes resident’s salary
- Can Med Grad (A) -- 25 Year Old Medical Student, excludes resident’s salary
- Can Med Grad (B) -- 25 Year Old Medical Student, includes resident’s salary