Re-accreditation demands and skilled labor flows: The paradoxes of professional migration

by

Monica Boyd* and Grant Schellenberg**

Abstract:
Using data from the 2001 Canadian Census of Population, our paper compares the employment patterns of Canadian and foreign trained engineers and physicians. Our analysis finds patterns consistent with reports which stress that re-accreditation requirements, including language proficiency, create barriers for the internationally educated. Multinomial analyses confirm that foreign trained engineers and physicians are less likely to be employed in their professional occupations than are their Canadian born and foreign born counterparts who trained in Canada. Among those who received engineering or medical training outside Canada, the internationally educated born in European countries other than Eastern Europe or in South Asian countries are the most likely to work in engineering occupations or to practice medicine. Gaps between those born in Canada or trained in Canada and those educated elsewhere are largest for recent cohorts of the foreign trained.

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Introduction:

Labor migration is an integral part of international migration. However, the skills that are sought by countries of settlement have changed over time, away from agricultural and manufacturing labour to those consistent with knowledge economies. Stressing the importance of highly educated labor in their post-industrial economies, many nations now favor the admission of professionally trained migrants in their migration policies.

However, two factors militate against a direct correspondence between the admission of foreign trained professionals and their employment in professional occupations. First, immigrant professionals can experience downward mobility associated with their initial status as new members of a society – a status which may be accompanied by unfamiliarity with the structure of local and national labour markets, the absence of job-search related networks and the lack of language skills and host society "experience". Second, professionals often face accreditation barriers. Regulated occupations in certain trades, law, engineering and health areas require certification and/or licensing, primarily through professional associations, often based on government statutes. The purpose of licensing and certification is to assure public health and safety (Mata 1999; McDade 1988; Wright and McDade 1992), although it also is true that these practices are the defining characteristics of occupational internal labour markets which create monopolies on products and/or services by controlling labour supply (Boyd and Thomas, 2001). All new recruits to such occupations must be accredited, including newcomers who may have been trained outside the host society. But, whereas those trained in host society institutions have recognized programs of study, validated work experience and high command of the language(s) of employment, immigrants may face difficulty in having degrees recognized, foreign work experience counted, and in meeting language requirements. In Canada, certification requirements are often described as a form of systemic discrimination, in that criteria are created which are universally applied to the Canadian born and foreign born alike, but have disproportionate effects in restricting access to trades or professions among the foreign born (Boleria 1992; McDade 1988).

The collision of migration policies with domestic requirements of professional accreditation thus creates a paradox: while recruited on the basis of their potential professional contributions, migrants often face re-accreditation requirements that act as barriers to the full utilization of their skills. Central to these requirements are the knowledge requirements imposed by professional associations, the content of the training and the language proficiency of those seeking employment in their chosen professions. These issues are especially salient for internationally educated professionals in health sciences and in engineering. In recent years the media, through newspapers and television, have highlighted the particular difficulty of physicians who are unable to practice medicine in Canada, partly because of small and scarce internships (residency) available for the skills upgrading of internationally educated physicians. Similarly, those trained in engineering may face difficulty in practicing as engineers either because their degrees are considered technical level degrees that are not equivalent to those awarded from university programs in Canada or

they represent fewer years of schooling than normal for Canadian awarded degrees. As well, both medical and engineering associations require demonstration of language proficiency for reasons of public safety[1].

Drawing on data from the 2001 Canadian Census of Population for persons with engineering and medical training, the central question in this paper is: to what extent are the internationally educated in occupations that would be expected, given their training. We answer this question by comparing the employment patterns of the Canadian born and educated with those for the internationally educated. Multinomial analyses confirm that foreign trained physicians and engineers are less likely to be employed in their professional occupations than are their Canadian born counterparts and the foreign born who received training in Canada. Underemployment, defined as not holding an occupation in one's education field of training, is most likely for foreign trained migrants born in Southeast and East Asia, including the Philippines. Conversely, for those who received engineering or medical training outside Canada, the internationally educated born in European countries other than Eastern Europe or in South Asian countries are the most likely to work in engineering occupations or to practice medicine. Our findings are consistent with reports which stress that re-accreditation requirements, including language requirement, can act as barriers in the labour market integration of the foreign trained. They also highlight the unanticipated consequences of immigration policies targeted towards recruiting high skilled labor.

Data Sources and Methodologies

Our study analyzes data from the 2001 Census database, housed at Statistics Canada. This database contains responses to the " 2B long form" which collected detailed demographic and socioeconomic information from approximately 1 in 5 households in Canada (see: www12.statcan.ca/english/census01/home/questionnaire.cfm). In order to limit the effects of both student enrolment associated with lengthy training and later retirements, we restrict the population to those individuals who were age 30 to 54 at the time of the Census (May, 2001), and living in private households. The age parameters are chosen because the period between age 30 and 54 is the core of the productive life for most people. It is also the period when they are typically well-established in their careers. The focus on this age group also removes variation associated with school completion and selective early retirement. We also exclude persons who are in Canada on a temporary basis (students, refugee claimants, and those on work permits) for whom year of arrival are not available. It should be noted that temporary, or non-permanent residents, represent a fraction of the

[1] Woven through content and language requirements are disparities between licensing associations and individuals as to what constitutes acceptable levels of work skills and language "proficiency." As discussed in one newdpaper report, individuals may label themselves as "engineers" but not have the training necessary to acquire right to use the "P.Eng" (or professional engineer) designation, which in turn is necessary in Canada to work as an engineer (as distinct from performing engineer like tasks). As well, case studies reveal that professional immigrants are told that their language skills are insufficient when in fact they believe their language proficiencies are good. At issue here may be different perceptions over the number of words that are known or considered to represent a good level of language skills, the knowledge of technical terms used in Canada, and accent. The latter is seldom explicitly discussed by licensing boards, but its importance as a barrier should not be under-estimated in post-industrial economies where the growth of the service sector, in both high and low wage occupations, means interacting with clients.

foreign born population. Canada is considered one of the traditional settlement countries, and admits over 95 percent of the foreign born as permanent residents.

Using information on country of birth, age at immigration and year of immigration, we develop a set of categories that correspond to degrees obtained within and outside Canada. Following procedures used in previous studies (Boyd, 2002; Boyd and Kaida, 2005; Boyd and Thomas, 2001, 2002), we group individuals into one of three mutually exclusive categories: (1) those born in Canada; (2) those foreign born who immigrated before 19 years of age; and (3) those foreign born who immigrated here when they were 28 years of age or older. Individuals in the first two groups are assumed to have received their highest degree in Canada while those in the third group are assumed to have received highest degrees elsewhere. We also exclude very recent arrivals in the third category. Since the census enumerates all residents in Canada, some immigrants may have resided in Canada for a very short period of time – possibly only a few months – leaving them with little time to take the steps needed to enter medical or engineering professions. To remove the initial dislocating effects of migration, we limited our sample to immigrants (permanent residents) who arrived in Canada when they were 28 years of age or older and who arrived in Canada before 1997. Consequently, these individuals had been in Canada for at least four years by December 2000.

Three criteria are used to identify individuals trained as engineers or as medical doctors. First, respondents to the census who had completed a post-secondary qualification were asked "What was the major field of study or training of this person's **highest** degree, certificate or diploma (**excluding** secondary or high school graduation certificates?)." Bold print appears on the questionnaire. This question on major field of study permits identifying those who underwent training in engineering fields. Those who cited any one of 21 engineering fields of study or any one of 20 medical-related fields were identified. Second, respondents to the census also were asked about the highest level of schooling and the numbers of years spent in post-secondary and university study. Persons trained as engineers were defined from these first two criteria – they had to have completed 4 or more years of university, received bachelors degrees or higher, and studied engineering (one of the 21 fields) for their highest degrees. Third, a census question on certificates, diplomas or degrees permitted individuals to indicate they had completed "A degree in medicine, dentistry, veterinary medicine or optometry". Persons trained as medical doctors were thus identified as those whose highest degree was in the study in the field of medicine, who indicated completion of a medical degree, and who had completed at least six years of university.

These criteria for inclusion in our study, particularly years of university education, describe minimal current expectations and protocols in Canada for professional training in medicine and engineering, ones that are applied to new labour market entrants both Canadian and foreign born. The internationally educated population selected thus permits a conservative test of what happens to foreign trained professionals since we omit from analysis those who have fewer years of schooling by Canadian standards, and who thus might experience additional difficulty in having credentials recognized.

Our central analytical question in this paper asks if foreign trained physicians and engineers are less likely to find employment in relevant occupations than those who trained in Canada. In order to examine the fit, or match, between training and work, we select occupations with titles that clearly indicate practicing as physicians or employment as engineers versus other related and non-related occupations. These are described in Appendix

B. We begin our analysis with descriptive information, turning to multinomial regression analyses to assess the fit between training and labour market insertion of the internationally educated who trained in engineering and in medicine. In the multivariate analyses we play particular attention to the occupational location of those who arrived as adults, demarcated by region of birth and by period of immigration. Our multivariate analyses adjust for the effects of sex composition, age, place of residence, visible minority status, language spoken at home, school attendance in the preceding year, type of degree and years of university, and field of study. These variables can influence the labour market experiences of those who studied engineering and medicine. Age is associated with increased labour market experience and may increase the likelihood of being in the labour force or working in an engineering occupation. However, age discrimination of older workers also may produce negative effects. Place of residence captures the effects of regional and local labour markets; large cities, represented in our study by residency in census metropolitan areas (CMAs), have more extensive knowledge based economies than smaller towns, and employment opportunities may be better for residents of these large cities. A number of studies show that visible minorities[2], or persons of colour, fare poorly in the Canadian labour force, and suggest that this reflects discrimination (Li, 2000; Pendakur and Pendakur, 1998, 2002; Swidinsky and Swidinsky, 2002). Language spoken at home consists of those who speak only one or both of Canada's charter languages, English and French, or those who use other languages in the home either to the exclusion of English and/or French or alongside these charter languages (Canada is officially bilingual). The ability to effectively use English or French is a form of human capital, and it not only enlarges employment opportunities but also is a requirement for engineering and medical re-certification in Canada. Finally, individuals who are attending school, either full-time or part-time, may not be full participants in the labour force or holding jobs commensurate with their training.

Who are the Internationally Educated Engineers?

Canada's emphasis in admitting high skilled workers can be seen in the ratio of foreign trained engineers relative to numbers of Canadian born. In our population age 30-54, there are approximately 39 thousand persons who entered Canada as adults, who have bachelors' degrees, at least four years of university and whose major field of study was engineering (Table 1). There are 90,000 Canadian born persons with the same characteristics, and the ratio of the two populations is higher than the one in five who are foreign born in the entire labour force.

There are differences between the groups in their demographic, social and economic characteristics. Compared with the Canadian born and those who arrived as children, the population that is internationally educated in the field of engineering is older, has a higher proportion of women, is highly concentrated in Canada's two magnet cities for immigrants (Toronto and Vancouver) and therefore more likely to reside in the provinces of Ontario and British Columbia. Reflecting the new immigration from areas other than Europe following regulatory and legislative changes in the 1960s and later in the criteria of admissibility,

[2] The term "visible minority" was developed by the federal government to meet data needs of federal employment equity legislation in the mid-1980s and beyond. It includes ten subgroups: Black, South Asian, Chinese, Korean, Japanese, South East Asian, Filipino, Other Pacific Islanders, West Asian and Arab and Latin American. People who declare themselves to be members of the non-visible minority population are overwhelming "white" although the non-visible minority population also includes aboriginals.

foreign trained engineers are more likely to be members of Canada's "visible minority" groups, or "persons of colour." Consistent with new source regions, persons arriving in adulthood with engineering fields of study have high percentages using one or more languages other than English or French in the home (seven out of ten) . Whereas almost half of the foreign born who arrived as children are from Europe and North America (primarily the United States), nearly two-thirds of those arriving in adulthood are from other regions, particularly from Asia. Seven out of ten of these later immigrants arrived in Canada in the decade prior to the 2001 census (Table 1).

Educational characteristics differ slightly as well. Compared to the Canadian born and those arriving as children, internationally educated persons who studied engineering have slightly higher percentages who attended school in 2000, higher percentages with masters and Ph.D. degrees, and higher percentages studying mechanical engineering (Table 2). There is little difference between the groups with respect to percentages who form part of the "experienced labour force" in terms of being employed in 2000 or 2001. However, the occupational distributions are very different for the three populations that have studied engineering. The internationally educated have much lower percentages holding either managerial and engineering occupations (see: Appendix B); nearly six out of ten have technical occupations or occupations unrelated to engineering, compared to one third of the Canadian born and four out of ten of those arriving as children (Table 2).

Engineers, their Occupations and Re-certification Requirements

What underlies these differing occupational locations of persons who studied engineering? One explanation is the different stock of human capital that characterize the populations of Canadian born, those arriving as children and those who are internationally educated. The latter have more advanced degrees and years of schooling and they concentrate in cities such as Vancouver and Toronto which are knowledge economies. However, they also have higher percentages who are speaking other languages at home. Further, as relatively recent arrivals, they may lack job and professionally related networks that would assist in finding employment in areas of study.

A second explanation focuses on the barriers associated with recertification requirements. The Canadian engineering profession is a publicly regulated occupation with its own "reserve" title. This means that by law, no one may offer engineering services to the public unless they first obtain a license from one of the 12 provincial and territorial engineering associations ("ordre:"in Quebec) that have been mandated by provincial/territorial law. In Canada, regulating the conditions of work is under the legal jurisdiction of each province. Although requirements vary by province, to be licensed as a professional engineer, individuals must satisfy the following requirements: 1) be a Canadian citizen or a permanent resident; 2) possess an undergraduate degree at the Bachelor level from an accredited Canadian university program in engineering or possess an otherwise recognized engineering degree and complete an assigned exam program. Normally associations will assign a program if an applicant does not have a Bachelor degree in engineering from an accredited Canadian university engineering program; 3) complete two to four years of engineering work experience. A minimum of 12 months of experience must be in North America ; 4) write and pass a professional practice examination on professional practice, ethics, engineering law and liability; 5) be of good character and reputation; and 6) be proficient in English or French, in Quebec (English or French in New Brunswick). Once

licensed, as a full member of a provincial or territorial association, engineers may legally use the designation "P.Eng." ("ing." in Quebec) after their name. It is illegal to use the "P.Eng/ing" title without having a license and being a member of the provincial/territorial association. As of the year 2000, approximately 157,000 engineers were licensed, representing 60 percent of the 262,000 persons age twenty-one and older who had at least a Bachelor degree and gave engineering as their major field of study in the 1996 census (Schwanen, 2000: Table 1).

As an umbrella association linking the provincial licensing bodies, the Canadian Council of Professional Engineers (CCPE, www.ccpe.ca) assesses the equivalency of the accreditation systems used outside Canada, and it monitors mutual recognition international agreements affecting accredited programs in the United States, the United Kingdom, Ireland, France, Australia, New Zealand, South Africa and Hong Kong (see website: www.ccpe.ca/ccpe.cfm). Until March 31, 2003, CPPE operated "The Initial Assessment Program," developed in conjunction with Citizenship and Immigration Canada (CIC). To assess the engineering qualifications of people applying for permanent residence in Canada who intended to work as engineers. The purpose of this assessment was to evaluate the likelihood of acceptance into the examination program by a provincial or territorial engineering association. A site visit in 2001 to the question and answer section on the Initial Assessment web-based documentation found several conditions under which an individual should not proceed with the initial assessment application. These conditions included: absence of a bachelor's degree in engineering from a university; the applicant is a computer programmer, architect, scientist or an agronomist; the applicant has a degree from the Philippines (see Boyd and Thomas, 2002). The latter stipulation reflects a licensing requirement of 16 years or more of schooling and the programs in the Philippines (personal conversation, CCPE staff, Ottawa, June 6, 2001).

Currently, CCPE operates Engineering International-Education Assessment Program (EIEAP) assesses the educational qualifications of individuals who were educated and trained outside of Canada, by comparing their education to a Canadian engineering education. The form for assessment emphasized that in order to be licensed as a professional engineer in Canada, a foreign trained person must formally apply to the appropriate engineering licensing body, pay the required fees, and meet all of its admission requirements, including:

- successful completion of technical examinations,
- demonstration of four years of acceptable engineering experience, including one year in a Canadian Environment,
- completion of the Professional Practice (Law and Ethics) examination, and provision of satisfactory references from professional engineers, including Canadian Professional Engineers (CCPE, www.ccpe.ca/e/imm_immigrating.cfm).

The preceding discussion indicates a complex set of factors determine who is likely to work in engineering in Canada, with the result that variations should exist among the internationally educated by period of arrival and place of birth. Since time is required to complete examinations and undertake any required new training, persons who have recently arrived should be less likely to be employed in occupations that are consistent with their fields of study. As well, persons arriving in Canada in the 1990s face a different, and less favorable, labour market than earlier arriving cohorts, and this may dampen the match

between credentials and occupational locations. Pronounced birthplace differences in the experiences of the internationally educated also appear likely for several reasons. First, in keeping with previous studies (Boyd 2002; Boyd and Thomas, 2001; 2002), little difference should exist in the labour market experiences of the Canadian born and those who immigrated as children, regardless of country of birth since these two populations have received their professional education from Canadian institutions. Second, among those who received their engineering education outside Canada (defined as those immigrating after age 27), those who are from the U.S.A., the U.K., North and West European countries, and from countries with Canadian international agreements should be more likely to be in occupations commensurate with their fields of study than are those born elsewhere. One reason for this expected pattern might be the greater familiarity of these groups with English and/or French, a fact that would enhance their potential productivity for would be employers and would facilitate re-accreditation where required. A second reason is that the CCPE has mutual agreements with the U.S., the U.K., France, Australia, New Zealand and Hong Kong, thus minimizing the potential barriers associated with accreditation requirements in engineering.

The distributions presented in Table 2 confirm variations in occupational location between the Canadian born, the foreign born arriving as children and those arriving at age 28 or later. Multivariate analyses presented next specifically examine variations between these groups with additional detail by region of birth and period of arrival for those immigrating as adults. The analysis also controls for the effects of variables known to be associated with labour market outcomes in general, and occupational location in particular. Since language knowledge is both a form of human capital and mandated in re-certification requirements, we examine what its impact is on the occupations held by internationally educated migrants. Unlike the United States and Australia censuses, the Canadian census does not ask respondents to report on levels of proficiency, focusing instead on mother tongue, knowledge of French and English and language use in the home. Past studies have found that use of a language other than English and/or French often is associated with poorer labour market performance, and this measure is used in the multivariate analysis.

Because our dependent variables are categorical variables, multinomial logistic regression (Liao 1994) is used. The technique relies on the computation of logits reflecting the natural log of the odds (log odds) of being in engineering occupations relative to managerial, technical or all other occupations. The technique relies on the computation of logits reflecting the natural log of the odds (log odds) of being in each occupational category as opposed to some reference category. Tables 3 and 4 express the logits and the odds ratios of being in three categories: manager occupations, technical occupations and all other occupations compared to being in engineering occupations (the logits for being in engineering occupations compared to managerial, technical and all other occupations can be produced by taking the opposite sign of the logits). Data are weighted so that statistical tests of significance correspond to those that would be observed for the actual size of the generation groups in the 2B census database.

Results of the multinomial analyses are presented in Tables 3 and 4 for region of birth and period of arrival respectively. Odds ratios assist the interpretation of results. For example, if a home language other than only English or French exists, the odds of holding managerial occupations compared to holding engineering occupations (net of other variables in the model) is lower than the odds observed for those who use only English or French (.77 vs. 1.00, Table 3, column 4, last row). Conversely, if the home language is other than only

English or French, the odds of having an occupation that is unrelated to engineering fields of study compared to holding engineering occupations, controlling for other variables, is higher than the odds observed for those who use only English or French (1.27 vs. 1.00, Table 3, column 6, last row). Although some of the effects of region of birth and period of arrival are not different from those of being Canadian born (controlling for other variables), there are differences in the likelihood of holding different types of occupations for many groups. In particular, those internationally educated persons who are not from North America, Europe, Oceania etc) have higher odds of being employed in occupations that have no correspondence to their engineering fields of study. The odds are especially high for those born in South East Asia, which includes the Philippines (odds ratios of 7.58, Table 3, column 6). Data in Table 4 show that the odds of being in technical occupations or in those not related to engineering increase for those who have arrived more recently. This may be picking up the effects of duration, as well as differences either in the economic context of reception or in the context of departure (during the 1990s the numbers of humanitarian based flows increased and included those born in the former USSR regions).

Univariate analyses reveal that birthplace and arrival groups differ in the extent to which languages other than English and/or French are used in the home. For example, nearly nine out of ten persons born in East Asia use languages other than English/French in the home as to eight out of ten persons born in Eastern Europe. In contrast five out of ten and four out of ten persons born in North America, other parts of Europe and Oceania as well as in Africa use languages other than English/French in the home. The impact of these different linguistic patterns on the likelihood of being in certain types of occupations rather than in others can be gauged by calculating probabilities from the logits in Tables 3 and 4. The assumption is that all groups have identical distributions with respect to the independent variables excluding home language, and that these distributions are those that characterize the entire population under investigation, consisting of those age 30-54 including the Canadian born, those foreign born arriving as children and those arriving at age 28 or later. Probabilities are then calculated for groups according to birthplace and period of arriving, assuming that everyone uses only English and/or French in the home and then that other languages are used, either exclusively or alongside English and/or French.

The results, expressed as chances out of 100, show that the likelihoods of employment in managerial and in engineering occupations are higher among all birthplace and period of arrival when only English or French is used in the home compared to when other languages are used. Conversely, the chances of having technical occupations or being in those that are not related to engineering studies are lower when only English and/or French is used. However, the effects of language in type of occupation held are on the whole rather small. Although home language is significantly associated with occupational location, period of arrival and region of birth appear to be more important factors underlying occupational variation among those who study engineering and subsequently migrate to Canada. Such variations are consistent with recertification requirements, which take time and which may view foreign programmes of study as not equivalent to those provided by Canadian schools.

The Study of Medicine versus the Practice of Medicine

Persons who seek to practice as physicians in Canada also must be licensed by regulatory bodies found in provinces. For those who are internationally educated, basic medical knowledge must be evaluated before being considered for licensure. In most cases

this means that persons with foreign training in medicine must pass the Medical Council of Canada's Evaluating Examination (MCCEE). This examination evaluates general medical knowledge compared to that of graduates of Canadian medical schools by testing the understanding of the principal fields of medicine - including internal medicine, obstetrics and gynecology, pediatrics, psychiatry, preventive medicine and community health, and surgery. The examination is held four times a year, in various centers in Canada and abroad. It is given in English and in French. A recent Canadian film, *Doctors with* Borders, profiled applicants who had to repeat this examination many times, and some who were told by assessors that they did not speak English well or spoke it with an accent.

Passing the MCCEE examination does not automatically mean that persons who are educated in medicine outside of Canada are eligible for licenses to practice medicine. In most provinces, graduates of foreign medical schools are required to have two to six years of postgraduate medical training at a Canadian university and must pass the appropriate certification examinations of the College of Family Physicians of Canada or the Royal College of Physicians and Surgeons of Canada. Some provinces and territories have a form of licensure for under-serviced areas (www.cicic.ca/professions/3112en.asp, accessed June 9, 2005).

A prevalent concern is that the internationally educated who have studied medicine face barriers in becoming licensed, in part because of the small number of residencies available to them. Thirteen accredited Canadian postgraduate medical training programs participate in the Canadian Resident Matching Service. This service matches prospective physicians to a training program. However, not all medical schools participating in the matching service accept graduates of foreign medical schools into their postgraduate medical training programs. Applications from graduates of medical schools outside of Canada are processed according to the policies established by each institution. Overall, numbers are small. For the years 1995, 1996, 1997, 1998, and 1999 the number of international medical graduates that were accepted stood at 23, 11, 16, 19, and 35 respectively. Numbers rose thereafter, but in 2005 only 80 matches were made, involving placements of the foreign trained at 6 medical schools. This represented 13 percent of the total number of foreign trained applicants who applied to the 2005 Canadian Resident Matching Service, and this rate is in general higher than observed in the early 1990s (www.carms.ca/jsp/main.jsp?path=../content/statistics/report/re_2005#table23, accessed June 9, 2005).

That the accreditation of the foreign trained who have studied medicine is lower than the actual pool of the internationally educated is also supported with census data. As shown in Table 6, over five thousand persons who studied medicine, arrived at age 28 or older, and are between the ages of 30-54 are resident in Canada in 2001. Although the population those who have studied medicine is smaller than observed for engineers, but here too the ratio of internationally educated physicians to the Canadian born is larger, at 25 percent than is observed in the entire Canadian labour force. Female physicians are proportionately a larger share of the population of persons who studied medicine than is the case for engineers, with women representing approximately 2 out of five of the Canadian born and those immigrating in adulthood (Table 6). Compared with the Canadian born and those immigrating as children, the internationally educated with medical fields of study are older and slightly more likely to live in Toronto. However like other groups, significant share lives in CMAs other than the big three and in non-CMA areas. Many are members of visible minorities groups, and almost half living in homes where languages other than English and/or French are used. Like those

who were foreign born and who studied engineering, region of origin distributions differ between those who arrived as children and those arriving as adults. Compared to those arriving as children, where nearly half are from North America, Europe, Oceania and other areas, only one quarter of those arriving as adults are from these areas, with another quarter born in Africa. Compared with those who studied engineering, those arriving as adults and who studied medicine have a higher percentage arriving prior to the 1990s, although it should be noted that almost 60 percent arrived during the past decade (Table 6).

Among those who studied medicine, there are indications that the foreign trained have fewer years of university schooling, with over half having under 8 years of university education compared to approximately one quarter of the Canadian born and those arriving with children. In all groups, most have studied the general practice of medicine rather than specialty fields. While the foreign trained have higher percentages not employed in 2000 or 2000, overall at least nine out of ten of all groups have employment histories (Table 7).

As was true for the internationally educated who studied engineering, groups differ dramatically in their occupations. Nine out of ten of the Canadian born and those arriving as children who studied medicine are employed as physicians. In contrast only six out of ten of those who are internationally educated work as doctors; one quarter work in occupations that are unrelated to fields of medicine or health more generally (Table 7).

To what extent do differences in characteristics of the Canadian born, those immigrating as children and those arriving as adults influence this pattern whereby the internationally educated have lower percentages working as physicians. Paralleling the analysis for those who studied engineering, multinomial logistic regressions are performed to highlight variations within the foreign trained population by region of birth and period of arrival (Tables 8 and 9). Net of other factors, the experiences of the foreign born who arrived as children in terms of working as a physicians do not different from those of the Canadian born, suggesting that education in Canadian institutions is at work. However, among those who are internationally educated and arrived as adults, birthplace and period of arrival effects are strong, and the magnitude of the odds ratios are larger than found for engineers. Controlling for other characteristics, the odds of working in other health occupations compared to that of working as a physician are nearly 3 times larger than observed for the Canadian born for those person who are internationally trained and born in North America, Europe (other than eastern Europe) and Oceania (Table 8, column 3). The odds are ten times that observed for the Canadian born for the foreign educated who are born in Southeast Asia or East Asia. Compared to the Canadian born or those who immigrated as children, those who immigrated as adults have significantly higher odds of holding occupations in areas unrelated to health occupations, regardless of region of birth. Again, the odds are highest for those born in Southeast Asia or East Asia. For the internationally educated, the odds of working in health related occupations or in occupations completely unrelated to health compared with the odds of working as a medical doctor increase relative to the odds observed for the Canadian born when the period of arrival is relatively recent (Table 9).

The odds ratios for using language(s) other than only English and/or French in the home also are larger than observed for the population that studied engineering, suggesting that language skills may be important in influencing the likelihood of practicing as physicians. The influence of language use and related knowledge is evident in the differential chances of holding occupations as physicians, other health practitioners, and all other occupations. These hypothetical chances are based on the assumption that all groups have the

identical distributions with respect to sex composition, age, city and province of residence, visible minority status school attendance, type of degree, years of university education and training. Table 10 shows that approximately nine out of ten Canadian born or those arriving as children would be physicians when only English and/or French was used in the home, and that the propensity would decline 9 to ten points if other languages were used. However, the gap tends to be larger for the internationally educated who arrived at age 28 or later, and the magnitude of difference varies depending on region of birth and period of arrival. If only English and/or French is used at home, 84 out of 100 foreign educated persons born in Africa or in South Asia would be employed as physicians (compared with over 90 out of 100 for the Canadian born or those arriving as children). However, the numbers decline to 67 and 66 out of 100 respectively when home language includes one or more languages in place or, or alongside English and/or French. Among those internationally educated who were born in East Asian countries only 56 out of 100 would be physicians if only English and/or French were used in the home, and these chances would decline to 44 out of 100 if other languages were used. Entry cohorts that arrived before 1980 are very similar in their chances of working as physicians with those of the Canadian born and to the foreign born who arrived as children. However, the chances decline for more recent cohorts. For those who arrived as adults in the early 1990s and who indicate a home language in 2001 other than only English and/or French, the chances of being a physician are 42 out of 100 and the changes of working in occupations that are unrelated to health are 30 out of 100 (Table 10).

Conclusion

Our data based conclusion is that individuals who train outside Canada as medical doctors or as engineers pay a price compared to those who received Canadian training. Foreign trained doctors and engineers are less likely to be employed in occupations that correspond to their training. Yet, if nations are formulating migration policies to favour the migration of professions, they are not wholly insensitive to the paradoxes that may result. Among the various initiatives existing world wide are those in which individual applications are reviewed by licensing boards before the decision for admission is taken (Australia) or where governments and associations are working in collaboration in order to remove unnecessary barriers.

So far, Canada has followed the latter path. Developments during the past two decades include: 1) the creation of several provincial task forces on the recognition of credentials obtained outside of Canada (see: Ontario, government of 1989) ; 2) the generation of reports by policy institutes and federal government departments on the under-recognition of foreign credentials (McDade 1988; Mata 1992, 1999; Wright & McDade 1992); 3) the establishment in 1992 of a federal interdepartmental group on the topic; 4) a major conference in October 1999 in Toronto, featuring keynote addresses by prominent provincial and federal politicians, including the two ministers of Citizenship and Immigration Canada and of Human Resources Canada; 5) funding commitments in the 2003 Speech from the Throne on barriers to the effective use of skilled immigrant labour; and 6) most recently on April 25, 2005 the announcement of a federally funded *Internationally Trained Worker Initiative*, which includes a program targeted specifically at internationally educated health care professionals as well as a Foreign Credential Recognition (FCR) Program.

Under the Foreign Credential Recognition Program, the Canadian federal government will provide funding for two projects that are explicitly targeted at those with engineering training. The Canadian Council of Professional Engineers will receive approximately $181,000 to "… conduct research in order to develop a database of foreign institutions offering degrees in engineering." The Canadian Foundation for Economic Education (CFEE) will receive $468,000 to "help Canada's engineering regulated profession reach newcomers with relevant information related to credential assessment and recognition in Canada; help newcomers obtain credential assessment recognition and required upgrading to work in the engineering field in Canada; and to help employers verify and assess the credentials of newcomers to Canada" (www.news.gc.ca/cfmx/CCP/view/en/index.cfm? articleid= 141029&).

Under the Internationally Trained Worker Initiative, $75 million also will be provided over five years to assist in the assessment and integration into the workforce of up to 1,000 physicians, 800 nurses and 500 other regulated health care professionals. The numbers will vary, however, according to the priorities of provincial and territorial governments. The funding will be applied to the following projects: a) the launch of a national website that will help international medical graduates prepare to become licensed to practice in Canada; b) a National Credential Verification Agency will be established by the Medical Council of Canada to provide a streamlined process for verifying the credentials of international medical graduates. After this verification, these graduates can then take an evaluation exam or other steps toward becoming licensed to practice in Canada. The single-source verification service will prevent these graduates from having to get their credentials verified in each province or territory in which they seek licensure; c) the Medical Council of Canada will make its evaluation exam more readily accessible to international medical graduates by putting it into electronic format; and d) the Canadian Post M.D. Education Registry will receive funding to create a pan-Canadian database with information about international medical graduates that will improve planning for the assessment, training and integration of these graduates. (www.hc-sc.gc.ca/english/media/releases/2005/2005_29.html).

These initiatives are organization in scope since professional associations rather than governments' license professionals including those who have studied engineering and medicine. What will be their impacts remains to be determined in the future. However, it is worth noting that these continued developments are motivated by a number of concerns, including that barriers to the use of internationally obtained credentials hamper an adequate delivery of professional services, the rational utilization of human resources and the equitable participation of all individuals, including the foreign born, in Canadian society (Mata 1992:2; also see Chapman and Iredale 1993; Mata 1999).

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Table 1: Demographic Characteristics of the Population Age 30-54 with Engineering Fields of Study[(a)], by Nativity and Age at Immigration, Canada 2001

	Canadian born (1)	FB, Immigrated Age 0-18 (2)	FB, Immigrated Age 28+ (3)
Population Estimates	90,300	14,100	38,600
Unweighted Ns	17,700	2,700	7,300
Sex	100	100	100
Women	9	10	18
Men	91	90	82
Age	100	100	100
30-39	49	54	24
40-49	38	31	53
50-54	13	16	22
Mean	40.4	40.1	44.2
Place of Residence	100	100	100
Montreal	18	13	12
Toronto	14	35	44
Vancouver	6	11	14
Other CMA	43	33	27
All Other Areas	20	7	4
Region of Residence	100	100	100
Atlantic Provinces	7	2	1
Quebec	30	15	13
Ontario	36	56	60
Manitoba & Saskatchewan	4	2	2
Alberta	14	12	9
British Columbia	9	13	15
Territories, Nunavut	0	--	--
Visible Minority Status	100	100	100
No	97	53	46
Yes	3	47	54
Home Language	100	100	100
Only English and/or French	99	80	31
Other Language(s)	1	20	69
Birthplace		100	100
N. Am,Europe, excl. E. Europe, Oceania, Other	(na)	41	13
Eastern Europe	(na)	6	28
Caribbean & S. Am.	(na)	7	5
Africa	(na)	6	8
SE Asia	(na)	5	8
South Asia	(na)	10	11
East Asia	(na)	19	17
West Asia	(na)	5	10
Years Since Arrival		100	100
4 to 5 years	(na)	(na)	30
6 to 10 years	(na)	(na)	41
11 to 20 years	(na)	18	26
21 years or more	(na)	82	4

(a) Must have bachelors degrees with 4 or more years of university.
Source: Statistics Canada 2001 Census of Population.

Table 2: Social and Economic Characteristics of the Population Age 30-54 with Engineering Fields of Study[(a)], by Nativity and Age at Immigration, Canada 2001

	Canadian born (1)	FB, Immigrated Age 0-18 (2)	FB, Immigrated Age 28+ (3)
Attended School, 2000	100	100	100
No	93	91	89
Yes	7	9	11
Highest Level of Schooling	100	100	100
Bachelors	77	75	49
Bachelors with Certificate or Diploma	5	6	12
Masters	16	16	29
Ph.D.	3	4	9
Years of University	100	100	100
4 years	51	51	30
5 years	23	23	41
6 years	13	12	12
7 years	7	6	5
8 years	3	3	3
9 years or more	4	4	8
Field of Study	100	100	100
Electrical Engineering	8	7	6
Chemical Engineering	16	12	18
Civil Engineering	19	22	23
Mechanical Engineering	18	15	21
Engineering, n.e.c.	24	29	17
Other Engineering	16	15	14
Employment History	100	100	100
Not Employed in 2000 or 2001	2	2	6
Employed in 2000 or 2001	98	98	94
Occupational Location	100	100	100
Managerial Occupations	27	26	16
Engineering Occupations	42	35	26
Technical Occupations	12	19	21
All Other	20	20	37

(a) Must have bachelors degrees with 4 or more years of university.
Source: Statistics Canada 2001 Census of Population.

Table 3: Logits and Odds Ratios of Work in Select Occupations versus Engineering Occupations for Persons Age 30-54 with Engineering Fields of Study[(a)], by Nativity, Age at Immigration and Region of Birth, Canada, 2001

	Logits			Odds Ratios		
	Managerial vs	Technical vs	All Other	Manager	Technical	All Oth.
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.123 (ns)	-0.601 ***	-0.265 ***			
Nativity						
Canadian born	(rg)	(rg)	(rg)	1.00	1.00	1.00
FB, Immig. 0-18	0.099 (ns)	0.160 *	-0.046 (ns)	(ns)	1.17	(ns)
FB, Immig Age 28+, N.Am,Europe, Ocean	-0.282 **	0.488 ***	0.174 (ns)	0.75	1.63	(ns)
FB, Immig Age 28+, E. Europe	-0.426 ***	0.912 ***	0.660 ***	0.65	2.49	1.93
FB, Immig Age 28+, Caribbean & S.Am	-0.244 (ns)	0.253 (ns)	0.573 ***	(ns)	(ns)	1.77
FB, Immig Age 28+, Africa	0.173 (ns)	0.433 **	0.560 ***	(ns)	1.54	1.75
FB, Immig Age 28+, SE Asia	0.210 (ns)	1.266 ***	2.025 ***	(ns)	3.55	7.58
FB, Immig Age 28+, S. Asia	-0.039 (ns)	0.252 (ns)	0.324 *	(ns)	(ns)	1.38
FB, Immig Age 28+, E. Asia	0.341 **	0.653 ***	0.307 *	1.41	1.92	1.36
FB, Immig Age 28+, W. Asia	0.578 ***	0.191 (ns)	0.778 ***	1.78	(ns)	2.18
Sex						
Men	-0.063 (ns)	-0.353 ***	-0.747 ***	(ns)	0.70	0.47
Women	(rg)	(rg)	(rg)	1.00	1.00	1.00
Age						
30-39	-0.391 ***	0.235 ***	-0.285 ***	0.68	1.26	0.75
40-49	(rg)	(rg)	(rg)	1.00	1.00	1.00
50-54	0.120 *	-0.221 ***	0.139 **	1.13	0.80	1.15
Place of Residence						
Montreal	0.079 (ns)	0.265 **	-0.225 **	(ns)	1.30	0.80
Toronto	0.236 ***	0.333 ***	0.261 ***	1.27	1.40	1.30
Vancouver	0.117 (ns)	-0.204 (ns)	0.054 (ns)	(ns)	(ns)	(ns)
Other CMAs	(rg)	(rg)	(rg)	1.00	1.00	1.00
Non-CMAs	-0.112 *	-0.342 ***	0.005 (ns)	0.89	0.71	(ns)
Province of Residence						
Atlantic Provinces	-0.094 (ns)	-0.283 *	0.059 (ns)	(ns)	0.75	(ns)
Quebec	-0.270 ***	-0.333 ***	0.147 *	0.76	0.72	1.16
Ontario	(rg)	(rg)	(rg)	1.00	1.00	1.00
Sask. & Manitoba	-0.087 (ns)	-0.343 **	0.125 (ns)	(ns)	0.71	(ns)
Alberta	-0.300 ***	-0.385 ***	-0.268 ***	0.74	0.68	0.76
BC	-0.053 (ns)	0.242 (ns)	0.188 (ns)	(ns)	(ns)	(ns)
Territories & Nunavut	0.042 (ns)	-0.309 (ns)	0.011 (ns)	(ns)	(ns)	(ns)
Visible Minority						
No	(rg)	(rg)	(rg)	1.00	1.00	1.00
Yes	-0.069 (ns)	0.470 ***	0.258 ***	(ns)	1.60	1.29
Attended School in 2000						
No	(rg)	(rg)	(rg)	1.00	1.00	1.00
Yes	-0.170 *	0.140 *	0.450 ***	0.84	1.15	1.57
Type of Degree						
Bachelors	(rg)	(rg)	(rg)	1.00	1.00	1.00
Bachelors with Certificate or Diploma	0.128 (ns)	-0.192 *	0.220 **	(ns)	0.83	1.25
Masters	0.048 (ns)	-0.284 ***	-0.382 ***	(ns)	0.75	0.68
Ph.D.	-0.049 (ns)	-0.385 **	0.194 *	(ns)	0.68	1.21
Yrs of University						
4 years	(rg)	(rg)	(rg)	1.00	1.00	1.00
5 years	-0.057 (ns)	0.082 (ns)	-0.039 (ns)	(ns)	(ns)	(ns)
6 years	-0.134 *	0.129 (ns)	0.016 (ns)	0.87	(ns)	(ns)
7 years	-0.233 **	0.184 *	0.101 (ns)	0.79	1.20	(ns)
8 years or more	-0.367 ***	0.165 (ns)	0.331 ***	0.69	(ns)	1.39
Field of Study						
Electrical Engineering	(rg)	(rg)	(rg)	1.00	1.00	1.00
Chemical Engineering	0.013 (ns)	-0.884 ***	0.400 ***	(ns)	0.41	1.49
Civil Engineering	-0.068 (ns)	-0.814 ***	-0.028 (ns)	(ns)	0.44	(ns)
Mechanical Engineering	-0.025 (ns)	-0.791 ***	0.075 (ns)	(ns)	0.45	(ns)
Engineering, n.e.c.	0.167 ***	-0.470 ***	0.280 ***	1.18	0.62	1.32
Other Engineering	0.330 ***	0.365 ***	0.800 ***	1.39	1.44	2.23
Home Language						
Only English and/or French	(rg)	(rg)	(rg)	1.00	1.00	1.00
Other Language(s)	-0.266 ***	0.198 **	0.235 ***	0.77	1.22	1.27

(a) Must have bachelors degrees or higher with 4 or more years of university.
(ns) Not significant at p=0.05 level *p<0.05, **p<0.01, ***p<0.001
(rg) Reference group.
Source: Statistics Canada 2001 Census of Population

Table 4: Logits and Odds Ratios for Work in Select Occupations versus Engineering Occupations for Persons Age 30-54 with Engineering Fields of Study[(a)], by Nativity, Age at Immigration and Period of Immigration, Canada, 2001

	Logits			Odds Ratios		
	Managerial vs	Technical vs	All Other	Manager	Technical	All Oth.
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.138 (ns)	-0.573 ***	-0.304 ***			
Nativity						
Canadian born	(rg)	(rg)	(rg)	1.00	1.00	1.00
FB, Immig. 0-18	0.004 (ns)	0.216 **	-0.103 (ns)	(ns)	1.24	(ns)
FB, Immig. Age 28+, before 1980	-0.358 *	-0.135 (ns)	0.021 (ns)	0.70	(ns)	(ns)
FB, Immig. Age 28+, arrived 1980-85	0.030 (ns)	0.383 **	0.247 *	(ns)	1.47	1.28
FB, Immig. Age 28+, arrived 1986-90	-0.021 (ns)	0.495 ***	0.575 ***	(ns)	1.64	1.78
FB, Immig. Age 28+, arrived 1991-96	-0.230 **	0.745 ***	0.700 ***	0.79	2.11	2.01
Sex						
Men	-0.043 (ns)	-0.391 ***	-0.748 ***	0.96	0.68	0.47
Women	(rg)	(rg)	(rg)	1.00	1.00	1.00
Age						
30-39	-0.392 ***	0.215 ***	-0.307 ***	0.68	1.24	0.74
40-49	(rg)	(rg)	(rg)	1.00	1.00	1.00
50-54	0.120 *	-0.140 *	0.205 ***	1.13	0.87	1.23
Place of Residence						
Montreal	0.086 (ns)	0.263 **	-0.220 **	(ns)	1.30	0.80
Toronto	0.217 ***	0.349 ***	0.281 ***	1.24	1.42	1.32
Vancouver	0.125 (ns)	-0.174 (ns)	0.038 (ns)	(ns)	(ns)	(ns)
Other CMAs	(rg)	(rg)	(rg)	1.00	1.00	1.00
Non-CMAs	-0.111 *	-0.341 ***	-0.001 (ns)	0.89	0.71	(ns)
Province of Residence						
Atlantic Provinces	-0.087 (ns)	-0.277 *	0.044 (ns)	(ns)	0.76	(ns)
Quebec	-0.266 ***	-0.330 ***	0.163 *	0.77	0.72	1.18
Ontario	(rg)	(rg)	(rg)	1.00	1.00	1.00
Sask. & Manitoba	-0.089 (ns)	-0.319 *	0.189 *	(ns)	0.73	1.21
Alberta	-0.310 ***	-0.364 ***	-0.241 ***	0.73	0.70	0.79
BC	-0.049 (ns)	0.237 (ns)	0.174 (ns)	(ns)	(ns)	(ns)
Territories & Nunavut	0.045 (ns)	-0.313 (ns)	0.001 (ns)	(ns)	(ns)	(ns)
Visible Minority						
No	(rg)	(rg)	(rg)	1.00	1.00	1.00
Yes	0.188 ***	0.366 ***	0.427 ***	1.21	1.44	1.53
Attended School in 2000						
No	(rg)	(rg)	(rg)	1.00	1.00	1.00
Yes	-0.168 *	0.125 (ns)	0.433 ***	0.85	(ns)	1.54
Type of Degree						
Bachelors	(rg)	(rg)	(rg)	1.00	1.00	1.00
Bachelors with Certificate or Diploma	0.108 (ns)	-0.158 (ns)	0.220 ***	(ns)	(ns)	1.25
Masters	0.016 (ns)	-0.211 ***	-0.421 ***	(ns)	0.81	0.66
Ph.D.	-0.058 (ns)	-0.341 **	0.117 (ns)	(ns)	0.71	(ns)
Yrs of University						
4 years	(rg)	(rg)	(rg)	1.00	1.00	1.00
5 years	-0.093 *	0.104 *	0.056 (ns)	0.91	1.11	(ns)
6 years	-0.123 *	0.099 (ns)	0.067 (ns)	0.88	(ns)	(ns)
7 years	-0.212 **	0.132 (ns)	0.122 (ns)	0.81	(ns)	(ns)
8 years or more	-0.339 ***	0.118 (ns)	0.336 ***	0.71	(ns)	1.40
Field of Study						
Electrical Engineering	(rg)	(rg)	(rg)	1.00	1.00	1.00
Chemical Engineering	0.018 (ns)	-0.890 ***	0.399 ***	(ns)	0.41	1.49
Civil Engineering	-0.056 (ns)	-0.825 ***	0.001 (ns)	(ns)	0.44	(ns)
Mechanical Engineering	-0.031 (ns)	-0.776 ***	0.091 (ns)	(ns)	0.46	(ns)
Engineering, n.e.c.	0.170 ***	-0.466 ***	0.281 ***	1.19	0.63	1.32
Other Engineering	0.337 ***	0.359 ***	0.804 ***	1.40	1.43	2.24
Home Language						
Only English and/or French	(rg)	(rg)	(rg)	1.00	1.00	1.00
Other Language(s)	-0.257 ***	0.227 ***	0.165 **	0.77	1.25	1.18

(a) Must have bachelors degrees or higher with 4 or more years of university.
(ns) Not significant at p=0.05 level *p<0.05, **p<0.01, ***p<0.001
(rg) Reference group.
Source: Statistics Canada 2001 Census of Population

Table 5: Chances out of 100[(a)] of Work in Select Occupational Categories, Population Age 30-54, With Engineering Fields of Study[(b)] by Home Language and by Nativity, Region of Birth, and Period of Immigration, Canada, 2001

	Only English and/or French at Home				Other Language(s) at Home			
	Managers (1)	Engineers (2)	Technical (3)	All Others (4)	Managers (5)	Engineers (6)	Technical (7)	All Others (8)
Birthplace								
Canadian Born	27	40	12	20	21	40	14	25
FB, arrived 0-18	29	39	13	19	22	38	16	24
FB, arrived age 28+								
N.Am,Europe, Oceania,All Oth.	20	39	18	23	14	37	21	28
Eastern Europe	14	32	23	31	10	29	26	36
Caribbean & S. Am.	19	36	13	32	13	33	15	38
Africa	25	32	14	28	19	30	17	34
SE Asia	12	15	16	57	8	13	16	63
South Asia	24	37	14	26	17	35	16	31
East Asia	30	31	18	22	22	30	21	27
West Asia	33	27	10	30	25	27	12	37
Period of Arrival								
Canadian Born	28	40	12	21	21	40	15	24
FB, arrived 0-18	28	39	14	19	21	39	18	22
FB, arrived age 28+								
Before 1980	21	44	11	23	16	43	14	27
1980-1985	26	35	15	24	19	35	19	27
1986-1990	22	32	16	30	16	31	19	34
1991-1996	17	31	19	33	12	29	22	36

(a) When divided by 100, figures become probabilities.
(b) Must have bachelors degrees or higher with 4 or more years of university.
Source: Tables 3 and 4.

Table 6: Demographic Characteristics of the Population Age 30-54, with Medical Fields of Study[(a)], by Nativity and Age at Immigration, Canada 2001

	Canadian born (1)	FB, Immigrated Age 0-18 (2)	FB, Immigrated Age 28+ (3)
Population Estimates	25,800	4,400	5,400
Unweighted Ns	5,000	900	1,100
Sex	100	100	100
Women	38	33	40
Men	62	67	60
Age	100	100	100
30-39	40	53	16
40-49	44	34	56
50-54	15	13	28
Mean	41.8	41.7	45.1
Place of Residence	100	100	100
Montreal	14	10	10
Toronto	13	29	31
Vancouver	8	12	11
Other CMA	39	37	33
All Other Areas	26	12	15
Region of Residence	100	100	100
Atlantic Provinces	8	5	5
Quebec	27	12	13
Ontario	35	51	48
Manitoba & Saskatchewan	6	5	6
Alberta	10	11	12
British Columbia	13	16	17
Territories, Nunavut	--	--	--
Visible Minority Status	100	100	100
No	95	51	49
Yes	5	49	51
Home Language	100	100	100
Only English and/or French	99	90	53
Other Language(s)	1	10	47
Birthplace		100	100
N. Am,Europe, excl. E. Europe, Oceania, Other	(na)	41	18
Eastern Europe	(na)	6	17
Caribbean & S. Am.	(na)	6	6
Africa	(na)	10	24
SE Asia	(na)	11	10
South Asia	(na)	6	7
East Asia	(na)	17	11
West Asia	(na)	3	7
Years Since Arrival		100	100
4 to 5 years	(na)	(na)	20
6 to 10 years	(na)	(na)	37
11 to 20 years	(na)	10	38
21 years or more	(na)	90	6

(a) Must have medical degrees with 6 or more years of university. Excludes persons with both medical and Ph.D. degrees.

Source: Statistics Canada 2001 Census of Population.

Table 7: Social and Economic Characteristics of the Population Age 30-54 with Medical Fields of Study[(a)], by Nativity and Age at Immigration, Canada 2001

	Canadian born (1)	FB, Immigrated Age 0-18 (2)	FB, Immigrated Age 28+ (3)
Attended School, 2000	100	100	100
No	90	88	88
Yes	10	12	12
Highest Level of Schooling	100	100	100
Medical Only	89	90	85
Medical & Masters	11	10	15
Years of University	100	100	100
6 years	13	11	33
7 years	13	15	21
8 years	16	16	14
9 years	12	10	6
10 years	14	12	10
11 years	9	11	5
12 years or more	23	24	11
Field of Study	100	100	100
GP	81	82	81
Specialist	19	18	19
Employment History	100	100	100
Not Employed in 2000 or 2001	1	1	10
Employed in 2000 or 2001	99	99	90
Occupational Location	100	100	100
Medical Doctor	91	91	61
All Other Health Occupations	4	3	14
All Other Occupations	5	6	24

(a) Must have medical degrees with 6 or more years of university. Excludes persons with both medical and Ph.D. degrees.

Source: Statistics Canada 2001 Census of Population.

Table 8: Logits and Odds Ratios for Work in Select Occupations versus Working as Physicians, Persons Age 30-54 with Medical Fields of Study[a], by Nativity, Age at Immigration and Region of Birth, Canada, 2001

	Logits		Odds Ratios	
	Oth. Hlth.	All Oth. Occup.	Oth. Hlth.	All Oth.
	(1)	(2)	(3)	(4)
Constant	-2.970 ***	-2.996 ***		
Nativity				
Canadian born	(rg)	(rg)	1.00	1.00
FB, Immig. 0-18	-0.309 (ns)	-0.086 (ns)	(ns)	(ns)
FB, Immig Age 28+, N.Am,Europe, Oceania	1.086 ***	1.238 ***	2.96	3.45
FB, Immig Age 28+, E. Europe	1.980 ***	1.486 ***	7.25	4.42
FB, Immig Age 28+, Caribbean & S.Am	0.645 (ns)	1.515 ***	(ns)	4.55
FB, Immig Age 28+, Africa	0.416 (ns)	0.917 ***	(ns)	2.50
FB, Immig Age 28+, SE Asia	2.335 ***	1.723 ***	10.33	5.60
FB, Immig Age 28+, S. Asia	0.008 (ns)	1.075 **	(ns)	2.93
FB, Immig Age 28+, E. Asia	2.304 ***	2.092 ***	10.02	8.10
FB, Immig Age 28+, W. Asia	0.823 (ns)	2.004 ***	(ns)	7.42
Sex				
Men	-0.255 *	-0.102 (ns)	0.77	0.90
Women	(rg)	(rg)	1.00	1.00
Age				
30-39	0.075 (ns)	-0.012 (ns)	(ns)	(ns)
40-49	(rg)	(rg)	1.00	1.00
50-54	0.217 (ns)	0.199 (ns)	(ns)	(ns)
Place of Residence				
Montreal	0.107 (ns)	0.090 (ns)	(ns)	(ns)
Toronto	-0.044 (ns)	0.490 **	(ns)	1.63
Vancouver	0.366 (ns)	0.754 *	(ns)	2.13
Other CMAs	(rg)	(rg)	1.00	1.00
Non-CMAs	-0.175 (ns)	-0.609 ***	(ns)	0.54
Province of Residence				
Atlantic Provinces	-0.865 *	0.080 (ns)	0.42	(ns)
Quebec	-0.167 (ns)	0.131 (ns)	(ns)	(ns)
Ontario	(rg)	(rg)	1.00	1.00
Sask. & Manitoba	-0.150 (ns)	-0.082 (ns)	(ns)	(ns)
Alberta	-0.368 (ns)	-0.195 (ns)	(ns)	(ns)
BC	0.121 (ns)	-0.602 (ns)	(ns)	(ns)
Territories & Nunavut	-0.310 (ns)	0.267 (ns)	(ns)	(ns)
Visible Minority				
No	(rg)	(rg)	1.00	1.00
Yes	-0.049 (ns)	-0.038 (ns)	(ns)	(ns)
Attended School in 2000				
No	(rg)	(rg)	1.00	1.00
Yes	0.609 ***	0.479 **	1.84	1.61
Type of Degree				
Medical Only	(rg)	(rg)	1.00	1.00
Medical & Masters	0.579 ***	0.754 ***	1.78	2.13
Yrs of University Education				
6 years	-0.235 (ns)	-0.245 (ns)	(ns)	(ns)
7 years	0.140 (ns)	0.250 (ns)	(ns)	(ns)
8 years	(rg)	(rg)	1.00	1.00
9 years	-0.426 (ns)	0.074 (ns)	(ns)	(ns)
10 years	-0.296 (ns)	-0.247 (ns)	(ns)	(ns)
11 years	-0.563 *	0.118 (ns)	0.57	(ns)
12 years or more	-0.491 *	-0.271 (ns)	0.61	(ns)
Type of Training				
GP	(rg)	(rg)	1.00	1.00
Specialist	0.450 **	0.167 (ns)	1.57	(ns)
Home Language				
Only English and/or French	(rg)	(rg)	1.00	1.00
Other Language(s)	0.656 **	1.112 ***	1.93	3.04

(a) Must have medical degrees with 6 or more years of university. Excludes persons with both medical and Ph.D. degrees.

(ns) Not significant at p=0.05 level *p<0.05, **p<0.01, ***p<0.001

(rg) Reference group.

Source: Statistics Canada 2001 Census of Population

Table 9: Logits and Odds Ratios for Work in Select Occupations versus Working as Physicians, Persons Age 30-54 with Medical Fields of Study[(a)], by Nativity, Age at Immigration and Period of Immigration, Canada, 2001

	Logits		Odds Ratios	
	Oth. Hlth.	All Oth. Occup.	Oth. Hlth.	All Oth.
	(1)	(2)	(3)	(4)
Constant	-2.937 ***	-3.003 ***		
Nativity				
Canadian born	(rg)	(rg)	1.00	1.00
FB, Immig. 0-18	-0.359 (ns)	-0.131 (ns)	(ns)	(ns)
FB, Immig. Age 28+, before 1980	-0.573 (ns)	-0.409 (ns)	(ns)	(ns)
FB, Immig. Age 28+, arrived 1980-85	0.935 ***	0.371 (ns)	2.55	(ns)
FB, Immig. Age 28+, arrived 1986-90	0.950 ***	1.405 ***	2.59	4.08
FB, Immig. Age 28+, arrived 1991-96	1.401 ***	1.694 ***	4.06	5.44
Sex				
Men	-0.334 **	-0.120 (ns)	0.72	(ns)
Women	(rg)	(rg)	1.00	1.00
Age				
30-39	0.061 (ns)	-0.034 (ns)	(ns)	(ns)
40-49	(rg)	(rg)	1.00	1.00
50-54	0.375 *	0.453 ***	1.45	1.57
Place of Residence				
Montreal	0.152 (ns)	0.086 (ns)	(ns)	(ns)
Toronto	-0.034 (ns)	0.449 **	(ns)	1.57
Vancouver	0.514 (ns)	0.847 *	(ns)	2.33
Other CMAs	(rg)	(rg)	1.00	1.00
Non-CMAs	-0.165 (ns)	-0.624 ***	(ns)	0.54
Province of Residence				
Atlantic Provinces	-0.901 **	0.049 (ns)	0.41	(ns)
Quebec	-0.144 (ns)	0.143 (ns)	(ns)	(ns)
Ontario	(rg)	(rg)	1.00	1.00
Sask. & Manitoba	-0.146 (ns)	-0.112 (ns)	(ns)	(ns)
Alberta	-0.310 (ns)	-0.185 (ns)	(ns)	(ns)
BC	0.042 (ns)	-0.747 *	(ns)	0.47
Territories & Nunavut	-0.316 (ns)	0.166 (ns)	(ns)	(ns)
Visible Minority				
No	(rg)	(rg)	1.00	1.00
Yes	-0.064 (ns)	0.069 (ns)	(ns)	(ns)
Attended School in 2000				
No	(rg)	(rg)	1.00	1.00
Yes	0.567 **	0.462 **	1.76	1.59
Type of Degree				
Medical Only	(rg)	(rg)	1.00	1.00
Medical & Masters	0.602 ***	0.689 ***	1.83	1.99
Yrs of University Education				
6 years	-0.199 (ns)	-0.281 (ns)	(ns)	(ns)
7 years	0.078 (ns)	0.219 (ns)	(ns)	(ns)
8 years	(rg)	(rg)	1.00	1.00
9 years	-0.430 (ns)	0.075 (ns)	(ns)	(ns)
10 years	-0.358 (ns)	-0.181 (ns)	(ns)	(ns)
11 years	-0.584 *	0.164 (ns)	0.56	(ns)
12 years or more	-0.547 **	-0.255 (ns)	0.58	(ns)
Training				
GP	(rg)	(rg)	1.00	1.00
Specialist	0.420 **	0.164 (ns)	1.52	(ns)
Home Language				
Only English and/or French	(rg)	(rg)	1.00	1.00
Other Language(s)	1.065 ***	1.205 ***	2.90	3.34

(a) Must have medical degrees with 6 or more years of university. Excludes persons with both medical and Ph.D. degrees.

(ns) Not significant at p=0.05 level *p<0.05, **p<0.01, ***p<0.001

(rg) Reference group.

Source: Statistics Canada 2001 Census of Population

Table 10: Chances out of 100[(a)] of Work in Select Occupational Categories, Population Age 30-54, With Medical Fields of Study(b) by Home Language and by Nativity, Region of Birth, and Period of Immigration, Canada, 2001

	Only English and/or French			Other Language(s) at Home		
	Physicians (1)	Other Health Occ. (2)	All Other Occ. (3)	Physicians (4)	Other Health Occ. (5)	All Other Occ. (6)
Birthplace						
Canadian Born	92	4	5	82	6	12
FB, arrived 0-18	93	3	4	84	5	12
FB, arrived age 28+						
N.Am,Europe, Oceania,All Oth.	78	9	13	57	13	30
Eastern Europe	67	19	15	45	24	30
Caribbean & S. Am.	77	6	17	55	8	38
Africa	84	5	11	67	8	26
SE Asia	60	24	17	38	29	33
South Asia	84	3	12	66	5	29
East Asia	56	22	23	34	25	41
West Asia	69	6	25	44	7	49
Period of Arrival						
Canadian Born	92	3	5	78	9	13
FB, arrived 0-18	93	2	4	82	6	12
FB, arrived age 28+						
Before 1980	95	2	3	85	5	9
1980-1985	85	8	6	66	18	16
1986-1990	77	8	16	51	15	35
1991-1996	70	11	19	42	19	39

(a) When divided by 100, figures become probabilities.

(b) Must have medical degrees with 6 or more years of university. Excludes persons with both medical and Ph.D. degrees.

Source: Tables 8 and 9.

APPENDIX A

Fields of study for engineers
Included in the analysis:

Chemical engineering (field of study code 511)
Civil engineering (field of study code 512)
Electrical/Electronic engineering (field of study code 519-521)
(includes: Electrical/Electronic; Electrical Engineering; Electronic Engineering)
Mechanical Engineering (General) (field of study code 527)
Engineering Not Elsewhere classified (field of study code 541)
Engineering – Other
(Includes: Construction Engineering; Industrial Design; Aeronautical And Aerospace; Biochemical Engineering; Biomedical Engineering; Structural Engineering; Survey Engineering; Transportation Engineering; Systems Design Engineering; Computer Engineering; Mcse; Industrial Engineering – General; Manufacturing Engineering; Robotics Engineering; Instrumentation Engineering; Power Engineering; Geological Engineering; Metallurgical Engineering; Mining Engineering; Petroleum Engineering; Engineering Physics)

Excluded from the analysis:
Architectural Engineering/Design; Sound and Recording Engineering; Audio Engineering; Agricultural Engineering; Environmental/Resource Engineering; Environmental Science; Marine Engineering; Water Resources Engineering; Engineering Science – General; Nuclear Engineering

Fields of study for doctors
Included in the analysis:
General Practice Medicine; Internal Medicine; Medical Anatomy; Medical Biophysics And Biochemistry; Medical Neurophysiology; Medical Pharmacology; Medical Physiology; Exercise Physiology; Basic Medical Sciences – Other; Medical Biology; Medical Toxicology; Neuroscience; Paediatrics; Psychiatry; Radiology; Medical Radiography; Medical Specializations – Other; Anaesthesia; Geriatrics; Medical Immunology; Medical Microbiology And Related Fields; Medical Pathology; Medical Parisitology And Virology; Surgery – General; Obstetrics And Gynaecology; Orthopaedic Surgery; Surgical Specialties – Other; Cardiology; Opthalmology; Podiatry; and Urology.

Excluded from the analysis:
Dentistry, Optometry and Veterinary medicine

APPENDIX B

Occupational classification for engineers (based on NOCS2001 classification system)
Engineers: Civil Engineers; Mechanical Engineers; Electrical & Electronics Engineers; Chemical Engineers; Industrial & Manufacturing Engineers; Metallurgical & Materials Engineers; Mining Engineers; Geological Engineers; Petroleum Engineers; Aerospace Engineers; Computer Engineers(Excluding software engineers); Other Professional Engineers Not elsewhere classified

Technical: Information systems analysts & consultants; database analysts data administrators; software engineers; computer programmers and interactive media developers; web designers & developers; chemical technologists & technicians; geological and mining technologists & technicians; meteorological technicians; biological technologists & technicians; agricultural and fish products inspectors; forestry technologists & technicians; conservation and fishery officers; landscaping and horticultural technicians & specialists; civil engineering technologists and technicians; mechanical engineering technologists and technicians; industrial engineering and manufacturing technologists and technicians; construction estimators; electrical and electronics engineering technologists and technicians; electronic service technicians; industrial instrument technicians and mechanics; aircraft aviation mechanics technicians and inspectors; architectural technologists and technicians; industrial designers; drafting technologists and technicians; land survey technologists and technicians; mapping and related technologists and technicians; non-destructive testers & inspectors; engineering inspectors and regulatory officers; inspectors in public and environmental health and occupational health and safety; construction inspectors; air pilots flight engineering flying instructors; air traffic control & related occupations; deck officers and engineering officers - water transport; railway traffic control and marine traffic regulations; computer and network operator and web technician; user support technicians; systems testing technicians.

Managers: Senior managers and all other managers

All other occupations:

Occupational classification for physicians (doctors) (based on NOCS2001 classification system):

Doctors: General Practitioners and family physicians; specialist physicians

Other health occupations: Dentists; veterinarians; optometrists; chiropractors; other professional occupations in health diagnosis and treatment; senior managers in health, education, social services; managers in health care; government managers in health and social policy development and program administration; health policy research, consulting and program officer; university professors; pharmacists; dietitians & nutritionists; audiologists and speech language pathologists; physiotherapists; occupational therapists; other professional occupations in therapy and assessment; head nurses & supervisors; registered nurses; medical laboratory technologists and pathologists' assistants; medical and ass. anatomopathology; medical laboratory technicians; veterinary and animal health technologists and technicians; respiratory therapy, clin.perf. and cardio-pulmonary technologists; medical radiation technologists; medical sonographers; cardiology technologists; electroencepha. and other diagnostic technology not elsewhere classified; other medical technologists and technicians; denturists; dental hygienists and dental therapists; dental technologists and laboratory bench workers; opticians; midwives and practitioners of natural healing; licensed practical nurses; ambulance attendants and other paramedical occupations; other technical occupations in therapy; dental assistants; nurse aides, orderlies and patient assistive services; other assistive occupations in support of health services

All Other Occupations