

Retention Patterns of Canadians Who Studied Medicine Abroad and Other International Medical Graduates

Schémas de rétention du personnel chez les Canadiens qui ont étudié la médecine à l'étranger et chez les autres diplômés internationaux en médecine



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Abstract

Objectives: Are Canadians who study abroad (CSAs) more likely to stay in Canada than other international medical graduates (IMGs)? We looked at retention patterns of CSAs and immigrant IMGs who completed post-graduate medical education (PGME) training in Canada to describe the proportion and predictors of those working in Canada and in rural communities in Canada in 2015.

Methods: We linked the National IMG Database to Scott's Medical Database to track the work locations of CSAs and immigrant IMGs in 2015.

Results: Of the 1,214 IMGs who entered PGME training in Canada between 2005 and 2011, most were working in Canada in 2015 (88.0%). Relatively few IMGs worked in rural communities (9.1%). There were no differences in work location patterns of CSAs and immigrant IMGs.

Conclusion: Contrary to what CSA advocates suggest, CSAs have the same retention patterns as immigrant IMGs. PGME admission policies should treat all IMGs in the same manner, regardless of their citizenship or residency before medical school.

Résumé

Objectifs : Les Canadiens qui ont étudié à l'étranger (CEE) sont-ils plus susceptibles de rester au Canada que les autres diplômés internationaux en médecine (DIM)? Nous avons examiné les schémas de rétention du personnel chez les CEE et chez les DIM immigrants qui ont terminé un programme de formation médicale postdoctorale (PFMP) au Canada, et ce, afin de décrire la proportion – et les indicateurs correspondants – de personnes qui travaillent au Canada et dans les collectivités rurales canadiennes, en 2015.

Méthode : Nous avons effectué un croisement entre la Base de données nationale sur les DIM et la Base de données médicales Scott's afin de localiser les lieux de travail des CEE et des DIM immigrants en 2015.

Résultats : Parmi les 1 214 DIM qui ont participé à un PFMP entre 2005 et 2011, la plupart travaillaient au Canada en 2015 (88,0 %). Relativement peu de DIM travaillaient dans des collectivités rurales (9,1 %). On ne remarque aucune différence dans les schémas de lieu de travail entre les CEE et les DIM immigrants.

Conclusion : Contrairement à ce que les défenseurs des CEE suggèrent, les CEE connaissent les mêmes schémas de rétention du personnel que les DIM immigrants. Les politiques d'admission aux PFMP devraient traiter tous les DIM de la même façon, sans égard à leur citoyenneté ou à leur programme de résidence avant l'école de médecine.

Introduction

International medical graduates (IMGs) are an important source of new physicians to Canada. Although many IMGs are able to immigrate to Canada and immediately practice on restricted or provisional licenses (Audas et al. 2004, 2005; Basky 2000; Nasmith 2000),

other IMGs must complete post-graduate medical education (PGME) training, typically in the form of a residency. The term “IMG” includes Canadian citizens and residents who graduated from medical school abroad (Canadians who study abroad [CSAs]). Compared to Canadian medical graduates (CMGs), a larger proportion of CSAs are male, older, have more post-secondary education, have a parent who is a physician and have applied fewer times for admission to medical schools in Canada (Banner et al. 2010). Compared to immigrant IMGs, a larger proportion of CSAs are male, younger than 35 years old, single and without children (Szafran et al. 2005).

Like most IMGs, CSAs must complete PGME training to qualify for examinations needed for full licensure in Canada. Most CSAs have few opportunities to complete PGME training where they went to medical school and thus return to Canada to complete PGME training and practice (Banner et al. 2010). Recent studies have found that CSAs are more likely to obtain PGME training positions than their immigrant IMG counterparts (Thomson and Cohn 2011b), and that there is some evidence to support the suggestion of bias in the selection process (Andrew 2010). Despite having less clinical experience, CSAs appear to be more successful than immigrant IMGs in obtaining a residency position (Szafran et al. 2005). Thomas and Cohn (2011b) attribute the difference to initial screening criteria that emphasize recent medical school graduates and clinical experience in North America. Unlike immigrant IMGs, CSAs are closer to their undergraduate medical training (many CSAs apply for residency during the fourth year of medical school) and are more likely to have done clinical rotations in North America as part of their undergraduate medical program (Banner et al. 2010; Thomson and Cohn 2011a). Szafran et al. (2005) suggest that interviews may play an influential role in the selection process and may disadvantage immigrant IMG applicants.

Post-graduate training positions for IMGs are a limited resource in the medical education system, and there has been increasing pressure to accommodate CSAs by providing post-graduate training spots for them (Thomson and Cohn 2011b), thereby enabling them to work in Canada. CSA advocates argue that given their existing ties to Canada, CSAs are more likely than immigrant IMGs to work in rural communities and provide a more long-term solution to physician shortages in these communities. However, we were unable to find any data on whether CSAs remain in Canada, and in rural communities, longer than immigrant IMGs.

Do the retention patterns of CSAs and immigrant IMGs differ? This study compares the retention patterns of CSAs and immigrant IMGs who completed PGME training in Canada. Specifically, we describe the proportion and predictors of: (1) working in Canada in 2015 and (2) working in rural communities in Canada in 2015. We hypothesize that a larger proportion of CSAs than immigrant IMGs will work in Canada and in rural communities in 2015.

Only a handful of studies have examined the retention and migration patterns of IMGs who begin practice in Canada, and most have focussed on IMGs who work immediately in Canada on restricted licenses (Audas et al. 2009; Stenerson et al. 2009). Retention rates are higher among IMGs who complete residency training in Canada than provisionally licensed physicians; compared to provisionally licensed physicians, 78% of IMGs who completed

residency in Canada remained in the country five years after completing training (Thurber 2003). To date, no study has examined whether CSAs display the same retention and migration patterns as immigrant IMGs.

This study is part of a larger project on CSAs in Canada. The study responds to calls from policy makers and medical educators for more information about CSA and immigrant IMG performances at the various stages of the credentialing and licensing process and their contribution to the supply of physicians in Canada (Canadian Post MD Education Registry 2011; Ministry of Health, Ministry of Advanced Education and University of British Columbia's Faculty of Medicine 2011). The study provides information to guide policies related to the limited numbers of IMG residency positions in Canada.

Methods

The Newfoundland and Labrador Health Research Ethics Board (HREB#14.154) approved this study.

Sources of data

We linked data from the Canadian Post MD Education Registry's (CAPER) National IMG Database with data from Scott's Medical Database (SMD). The National IMG Database was funded from 2005 to 2011; it captures longitudinal data to track IMGs as they qualify for licensure and join the physician workforce, and it includes data from various agencies that are involved in the training, assessment, certification and licensing of IMGs (Canadian Post MD Education Registry 2011). SMD is a listing of physicians in Canada and is the most comprehensive database available to track physician locations (CIHI 2015; MD Select 2004). As part of its ongoing monitoring of work locations of PGME residents (Canadian Post-MD Education Registry 2015), CAPER had data from SMD for 2015.

Variables

Using a cohort study design, we examined two dichotomous (Y/N) outcomes in the analyses: (1) work in Canada in 2015; and among those working in Canada, (2) work in rural communities in 2015. We identified rural communities (population <10,000) based on 2011 census data (Statistics Canada 2011), and accounted for Metropolitan Influence Zone (MIZ). Statistics Canada defines a strong MIZ as municipalities where "at least 30% of the CSD's [census sub-division, i.e., municipality] resident employed labour force commute to [larger city]" (Statistics Canada 2011). This population cut-off is used in studies of rural communities in Canada (Hutten-Czapski and Thurber 2002).

The independent variable was type of IMG. We defined CSAs as IMGs who were born in Canada and/or who are Canadian citizens or permanent residents before entering medical school. Immigrant IMGs were IMGs who were neither born in Canada nor Canadian citizens or permanent residents. Preliminary analyses suggested that IMGs who graduated from medical school in Western (the UK, Ireland, Western Europe, New Zealand and

Australia) or Caribbean countries have different outcomes than IMGs who did not graduate from medical schools in these countries (Mathews et al. In Press). We therefore created an independent variable that captured both legal status and training site variables included in the National IMG Database. We examined four groups of IMGs:

- Canadian (citizens/permanent residents) who graduated from Western and Caribbean medical schools (CSA/Western).
- Canadian (citizens/permanent residents) who graduated from other (not Western or Caribbean) medical schools (CSA/non-Western).
- Immigrant international medical graduates of Western and Caribbean medical schools (OtherIMG/Western).
- Immigrant international medical graduates of other (not Western or Caribbean) medical schools (OtherIMG/non-Western).

Co-variables were gender (male/female), age at start of PGME, years between medical degree and start of PGME, participation in a skills assessment/training program (Y/N), specialty type (family medicine/specialty), PGME region (Ontario/non-Ontario), first PGME rank (resident/fellow) and eligibility for a full license (Y/N). We coded the age at start of PGME variable as younger than 30 years old and 30 years and older. For years between medical degree and PGME, we calculated the difference between the year in which an IMG first entered a Canadian post-graduate medical education program and the year of graduation from medical school and coded the IMG as either a recent graduate (0–5 years) or older graduate (6+ years). After a preliminary analysis, we coded PGME region as Ontario and outside Ontario based on the location of the medical school. Eligibility for a full license refers to whether an IMG passed both the Medical Council of Canada Qualifying Examination Part 2 (MCCQE2) and specialty examinations. Specialty examinations refer to the Canadian College of Family Physicians examination and any of the examinations through the Royal College of Physicians and Surgeons of Canada. For first rank, we coded trainees whose first ranks ranged from PG1 to PG7 as residents (in a residency program) and those whose first rank was PG9 or higher as fellows (in a fellowship program) (Canadian Post MD Education Registry 2015).

Sample

To be eligible for the study, IMGs had to have first entered a family medicine PGME program between 2005 and 2009, or have entered a specialty PGME program in 2005 or 2006. These cut-off periods allow sufficient time to qualify for the exams. IMGs who first entered PGME programs before these dates may have passed the MCCQE2 before 2005 (before the start of the Database) and would be coded as not passing the examination. CAPER data in the National IMG Database include all enrolment in PGME programs from 1988 onward. Moreover, the cut-off period allows IMG trainees sufficient time to complete their programs

and write specialty examinations. We included fellows because a substantial number of IMGs use fellowship programs to qualify for practice in Canada (Mathews et al. In Press).

We excluded US graduates because a number of agencies in Canada (e.g., CaRMS, Collège des médecins du Québec) consider graduates of accredited US medical schools as CMGs (MacLellan et al. 2010; Szafran et al. 2005). We excluded visa trainees because they are funded by their home countries to complete their residency training in Canada with the expectation that they will return to practice in the home country (Canadian Post MD Education Registry 2012; Hall et al. 2004).

Statistical Analysis

Using SPSS (version 23.0), we described the characteristics of the sample. We used chi-square tests to compare the characteristics of the four groups of IMGs and identify potential interactions. Where the four-group test was significant, we conducted post hoc chi-square tests comparing two groups at a time. We also used chi-square tests between each outcome and relevant predictors, and multiple logistic regression to identify significant ($p < 0.05$) predictors for each outcome. Variables were examined for possible co-linearity a priori. If variables were correlated (e.g., “age at start of PGME” and “years between medical degree and PGME”), we included only one of the variables in the model. Predictors were removed from the model if they were not significant (based on the Wald test) and if they did not significantly improve the change in the -2 log-likelihood value (Tabachnick and Fidell 2001). The tables list the variables included in the final regression models.

Results

There were 1,214 IMGs who first entered a family medicine PGME program between 2005 and 2009, or who first entered a specialty PGME program in 2005 or 2006. More than half the sample was an OtherIMG/non-Western IMG (50.3%), was female (55.4%), was an older graduate (61.9%), had not participated in a skills assessment/training program (75.1%), was a family physician (70.2%), had trained outside Ontario (50.5%), had the qualifications to be eligible for a full license (71.3%) and had first entered a PGME program as a resident (92.5%) (Table 1). Most IMGs (88.0%) were working in Canada in 2015. Of the IMGs working in Canada, 9.1% worked in a rural community in 2015.

TABLE 1. Characteristics of IMGs who entered family medicine PGME training in 2005–2009 or specialist PGME training in 2005–2006, by full cohort and by group type ($N = 1,214$)

Characteristics	Full cohort, n (%)	IMG type				p -value
		CSA/ Western, (%)	CSA/non- Western, n (%)	OtherIMG/ Western, n (%)	OtherIMG/ non- Western, n (%)	
Gender						
Female	673 (55.4)	79 (40.3)	234 (61.3)	19 (76.0)	341 (55.8)	0.001***
Male	541 (44.6)	117 (59.7)	148 (38.7)	6 (24.0)	270 (44.2)	

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Characteristics	Full cohort, n (%)	IMG type				p-value
		CSA/Western, (%)	CSA/non-Western, n (%)	OtherIMG/Western, n (%)	OtherIMG/non-Western, n (%)	
Age at start of PGME						
Under 30	237 (19.5)	96 (49.0)	56 (14.7)	11 (44.0)	74 (12.1)	0 ^{§,†,‡,***}
30+	977 (80.5)	100 (51.0)	326 (85.3)	14 (56.0)	537 (87.9)	
Years between MD and PGME						
Recent graduate (0–5 years)	462 (38.1)	189 (96.4)	130 (34.0)	14 (56.0)	129 (21.1)	0 ^{§,†,‡,0,***}
Older graduate (6+ years)	752 (61.9)	7 (3.6)	252 (66.0)	11 (44.0)	482 (78.9)	
Had skills assessment						
Yes	302 (24.9)	9 (4.6)	94 (24.6)	5 (20.0)	194 (31.8)	0 ^{§,†,‡,0}
No	912 (75.1)	187 (95.4)	288 (75.4)	20 (80.0)	417 (68.2)	
Specialty type						
Family medicine	852 (70.2)	168 (85.7)	292 (76.4)	17 (68.0)	375 (61.4)	0 ^{§,†,‡,0}
Specialist	362 (29.8)	28 (14.3)	90 (23.6)	8 (32.0)	236 (38.6)	
PGME region						
Ontario	601 (49.5)	72 (36.7)	203 (53.1)	17 (68.0)	309 (50.6)	0 ^{§,†,‡}
Other	613 (50.5)	124 (63.3)	179 (46.9)	8 (32.0)	302 (49.4)	
Full license eligible						
Yes	865 (71.3)	151 (77.0)	272 (71.2)	21 (84.0)	421 (68.9)	0.077
No	349 (28.7)	45 (23.0)	110 (28.8)	4 (16.0)	190 (31.1)	
First rank						
Residents	1,123 (92.5)	195 (99.5)	371 (97.1)	20 (80.0)	537 (87.9)	0 ^{†,‡,0}
Fellows	91 (7.5)	1 (0.5)	11 (2.9)	5 (20.0)	74 (12.1)	
In Canada in 2015						
Yes	1,068 (88.0)	179 (91.3)	342 (89.5)	22 (88.0)	525 (85.9)	0.146
No	146 (12.0)	17 (8.7)	40 (10.5)	3 (12.0)	86 (14.1)	
In rural Canada in 2015*						
Yes	97 (9.1)	26 (14.5)	27 (7.9)	1 (4.5)	43 (8.2)	0.045 ^{§,†}
No	971 (90.9)	153 (85.5)	315 (92.1)	21 (95.5)	482 (91.8)	

CSA = Canadian who studies abroad; CSA/non-Western = Canadian citizen, not Western/Caribbean graduate; CSA/Western = Canadian citizen, Western/Caribbean graduate; IMG = international medical graduate; MD = medical degree; OtherIMG/non-Western = non-citizen, not Western/Caribbean graduate; OtherIMG/Western = non-citizen, Western/Caribbean graduate; PGME = post-graduate medical education. *of IMGs working in Canada.

Post-hoc tests: [‡]CSA-Western significantly differs from CSA/non-Western; [†]CSA-Western significantly differs from OtherIMG/Western; [†]CSA/Western significantly differs from OtherIMG/non-Western; [‡]CSA/non-Western significantly differs from OtherIMG/Western; [§]CSA/non-Western significantly differs from OtherIMG/non-Western;

**OtherIMG/Western significantly differs from OtherIMG/non-Western.

As expected by variable definitions, all CSA-Western and OtherIMG/Western IMGs had graduated from medical schools in Western and Caribbean countries (Table 1). The largest proportion of CSA/non-Western IMGs graduated from medical school in Eastern Europe and Asia, whereas the largest proportions from the OtherIMG/non-Western group graduated from medical schools in the Middle East and North Africa and Asia. Female IMGs made up a lower proportion of CSA-Western IMGs than the three other groups. Those from the OtherIMG/Western group had a larger proportion of females than OtherIMG/non-Western IMGs. IMGs from Western medical schools (CSA/Western and OtherIMG/Western) had larger proportions of IMGs who were under 30 years of age at the start of their PGME programs than non-Western IMGs (CSA/non-Western and OtherIMG/non-Western). CSA/Western had the largest proportion of younger graduates (96.4%), followed by OtherIMG/Western (56.0%), CSA/non-Western (34.0%) and OtherIMG/non-Western (21.1%). Almost one-quarter (24.9%) of those in the study participated in a skills assessment/training program. A smaller proportion of CSA/Western IMGs participated in skills assessment and training programs than each of the other groups. A larger proportion of CSA/Western IMGs was in family medicine programs than each of the other groups. A smaller proportion of CSA/Western IMGs entered PGME programs in Ontario than all other groups. For retention outcomes, a larger proportion of CSA/Western IMGs than OtherIMG/non-Western IMGs worked in rural communities in 2015.

Compared to IMGs who did not work in Canada in 2015, a larger proportion of IMGs who worked in Canada were Canadian citizens, were family physicians, were eligible for a full license and were a resident when they first entered PGME (Table 2). After controlling for other significant predictors, IMGs who were eligible for a full license were 4.28 times more likely to work in Canada in 2015 (Table 3). Fellows were 0.38 times as likely as residents to work in Canada.

In total, 97 (9.1%) of the 1,068 IMGs who worked in Canada in 2015 worked in a rural community. Compared with those who did not work in a rural community, a larger proportion of IMGs who worked in a rural community were a CSA/Western IMG, were male, were a recent graduate and were a family physician (Table 2). After controlling for other significant predictors, male IMGs were 1.77 times more likely to work in a rural community in 2015 than female IMGs (Table 3). Specialists were 0.43 times as likely as family physicians to work in a rural community.

Discussion

The vast majority of IMGs in the study were working in Canada in 2015 (88.0%), up to nine years following their training. Among IMGs who worked in Canada, a small proportion of IMGs worked in rural Canada in 2015 (9.1%). The rural retention rates of IMGs (97 of 1,214) is 8.0%; lower than the rate for CMGs reported in the literature (11.2%) (Hutten-Czapski and Thurber 2002). Studies have highlighted the importance of cultural communities in the work locations of IMG physicians; small rural communities may not offer the cultural network that IMG physicians prefer (Mayo and Mathews 2006).

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TABLE 2. IMGs who worked and did not work in Canada in 2015 and rural Canada in 2015, among a cohort of IMGs who entered family medicine PGME training in 2005–2009 or specialist PGME training in 2005–2006

Variable	In Canada in 2015			In rural Canada in 2015*		
	Yes, n (%)	No, n (%)	p-value	Yes, n (%)	No, n (%)	p-value
Type of IMG						
CSA/Western	179 (16.8)	17 (11.6)	0.146	26 (26.8)	153 (15.8)	0.045
CSA/non-Western	342 (32.0)	40 (27.4)		27 (27.8)	315 (32.4)	
OtherCSA/Western	22 (2.1)	3 (2.1)		1 (1.0)	21 (2.2)	
OtherCSA/non-Western	525 (49.2)	86 (58.9)		43 (44.3)	482 (49.6)	
Gender						
Female	596 (55.8)	77 (52.7)	0.485	43 (44.3)	553 (57.0)	0.017
Male	472 (44.2)	69 (47.3)		54 (55.7)	418 (43.0)	
Age at start of PGME						
Under 30	209 (19.6)	28 (19.2)	0.911	18 (18.6)	191 (19.7)	0.792
30+	859 (80.4)	118 (80.8)		79 (81.4)	780 (80.3)	
Years between MD and PGME						
Recent graduate (0–5 years)	413 (38.7)	49 (33.6)	0.233	48 (49.5)	365 (37.6)	0.022
Older graduate (6+ years)	655 (61.3)	97 (66.4)		49 (50.5)	606 (62.4)	
Had skills assessment						
Yes	264 (24.7)	38 (26.0)	0.732	19 (19.6)	245 (25.2)	0.219
No	804 (75.3)	108 (74.0)		78 (80.4)	726 (74.8)	
Specialty type						
Family medicine	773 (72.4)	79 (54.1)	0	82 (84.5)	691 (71.2)	0.005
Specialist	295 (27.6)	67 (45.9)		15 (15.5)	280 (28.8)	
PGME region						
Ontario	538 (50.4)	63 (43.2)	0.102	50 (51.5)	488 (50.3)	0.809
Other	530 (49.6)	83 (56.8)		47 (48.5)	483 (49.7)	
Full license eligible						
Yes	810 (75.8)	55 (37.7)	0	77 (79.4)	733 (75.5)	0.393
No	258 (24.2)	91 (62.3)		20 (20.6)	238 (24.5)	
First rank						
Residents	1,010 (94.6)	113 (77.4)	0	93 (95.9)	917 (94.4)	0.551
Fellows	58 (5.4)	33 (22.6)		4 (4.1)	54 (5.6)	

CSA = Canadian who studies abroad; CSA/non-Western = Canadian citizen, not Western/Caribbean graduate; CSA/Western = Canadian citizen, Western/Caribbean graduate; IMG = international medical graduate; MD = medical degree; OtherIMG/non-Western = non-citizen, not Western/Caribbean graduate; OtherIMG/Western = non-citizen, Western/Caribbean graduate; PGME = post-graduate medical education.

TABLE 3. Predictors of IMGs who worked and did not work in Canada in 2015 and rural Canada in 2015, among a cohort of IMGs who entered family medicine PGME training in 2005–2009 or specialist PGME training in 2005–2006

Variable	In Canada in 2015		In rural Canada in 2015*	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Full license eligible				
Yes	4.28 (2.92, 6.27)	0	NS	NS
No	1.00		NS	
First rank				
Residents	1.00	0	NS	NS
Fellows	0.38 (0.23, 0.63)		NS	
Specialty type				
Family medicine	NS	NS	1.00	0.003
Specialist	NS		0.43 (0.24, 0.75)	
Gender				
Female	NS	NS	1.00	0.009
Male	NS		1.77 (1.16, 2.70)	

95% CI = 95% confidence interval; IMGs = international medical graduates; NS = not significant predictor (not included in model); OR = odds ratio; PGME = post-graduate medical education. *IMGs working in Canada.

Male IMGs were more likely to work in rural communities in 2015 than female IMGs. This finding likely reflects traditional gender roles; men may be more likely to head single-income households or have more influence in work locations. Moreover, given the importance of opportunities for spousal employment in the rural communities, non-physician male spouses may have greater difficulty finding suitable employment in rural communities (Mayo and Mathews 2006; Myroniuk et al. 2016).

Family physicians are more likely to work in small rural communities, which may not have sufficient patient size to support a sub-specialist. Similar findings have been reported for CMGs (Mathews et al. 2015).

Almost three-quarters of the IMGs in the cohort qualified for a full license. Although eligibility for full licensure was a predictor of working in Canada in 2015, one-quarter of the study physicians who worked in Canada in 2015 were not eligible for a full license. Roughly one-fifth of IMGs in the study cohort exit PGME programs without full license credentials (Mathews et al. In Press); however, data from the National IMG Database do not reveal why. For example, studies have shown that IMGs do not perform as well as CMGs in PGME programs (Andrew 2010; Bates and Andrew 2001; MacLellan et al. 2010; Thomson and Cohn 2011a). Alternatively, IMGs who did not intend to remain in Canada may have chosen not to write the MCCQE2 or specialty examinations. Obtaining a residency position is competitive and many qualified IMGs are unable to secure a

training position. Further research is needed to understand and improve IMG performance in PGME.

There were no differences in the work location patterns of different groups of IMGs. Contrary to our hypotheses, CSAs were not more likely to remain in Canada or work in rural communities than immigrant IMGs. These findings refute suggestions that CSAs are more likely to be a solution to rural physician shortages than other IMGs. In response to earlier reports that highlighted biases in the selection of IMG post-graduate applicants (Thomson and Cohn 2011b), medical schools in Canada have strengthened policies around applicant screening, ranking and selection (Best Practices in Applications and Selection Working Group 2013). The findings from this study lend further weight to these initiatives.

Although return-of-service agreements are part of rural physician recruitment and retention programs, we are unable to assess the exact role of return-of-service agreements in the work location patterns of IMGs in the study because these data are not included in the National IMG Database. Return-of-service agreements provide physicians with financial incentives (usually during training) in exchange for a commitment to work in an underserved community following training (Bärnighausen and Bloom 2009). Before 2007, return-of-service agreements were generally voluntary for IMGs. Starting in 2007, return-of-service agreements were mandatory in most provinces for IMGs who entered the first match of the residency matching process (Mathews et al. 2013). Because most IMGs in the study would have participated in the CaRMS match before 2007, they are unlikely to have had a mandatory return-of-service agreement. An evaluation of return-of-service agreements in Newfoundland and Labrador found that a large proportion of IMGs (most with mandatory agreements) did not fulfill service commitments (Mathews et al. 2013); however, this study examined agreements implemented before changes to the residency match (and return-of-service agreements) in 2007. A 2013 study of family physicians initially located in rural areas indicated that, although a greater proportion of new IMGs go to rural areas than CMGs, they migrate out of rural areas much sooner than the CMGs who do not typically have return-of-service agreements (Buske 2013). Further research is needed to assess how mandatory agreements have influenced work location and retention of IMGs who completed residency training after 2007.

The study also demonstrates the utility of data sets, such as the National IMG Database, that link data from various agencies involved in the training, credentialing and licensing of the health professionals. Research using these data sets provides a valuable means to inform policy debates and support health workforce planning.

The study has a number of limitations. As previously described, we created a proxy variable to identify IMGs who qualified for a full license, and used SMD to identify work locations. Some physicians who work in Canada may not be included in SMD, and therefore, we may underestimate retention rates. Our sample size was limited to the period covered by the National IMG Database (2005–2011). Our analyses identify IMGs who are Canadian citizens or permanent residents, but we are unable to describe how long they have lived in the

country or when they became citizens or permanent residents relative to their entry to medical school. Moreover, the National IMG Database does not include information on rural background or province of origin – known predictors of work locations among Canadian medical trainees (Myroniuk et al. 2016).

Conclusion

We linked data from the National IMG Database and SMD to examine the retention of IMG PGME trainees. Most IMGs were working in Canada in 2015 (88.0%); 9.1% of these physicians were working in a rural community. There was no difference in the work location patterns of CSA and immigrant IMGs. CSAs are as likely to remain in Canada or work in rural communities as their immigrant IMG counterparts. The study findings support the equal treatment of all IMG physicians (CSA and immigrant) in PGME selection and training. It also highlights the need to improve IMG PGME training so that more IMGs are able to obtain credentials for independent practice. Finally, it reinforces the need to retain IMG PGME trainees.

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