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3 Realization of entry-to-practice milestones of Canadians who studied medicine abroad and other  
4 international medical graduates  
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## Background

Canadians who study medicine abroad (CSA) compete with other international medical graduates (IMG) to realize milestones needed for full licensure. Besides legal status, country of training is believed to influence milestone realization. We examined the entry-to-practice milestone realization of CSA and non-CSA IMG who attended “Western” (W) and “non-Western” (NW) medical schools.

## Methods

Using the Canadian Post-MD Education Registry’s National IMG Database, we examined the rates and predictors of 1) obtaining a post-graduate position (residency/fellowship), 2) passing the Medical Council of Canada Qualifying Examination Part 2 (MCCQE2), and 3) obtaining a specialty designation. We examined non-visa, non-US IMG who had completed pre-requisites for each milestone, and who would have normally realized the milestones between 2005 and 2011 (the period covered by the Database).

## Results

Among 6,925 eligible IMG, 31% obtained a post-graduate position. Of these 1,214, 92.8% passed the MCCQE2 and 73.2% obtained a specialty designation. After controlling for other significant predictors, CSA-W (OR=4.89; 95%CI=4.00-6.00) and CSA-NW (OR=1.57; 95%CI=1.37-1.79) were more likely to obtain a post-graduate position than non-CSA-NW. There was no difference among the IMG groups in passing the MCCQE2. After controlling for other significant predictors, CSA-W (OR=4.85; 95%CI=1.21-18.64) were more likely to obtain a specialty designation than non-CSA-NW.

## Conclusion

Being a Canadian (citizen/permanent resident) and attending a Western medical school influence IMG's realization of milestones needed to enter practice in Canada. Further research is underway to examine how legal status and training site influence the selection and preparation of IMG wishing to enter practice in Canada.

**Keywords:** international medical graduates, Canadians who study abroad, credentials, residency, physician workforce, post graduate medical education

Confidential

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4 International medical graduates (IMG) are physicians who, regardless of citizenship,  
5 graduated from medical school outside of Canada. In order to obtain full licensure, IMG must  
6 verify their educational credentials, pass language proficiency tests, and pass three Medical  
7 Council of Canada (MCC) examinations (the Evaluating Examination [MCCEE], Qualifying  
8 Examination Part 1 [MCCQE1], and Qualifying Examination Part 2 [MCCQE2]) [1]. They must  
9 also pass examinations to obtain specialist credentials (Certificant of the College of Family  
10 Physicians [CCFP], Fellow of the Royal College of Physicians of Canada [FRCPC], Fellow of  
11 the Royal College of Surgeons of Canada (FRCSC)) [1, 2].  
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22 IMG must have recognized clinical experience to write the MCCQE2 and specialty  
23 examinations. Those who do not must complete post-graduate medical education (PGME)  
24 (usually residency training). Obtaining a residency position is the greatest obstacle to full  
25 licensure because there are many more applicants than positions available to IMG [3, 4, 6-12].  
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32 The term “IMG” describes a large and heterogeneous group of physicians. It includes  
33 individuals who practiced medicine in their home country before immigrating to Canada as well  
34 as physicians who came to Canada to complete their training (and have never practiced). It  
35 includes Canadian citizens or permanent residents who went abroad to study medicine (known as  
36 Canadians who studied abroad - CSA) [10, 13]. There has been a three-fold increase in the  
37 number of CSA applying for residency positions between 2006 and 2009 [8, 14]. CSA appear to  
38 be more successful than non-CSA IMG in obtaining a residency position [15]; while CSA make  
39 up roughly one-quarter of the IMG applicant pool in Ontario, they obtained over half of the  
40 available positions [9].  
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53 The objective of the study is to compare CSA and non-CSA IMG’s realization of three  
54 entry-to-practice milestones: obtaining a PGME training position, passing the MCCQE2, and  
55 obtaining a specialist designation. We hypothesize that CSA will be more successful in realizing  
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2 these milestones than non-CSA IMG. This study responds to calls for more information about  
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4 CSA and non-CSA IMG performance at the various stages of the credentialing and licensing  
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6 process [3, 16]. CSA proponents call for greater accommodation in the medical education  
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8 system for CSA, purporting CSA's prior connections to Canada, understanding of Canadian  
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10 culture, and superior performance in PGME training. Others advocate for greater fairness and  
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12 transparency, and equal treatment of all IMG [10]. This study provides evidence to assess claims  
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14 and inform policies.  
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## 21 **Methods**

### 22 Sources of Data

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24 The Newfoundland and Labrador Health Research Ethics Board (HREB#14.154)  
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26 approved this study. We used the National IMG Database held by the Canadian Post MD  
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28 Education Registry (CAPER) and includes data from various agencies involved in the training,  
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30 assessment, certification, and licensing of IMG [17]. Data were available on IMG in all  
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32 provinces and territories except Prince Edward Island, the Northwest Territories, and Nunavut.  
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34 The Database is the most complete and comprehensive dataset on IMG in Canada, with data  
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36 from 2005 to 2011 (all available years of data).  
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### 43 Primary Measurements/Outcomes

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45 We examined three outcomes: obtained a PGME (residency or fellowship) position  
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47 (Y/N), passed the MCCQE2 (Y/N), and obtained a specialty designation (Y/N). Examination  
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49 data were reported to the National IMG Database by the MCC, CFPC, and RCPSC. The  
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51 National IMG Database records the year in which an IMG passes the MCCQE2 and the year in  
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53 which they were awarded a specialty designation. It does not include whether an IMG wrote or  
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55 failed the exam. In all our analyses, we assumed that all IMG would attempt to obtain full  
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2 licensure (i.e., an IMG who realized one milestone would attempt to realize subsequent  
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4 milestones).

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7 We defined CSA as IMG who were Canadian citizens or permanent residents prior to  
8 entering medical school. Preliminary analyses suggested that IMG who graduated from medical  
9 school in Western or Caribbean countries may have different outcomes than IMG who did not  
10 graduate from medical schools in these countries. We therefore created an independent variable  
11 that captured both legal status and training site, and examined four groups of IMG in the study:  
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19 • Group 1: Canadian citizens/permanent residents who graduated from medical schools in  
20 Western and Caribbean countries (CSA-Western).  
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24 • Group 2: Canadian citizens/permanent residents who did not graduate from medical schools  
25 in Western and Caribbean countries (CSA-nonWestern).  
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29 • Group 3: Non-citizens/permanent residents, who graduated from medical schools in Western  
30 and Caribbean countries (nonCSA-Western).  
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34 • Group 4: Non-Canadian citizens/permanent residents who did not graduate from medical  
35 schools in Western and Caribbean countries (nonCSA-nonWestern).  
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38 Co-variates considered in the analysis were age (younger graduate/older graduate); sex  
39 (M/F); participation in a skills assessment/training program (Y/N); and, where applicable,  
40 specialty (family medicine/specialist), and first rank (resident [PG1-7]/fellow [PG9]) [3, 18].  
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42 Because birthdate was not available on all IMG, we calculated the difference between year of  
43 graduation from medical school and year of realizing a standard reference (passing the  
44 MCCQE1, or if applicable, entering PGME) to create comparable age categories. We coded age  
45 as young graduate (-5 to 5 years between graduating from medical school and passing  
46 MCCQE1 or entering PGME) or older graduate (6+ years between graduating from medical  
47 school and passing MCCQE1 or entering PGME). We included both residency and fellowship  
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3 training in the analysis because fellowship (additional years of clinical or research training that  
4 normally follow residency [19]) qualifies as recognized clinical experience that enables IMG to  
5 write the MCCQE2 and specialty examinations.  
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10 Because the National IMG Database covers a seven year period (from 2005 to 2011) and  
11 few IMG would be able to complete all steps (from MCCEE to specialty examination) needed  
12 for full licensure during that time, we examined two separate cohorts in the study. For the  
13 outcome ‘obtained PGME position’, IMG had to have passed or been exempt from the MCCQE1  
14 between 2005 and 2010. This time cut-off allows IMG at least one year to obtain a PGME  
15 position. For the outcomes ‘passed MCCQE2’ and ‘obtained specialty designation’, IMG had to  
16 have first entered a family medicine PGME program between 2005 and 2009, or have first  
17 entered a specialty PGME program in 2005 or 2006. These cut-off periods allow sufficient time  
18 for the IMG to qualify for MCCQE2, and to complete their programs and write the applicable  
19 specialty examination. We excluded IMG who first entered PGME programs before these dates  
20 because they may have passed the MCCQE2 before 2005 (before the start of the Database. The  
21 CAPER data submitted to the National IMG Database extends to 1988 and allows us to  
22 determine the first and last years in PGME training.  
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40 We excluded graduates of US medical schools and visa trainees from the analysis. We  
41 excluded US graduates because a number of agencies in Canada categorize graduates of  
42 accredited US medical schools as Canadian medical graduates [15, 20]. We excluded visa  
43 trainees because they are expected to return to their home-country after training and may not  
44 write examinations expected of other IMG [21, 22].  
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### 51 Statistical Analysis

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54 Using SPSS (version 23.0), we described the characteristics of the sample, and used chi-  
55 square tests between each outcome and relevant predictors. We used multiple logistic regression  
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3 to identify significant ( $p < 0.05$ ) predictors for each outcome. We selected other potential  
4 predictor variables for each regression model on the basis of the chi-square tests. Variables were  
5 examined for possible co-linearity *a priori*. Predictors were removed from the model if they  
6 were not significant (based on the Wald test) and if they did not significantly improve the change  
7 in the -2 log likelihood value [23]. The tables list the variables included in the final regression  
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## 19 Results

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21 Between 2005 and 2010, 6,925 IMG had passed the MCCQE1 and were included in the  
22 cohort for the analysis of the outcome 'Obtained PGME Position'. Almost one-third (31.0%) of  
23 the IMG entered a PGME program (Table 1). The majority of the sample was nonCSA-  
24 nonWestern (67.5%), was male (54.0%), was an older graduate (65.9%), and had not participated  
25 in a skills assessment/training program (64.2%) (Table 1).  
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33 Compared to IMG who did not get a PGME position, a larger proportion of IMG who  
34 obtained a PGME position was in Groups 1 and 2, was female, and was a more recent graduate  
35 (Table 2). After controlling for other significant predictors, men were 0.74 times as likely as  
36 women to get a PGME position (Table 3). More recent graduates were 1.77 times more likely to  
37 get a PGME position than older graduates. Those who had participated in a skills  
38 assessment/training program were 1.15 times more likely to get a PGME position than those who  
39 had not. CSA-Western and CSA-nonWestern IMG were 4.69 and 1.49 times more likely,  
40 respectively, to get a PGME position than nonCSA-nonWestern IMG.  
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52 In the second cohort, there were 1,214 IMG who had first entered a family medicine  
53 PGME program between 2005 and 2009 or had first entered a specialty PGME program in 2005  
54 or 2006. The majority of these IMG passed the MCCQE2 (92.8%) and obtained a specialty  
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2 designation (73.2%). The majority of IMG was nonCSA-nonWestern (50.3%), was female  
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4 (55.4%), had not participated in a skills assessment/training program (61.9%), was in a family  
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6 medicine PGME program (70.2%), and was a resident (92.5%) (Table 1).  
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10 Compared to IMG who did not pass the MCCQE2, a larger proportion of IMG who  
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12 passed the MCCQE2 was female, had participated in a skills assessment/training program, was  
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14 in a family medicine program, and was a resident (Table 2). After controlling for other  
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16 significant predictors, men were 0.44 times as likely as women to pass the MCCQE2 (Table 3).  
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18 Younger graduates were or 0.53 times as likely as older graduates to pass the MCCQE2 and  
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20 those who had participated in a skills assessment/training program were 3.80 times more likely  
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22 to pass the exam than those who had not. Fellows were 0.05 times as likely as residents to pass  
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24 the MCCQE2.  
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28 Compared to IMG who did not get a specialty designation, a larger proportion of IMG  
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30 who got a specialty designation was from Group 1, 2, and 3; was female; was a younger  
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32 graduate; had not participated in a skills assessment/training program; was in a family medicine  
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34 program; and was a resident (Table 2). After controlling for other significant predictors, male  
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36 IMG were 0.74 times as likely as female IMG to obtain a specialty designation (Table 3). IMG  
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38 who had participated in a skills assessment/training program were or 0.65 times as likely to  
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40 obtain a specialty designation as those who had not participated in a program. Family medicine  
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42 trainees were 0.59 times as likely as specialist trainees to obtain a specialist designation. Fellows  
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44 were or 0.16 times as likely to obtain a specialty designation as residents.  
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## 51 52 **Interpretation**

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54 We used the National IMG Database to examine IMG's realization of requirements for  
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56 full licensure. CSA were more likely to obtain a PGME position, but did not perform better than  
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2 non-CSA in subsequent milestones. Thomson and Cohn [9] describe the role of shared values or  
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4 cultural competence as a possible explanation for CSA's higher success rate in obtaining  
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6 residency placements compared to other non-CSA IMG. In the IMG context, cultural  
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8 competence refers to learning the contextual subtleties of medical practice in Canada, verbal and  
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10 non-verbal communication skills, and adjustment to the training environment in Canada [12, 21,  
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12 24-34].  
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16 A sizeable proportion of IMG in residency programs did not pass the MCCQE2 (up to 6  
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18 years after being admitted to a program) to obtain the LMCC credential (5%; 52 of 1,123; Table  
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20 2). Moreover, 23% (258 of 1,123; Table 2) of IMG residents did not obtain a specialty  
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22 designation to qualify for full licensure. These findings confirm previous studies that show IMG  
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24 do not perform as well as Canadian medical graduates (CMG) on CFPC or RCPSC [9, 10, 20,  
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26 35]. Moreover, a substantial number of IMG withdraw from the residency program or require  
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28 remedial training to complete their programs [20, 36]. In this study, we do not know whether  
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30 IMG had withdrawn from their PGME program, did not take the exam, or failed the exam  
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32 because these data are not reported to the National IMG Database. Residents (IMG and CMG)  
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34 may choose not to take the examination since they are able to practice without a specialty  
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36 designation (usually under a provisional license) [37], or if they do not intend to practice in  
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38 Canada.  
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45 While most studies only examine whether IMG obtain residency positions [10, 15, 35,  
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47 38, 39], we included fellows because, by providing access to recognized clinical experience,  
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49 fellowships enable some IMG to qualify for the MCCQE2 and speciality examinations. While  
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51 fellows were less likely than residents to pass the MCCQE2 or obtain a specialty designation,  
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53 60.4% (55 of 91; Table 2) passed the MCCQE2 and 26.4% (24 of 91; Table 2) obtained a  
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specialty designation. These results suggest that fellowships may offer an alternate route for some IMG to qualify for licensure in Canada.

IMG who participated in a skills assessment/training program were more likely to obtain a PGME position and pass the MCCQE2, but less likely to obtain a specialty designation. These programs are a PGME admission requirement in some provinces, which may help explain why program participants are more likely to obtain a PGME position. Moreover, given that these programs often use educational tools similar to an observed structured clinical examination, participants may be better prepared for the MCCQE2 examination, which uses a similar format. However, participation in these programs does not identify individuals who will perform well in the longer term in their training program.

The National IMG Database is a unique data set that includes data from a variety of organizations involved in the training, credentialing, and licensing of physicians. Our analyses show a number of limitations with the National IMG Database which includes data for a period of seven years. Given the sequential nature of examinations, we are unable to analyze a single cohort from the start (taking the MCCEE) to the end (obtaining a specialty designation) of the entry-to-practice process. Organizations contributed data to the Database when an IMG succeeded in accomplishing a milestone but did not provide data when an IMG was unsuccessful. As a result, we are unable to distinguish IMG who attempted to realize a milestone from those who did not. Throughout our analyses we assume that all IMG who realized one milestone will attempt to realize the subsequent milestone. As a consequence, the analyses likely underestimate true milestone realization rates by overinflating denominators.

The faculties of medicine report legal status of IMG and first rank to the Database. Since they only report on IMG who enter PGME programs, it is not possible to identify potential visa trainees or fellows prospectively. As a result, we included visa trainees or fellows (but

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2 ultimately were unsuccessful or did not apply) thereby overinflating the denominator and  
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4 lowering the overall success rate.  
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## 9 10 **Conclusions**

11 Among milestone-eligible IMG, 31% obtained a PGME position, 92.8% passed the  
12 MCCQE2, and 73.2% obtained a specialty designation. Roughly one in four IMG in PGME do  
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14 not obtain the entry-to-practice milestones required for full licensure. CSA were more likely  
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16 than non-CSA to obtain a PGME position, and CSA graduates from Western or Caribbean  
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18 countries were more likely to obtain a PGME position than other CSA. However, once in a  
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20 PGME program, there is no difference in the CSA and non-CSA's realization of entry-to-practice  
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22 milestones.  
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Table 1: Characteristics of eligible IMG in the study

Characteristics	IMG* (n=6,925) n (%)	IMG** (n=1214) n (%)
<b>Obtained PGME</b>		
Yes	2,144 (31.0)	-
No	4,781 (69.0)	-
<b>Passed MCCQE2</b>		
Yes	-	1,126 (92.8)
No	-	88 (7.2)
<b>Got Specialty Designation</b>		
Yes	-	889 (73.2)
No	-	325 (26.8)
<b>Type of IMG</b>		
Group 1: CSA-Western	649 (9.4)	196 (16.1)
Group 2: CSA-nonWestern	1375 (19.9)	382 (31.5)
Group 3: NonCSA-Western	229 (3.3)	25 (2.1)
Group 4: NonCSA- nonWestern	4672 (67.5)	611 (50.3)
<b>Gender</b>		
Female	3185 (46.0)	673 (55.4)
Male	3739 (54.0)	541 (44.6)
<b>IMG Age</b>		
Younger graduate	2329 (33.6)	462 (38.1)
Older graduate	4562 (65.9)	752 (61.9)
Missing Information	34 (0.5)	0 (0)
<b>Had Skills Assessment</b>		
Yes	2482 (35.8)	302 (24.9)
No	4443 (64.2)	912 (75.1)
<b>Specialty Type</b>		
Family Medicine	880 (12.7)	852 (70.2)
Specialist	1264 (18.3)	362 (29.8)
Missing	4781 (69.0)	
<b>First Rank</b>		
Residents	-	1123 (92.5)
Fellows	-	91 (7.5)
* Passed MCCQE1 between 2005 and 2010; ** Entered family medicine PGME program between 2005 and 2009 or specialty PGME program in 2005 or 2006; IMG – international medical graduate; MCCQE1 – Medical Council of Canada Qualifying Examination Part 1; MCCQE2 – Medical Council of Canada Qualifying Examination Part 2; PGME – post-graduate medical education		

**Table 2: Characteristics of IMG who obtained and did not obtain a PGME position, passed and did not pass the MCCQE2, and obtained and did not obtain a specialty designation**

Characteristics	Obtained PGME position*		p value	Passed MCCQE2*		p value	Obtained Specialty Designation**		p value
	Yes	No		Yes	No		Yes	No	
<b>Type of IMG</b>			0.000			0.339			0.011
Group 1: CSA-Western	430 (20.1)	219 (4.6)		180 (16.0)	16 (18.2)		158 (17.8)	38 (11.7)	
Group 2: CSA-nonWestern	486 (22.7)	889 (18.6)		362 (32.1)	20 (22.7)		280 (31.5)	102 (31.4)	
Group 3: NonCSA-Western	55 (2.6)	174 (3.6)		23 (2.0)	2 (2.3)		22 (2.5)	3 (0.9)	
Group 4: NonCSA- nonWestern	1173 (54.7)	3499 (73.2)		561 (49.8)	50 (56.8)		429 (48.3)	182 (56.0)	
<b>Gender</b>			0.000			0.000			0.004
Female	1107 (51.6)	2078 (43.5)		643 (57.1)	30 (34.1)		515 (57.9)	158 (48.6)	
Male	1037 (48.4)	2702 (56.5)		483 (42.9)	58 (65.9)		374 (42.1)	167 (51.4)	
<b>IMG age</b>			0.000			0.424			0.006
Younger graduate	1049 (48.9)	1280 (26.8)		425 (37.7)	37 (42.0)		359 (40.4)	103 (31.7)	
Older graduate	1094 (51.0)	3468 (72.5)		701 (62.3)	51 (58.0)		530 (59.6)	222 (68.3)	
Missing Information	1 (0.0)	33 (0.7)							
<b>Had Skills Assessment</b>			0.168			0.001			0.023
Yes	743 (34.7)	1739 (36.4)		293 (26.0)	9 (10.2)		206 (23.2)	96 (29.5)	
No	1401 (65.3)	3042 (63.6)		833 (74.0)	79 (89.8)		683 (76.8)	229 (70.5)	
<b>Specialty Type</b>			0.000			0.000			0.000
Family Medicine	880 (41.0)	0 (0)		817 (72.6)	35 (39.8)		672 (75.6)	180 (55.4)	
Specialist	1264 (59.0)	0 (0)		309 (27.4)	53 (60.2)		217 (24.4)	145 (44.6)	
No PGME position	0 (0)	4781 (100.0)					-	-	
<b>First Rank</b>			-			0.000			0.000
Residents	-	-		1071 (95.1)	52 (59.1)		865 (97.3)	258 (79.4)	
Fellows	-	-		55 (4.9)	36 (40.9)		24 (2.7)	67 (20.6)	

\* Passed MCCQE1 between 2005 and 2010; \*\* Entered family medicine PGME program between 2005 and 2009 or specialty PGME program in 2005 or 2006; IMG – international medical graduate; MCCQE1 – Medical Council of Canada Qualifying Examination Part 1; MCCQE2 – Medical Council of Canada Qualifying Examination Part 2; PGME – post-graduate medical education

Table 3: Predictors of IMG who realized entry-to-practice milestones: obtained a PGME position, passed MCCQE2, and obtained a specialty designation

Variable	Obtained PGME position*		Passed MCCQE2*		Obtained Specialty Designation**	
	OR (95% CI)	p value	OR (95% CI)	P value	OR (95% CI)	P value
<b>Gender</b>		0.000		0.001		0.026
Female	1.00		1.00		1.00	
Male	0.74 (0.66-0.82)		0.44 (0.27-0.73)		0.74 (0.56-0.96)	
<b>IMG Age</b>		0.000		0.019		N/S
Younger graduate	1.77 (1.57-2.00)	0.000	0.53 (0.31-0.90)		N/S	
Older graduate	1.00		1.00		N/S	
Missing Information	0.03 (0.04-0.22)	0.001	-		N/S	
<b>Had Skills Assessment</b>		0.018		0.001		0.006
No	1.00		3.80 (1.75-8.26)		0.65 (0.48-0.89)	
Yes	1.15 (1.02-1.29)		1.00		1.00	
<b>Type of IMG</b>		0.000		N/S		N/S
Group 1: CSA-Western	4.69 (3.82-5.71)	0.000	N/S		N/S	
Group 2: CSA-nonWestern	1.49 (1.31-1.70)	0.000	N/S		N/S	
Group 3: NonCSA-Western	0.96 (0.70-1.32)	0.813	N/S		N/S	
Group 4: NonCSA- nonWestern	1.00		N/S		N/S	
<b>Specialty Type</b>		N/S		N/S		0.001
Family Medicine	N/S		N/S		0.59 (0.44-0.80)	
Specialist	N/S		N/S		1.00	
<b>First Rank</b>		N/S		0.000		0.000
Residents	N/S		1.00		1.00	
Fellows	N/S		0.05 (0.03-0.09)		0.16 (0.09-0.26)	
* Passed MCCQE1 between 2005 and 2010; ** Entered family medicine PGME program between 2005 and 2009 or specialty PGME program in 2005 or 2006; IMG – international medical graduate; MCCQE1 – Medical Council of Canada Qualifying Examination Part 1; MCCQE2 – Medical Council of Canada Qualifying Examination Part 2; PGME – post-graduate medical education; N/S – not significant/not included in model						