



## Selection of international medical graduates into postgraduate training positions in Canada. Who applies? Who is selected? Sélection des diplômés hors du Canada et des États-Unis pour les postes de résidence : qui postule ? qui est choisi ?

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Article abstract

**Background:** International medical graduates (IMGs) are an essential part of the Canadian physician workforce. Considering current pressures on the health care system, an update regarding application numbers and match rates for IMGs to postgraduate positions in Canada is needed.

**Methods:** We conducted a quantitative cross-sectional study to explore the characteristics of IMGs who are currently applying to the Canadian Residency Matching Service (CaRMS) positions to gain a broad understanding of the composition of this group and the factors associated with successful matching. **Results:** Out of 1,725 applicants in 2019, 14.1% matched on the first attempt and 6.4% after two to three attempts. Only 22.7% matched with a position (57.6% women). Applicants submitted an average 19.6 site/program applications. The percentage of IMGs matched did not statistically differ by gender. The relationship between the year of graduation or geographic area of medical school qualified and matching was significant for the first and second iterations, with current-year graduates and Oceania/Pacific Islands applicants more likely to match.

**Conclusions:** This study provided us with accurate numbers and information about the Canadians studying abroad and IMG groups applying, and factors associated with being matched to the IMG positions through CaRMS, which will be instrumental in informing future selection implications for Canada.

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## Selection of international medical graduates into postgraduate training positions in Canada. Who applies? Who is selected?

### Sélection des diplômés hors du Canada et des États-Unis pour les postes de résidence : qui postule? qui est choisi?

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#### Abstract

**Background:** International medical graduates (IMGs) are an essential part of the Canadian physician workforce. Considering current pressures on the health care system, an update regarding application numbers and match rates for IMGs to postgraduate positions in Canada is needed.

**Methods:** We conducted a quantitative cross-sectional study to explore the characteristics of IMGs who are currently applying to the Canadian Residency Matching Service (CaRMS) positions to gain a broad understanding of the composition of this group and the factors associated with successful matching.

**Results:** Out of 1,725 applicants in 2019, 14.1% matched on the first attempt and 6.4% after two to three attempts. Only 22.7% matched with a position (57.6% women). Applicants submitted an average 19.6 site/program applications. The percentage of IMGs matched did not statistically differ by gender. The relationship between the year of graduation or geographic area of medical school qualified and matching was significant for the first and second iterations, with current-year graduates and Oceania/Pacific Islands applicants more likely to match.

**Conclusions:** This study provided us with accurate numbers and information about the Canadians studying abroad and IMG groups applying, and factors associated with being matched to the IMG positions through CaRMS, which will be instrumental in informing future selection implications for Canada.

#### Résumé

**Contexte :** Les diplômés hors du Canada et des États-Unis (DHCEU) constituent un élément essentiel de la main-d'œuvre médicale au Canada. Compte tenu des pressions qui s'exercent actuellement sur le système de santé, il est nécessaire de faire le point sur le nombre de candidatures et les taux de jumelage des DHCEU à des postes de résidence au Canada.

**Méthodes :** Nous avons mené une étude quantitative transversale pour explorer les caractéristiques des DHCEU qui postulent actuellement aux postes du Service canadien de jumelage des résidents (CaRMS) afin de mieux comprendre la composition de ce groupe et les facteurs associés à un jumelage réussi.

**Résultats :** Sur 1 725 candidats en 2019, 14,1 % ont été jumelés dès leur première tentative et 6,4 % après 2 ou 3 tentatives. Seulement 22,7 % des candidats ont obtenu un poste (57,6 % de femmes). En moyenne, les candidats ont soumis des demandes à 19,6 endroits/programmes. Le pourcentage de DHCEU jumelés n'était pas statistiquement différent selon le sexe. La relation entre l'année d'obtention du diplôme ou la zone géographique de la faculté de médecine où il avait été obtenu et le jumelage était significative pour le premier et le deuxième tours, les diplômés de l'année en cours et les candidats de l'Océanie/îles du Pacifique étant plus susceptibles d'être jumelés.

**Conclusions :** Cette étude nous a fourni des chiffres et des renseignements précis sur les Canadiens qui étudient à l'étranger et les groupes de DHCEU qui posent leur candidature aux postes destinés aux DHCEU dans le cadre du CaRMS, ainsi que sur les facteurs associés à un jumelage réussi, ce qui contribuera à guider la sélection des futurs candidats au Canada.

## Introduction

In Canadian medical education, an international medical graduate (IMG) is a graduate from a non-North American accredited medical school.<sup>1</sup> IMGs are an essential part of the Canadian physician workforce, making up approximately 24% of the workforce, ranging from 11.0% in Quebec to 47.1% in Saskatchewan.<sup>2</sup> IMGs constitute approximately 25% of physicians in the United States.<sup>2</sup> In Canada, the only route to obtain a license to practice as a physician is through a residency position in an accredited residency program via the two consecutive iterations of Canadian Residency Matching Service (CaRMS). An iteration is the repetitive cycle of the match process. The initial cycle is the first iteration, and the subsequent repetition of the cycle is the second iteration which includes the positions that remained unfilled in the first iteration. Due to the competitive nature of applications to medical schools, an increasing subset of Canadians have decided to pursue their medical education abroad and return to Canada for postgraduate residency training.<sup>3,4</sup> The number of these Canadians studying abroad (CSAs) appears to be increasing dramatically.<sup>3-6</sup> In 2010, there were approximately 3,500 Canadian students enrolled in medical schools abroad, many of them sharing the desire to return home to Canada to practise medicine.<sup>5,6</sup> Previous studies have indicated that the reason for this increase in the number of CSAs is due to low medical school acceptance rates in Canada.<sup>5,6</sup> Informal estimates are that at least 5,000 CSA's are currently studying medicine abroad.<sup>3,4</sup> CSAs and IMGs ultimately seek licensure in Canada.<sup>3,4,7,8</sup> Both groups must apply to the CaRMS IMG positions for postgraduate training as IMGs.<sup>9-12</sup> In the past, IMGs were the only group applying for CaRMS IMG positions,<sup>7</sup> but now they compete with CSAs for these limited, highly desirable spots.<sup>3,4</sup> In light of the current diversity debate, this may raise challenges if the goal is to acquire a representative intake of applicants.<sup>13</sup>

Since the last official report, issued in 2010,<sup>5,6</sup> there is limited information about graduates applying to Canadian IMG positions. This study aimed to look at the applications to IMG CaRMS positions and match characteristics in 2019 across Canada. We selected the year 2019 because it was the most typical recent residency match to date due to significant subsequent changes in the process due the COVID pandemic. During the pandemic, CaRMS interviews became virtual only. This information about the CaRMS

match has significant political, financial, and workforce implications for Canada.<sup>1,3-6,8</sup> The data help answer the following questions: (1) What do we know about the group of IMGs and CSAs applying to CaRMS IMG positions in 2019? (2) What do we know about the IMG CaRMS match statistics? (3) What programs and how many programs are IMGs applying for?

## Methods

### Study Design

This retrospective, quantitative cross-sectional study uses data on candidates applying for IMG positions in the 2019 CaRMS match. The authors acquired the data from the CaRMS 2019 database with the proper ethics approval; authorization from CaRMS included all individuals applying for IMG positions through CaRMS in 2019. As of 2017, due to privacy legislation limits, CaRMS only provides data in aggregate/average or percentage form and no longer provides raw data. We explored questions using basic statistics in this explorative study.

We performed data analyses using IBM SPSS version 24 for Mac OS. Contingency tables were statistically analyzed using chi-square tests with an alpha level of .05.

### Statement of Ethics

The research team, the CaRMS database, the local Research and Ethics Board from the institution (McMaster University) and the Hamilton Integrated Research and Ethics Board (HiREB) signed a data access agreement (project no.8372-C). All data were gathered and analyzed following the guidelines set out by the Research and Ethics Committee at the home institution, McMaster University, and HiREB.

## Results

### Characteristics of individuals who applied to and matched to the IMG positions in first and second iterations in Canada.

The total number of IMG applicants who applied to the first and second (for unmatched after first iteration) 2019 CaRMS match is 2540. Out of this, 238 (9.37%) became inactive/withdrew, and 577 (22.71%) did not submit a list of the programs where each applicant wants to train, in order of preference or a rank order list (ROL); eventually, 1725 (67.91%) were considered final participants who submitted ROLs.

*Table 1. R1 First and Second iteration 2019 IMG match by graduation year current versus previous years graduation*

	Current year graduates		Previous year graduates			Total	Chi-Square Test	
	Matched	%Matched	Unmatched	Matched	%Matched	Unmatched		Total
1 <sup>st</sup> Iteration	117	50.0%	117	239	18.5%	1051	1524	$\chi^2 (1, N = 1524) = 109.59, p < .001$
2 <sup>nd</sup> Iteration	10	12.8%	68	25	3.4%	705	808	$\chi^2 (1, N = 808) = 15.01, p < .001$

In its first iteration, 1524 IMGs applied to the CaRMS match. Of these, 1290 (84.64%) were previous-year graduates and 234 (15.35%) current year graduates. Of 1524, 356 (23.36%) matched in total in the first iteration (Table 1). One hundred and seventeen IMGs (50%) out of 234 current year graduates and 239 (18.5%) out of 1290 previous year graduates who applied, matched in the first iteration. The relationship between year of graduation and matching was significant for the first iteration, with current-year graduates being more likely to match than previous-year graduates ( $p < .001$ ).

In the second iteration, CaRMS reports that 808 IMGs applied. Of these applicants, 730 (90.35%) were previous-year graduates, and 78 (9.65%) were current-year graduates. Of these, 35 (4.33%) matched in total in the second iteration match. Ten (12.8%) out of 78 current year graduates and only 25 (3.4%) out of 730 previous-year graduates who applied, matched in the second iteration. The relationship between year of graduation and matching was significant for the second iteration, with current-year graduates being more likely to match than previous-year graduates ( $p < .001$ ).

In total, 391 out of 1725 applicants in the first and second iterations (22.67%) of the CaRMS matched to a position and entered postgraduate training via the CaRMS match in 2019.

#### Number of times applicants applied to CaRMS vs success in matching

Out of 1725, 244 IMG applicants (14.14%) matched at the first attempt, while 110 IMGs (6.38%) matched after 2-3 attempts. Only 37 IMGs (2.14%) matched after more than three attempts.

The average number of IMG applications per candidate to CaRMS in the first iteration in 2019 was 19.6.

#### Gender of matched versus unmatched groups first and second iterations

In 2019, 994 women applied to the IMG CaRMS match, and 230 (23.14%) women matched in the first or second

iteration. Of the 731 men who applied to the first or second iteration, 161 (22.02%) matched. The percentage of IMGs matched did not differ by gender.

#### IMGs applications and percent matched by world region in 2019

The top three most successful world regions for IMG applications to CaRMS included the following: Oceania/Pacific Islands, with 35 applicants in 2019, of which 16 (46%) matched, as well as Europe, with 460 applicants, of which 170 (37%) matched, and Central America/Caribbean, with 369 applicants, of which 81 (22%) matched.

The relationship between the geographic area of medical school qualified and entering postgraduate training in Canada through successfully matching through CaRMS was significant ( $p < .001$ ) (Table 2).

#### Comparison to previous years (2013-2019)

Applications numbers have gradually increased from 2013 to 2019 (2571-2792), whereas matching percentages for IMGs have declined over the same period from 499 (25%) to 391 (22%).

In 2019, 74% of "active IMGs" submitted ROLs, according to CaRMS. The trends for ROL submission from 2013 to 2019 went from 77.60% to 74.40%.

*Table 2. Regional IMG Match Results details for 2019 CaRMS match and percent distribution of geographical area of matched applicants*

Region	Matched <i>n</i> (%)	Unmatched <i>n</i>	Total <i>n</i>
Africa	28 (7.2)	227	255
Asia	48 (12.3)	251	299
Central America/Caribbean	81 (20.8)	288	369
Europe	170 (43.5)	290	460
Mexico	1 (0.2)	4	5
Middle East	43 (11)	223	266
Oceania/Pacific Islands	16 (4.1)	19	35
South America	4 (1)	32	36
Totals	391 (100)	1334	1725

$\chi^2 (7, N = 1725) = 100.81, p < .001$

## Top choice disciplines for postgraduate training in Canada for IMGs

The four top choices for Postgraduate programs for IMGs in Canada were family medicine (49.1%) and non-surgical specialist disciplines, such as anesthesiology, dermatology (29.0%), internal medicine (13.7%), and surgical specialist disciplines (8.2%). The percentage of IMGs matched did not differ statistically by gender. IMGs filled 16 non-surgical disciplines, 17 family medicine positions, and one internal medicine position in the second iteration.

## Discussion

There has been significant attention to equity issues regarding entry to medical school. However, that same level of attention regarding equity is not applied to the recruitment of IMGs.<sup>14 15</sup> Our results imply that a significant number of IMGs (over 77%) never successfully match to a residency position in Canada, which in turn, points to underutilized IMG resources in Canada. The probability of matching for IMG decreases drastically with the number of attempts. There seems to be a preference for matching current-year IMG graduates versus previous-year graduates in the first iteration of the CaRMS match. The previous evidence does not support this finding.<sup>10 11</sup> This phenomenon is leading to a growing pool of IMGs who have previously gone unmatched and unsuccessfully apply to CaRMS repeatedly.<sup>1 3-7</sup> This is partly due to the decision of postgraduate deans to limit unmatched second iteration Canadian medical graduate (CMG) positions to CMGs only to decrease the number of CMG applicants that go unmatched. This started after a record number of unmatched CMGs in 2018 led to reports of adverse events, such as the suicide of a CMG, complaints of burnout within CMG group, and decrease in well-being.<sup>16</sup> Nevertheless, compared to 2010, the distribution of female vs male applicants is now very similar to the gender distribution in Canadian medical schools.<sup>17</sup>

Individuals from racial and ethnic populations that are underrepresented in the medical field relative to their numbers in the general population include IMGs.<sup>13 18</sup> The fate of unmatched IMGs is often obscure, and IMGs often must work in jobs for which they are overqualified if they cannot match.<sup>19</sup> Canadian healthcare could utilize these IMGs as an essential resource to address the challenges related to lack of healthcare workforce.<sup>19</sup>

Potential limitations of this study include that the acquired data only included the applicants who met CaRMS application criteria and qualified to apply to the IMG

match. The eligibility criteria for the first iteration main residency match usually includes landed immigrant status, a passing mark on the Medical Council of Canada Qualifying Exam Part 1 and on the National Assessment Collaboration (NAC) Examination, as well as a minimum mark on a test of English as a foreign language exam (<https://mcc.ca/examinations/>). These criteria would exclude many IMGs and CSAs from applying to CaRMS, leading to an underestimation of real numbers of immigrant IMGs and CSAs in the Canadian system. Some provinces also require prior assessment by the assessment program for IMGs in that province to be eligible for the first (e.g., British Columbia) or second (Alberta) or first and second iteration (Quebec). These requirements would imply that only looking at the IMG applications in the first (and second) iterations of the CaRMS match would exclude these candidates.

## Conclusion

With this study, we were able to establish accurate numbers and information about the CSA and IMG groups applying, but more importantly, factors associated with being matched to the IMG positions through CaRMS, which will be instrumental in informing national workforce planning for Canada. This report addresses a gap in the literature to initiate a discussion about underrepresented individuals and equity and diversity in IMG admissions to postgraduate residency positions in Canada. Increasing racial diversity and education equity in Canada may require intentionality in mentorship and supports, for example, in the form of mentorships or other forms of longitudinal support for IMGs.<sup>18 20</sup>

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