Original Article

Differences between international medical graduates and Canadian medical graduates in a medical learning environment: From matching to residency and beyond

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Abstract

Objective: To determine the differences between international medical graduates (IMG) and canadian medical graduates (CMG) in the medical learning environment (MLE) as there is progression from matching to residency and beyond. **Method:** A narrative literature review was done using the search engines pubmed, medline and embase on publications from 2000 to 2021 comparing IMG to CMG and those that compared IMG to non IMG in international publications were also considered. **Results:** The IMGs are offered less residency program positions compared to CMGs during the CaRMS selection process and specifically less in specialty programs. Amongst the article, 66% of IMGs compared to 90% of CMG were successful in the certification examination of the college of family physicians of Canada. A US article on the other hand found similarities in performance of USMGs and IMGs in a surgical residency program. **Conclusion:** A lot of IMG face several challenges including perceived systemic and individual discrimination, lack of mentorship and poor ability to navigate after immigration even after they are matched into a Canadian residency program. These are significant issues that should be dealt with to enable increase success and survival of IMGs in the MLE.

Keywords: International medical graduates, medical learning environment, residency

Introduction

A lot of medical communities depend on a constant influx of foreign-trained physicians, who are called international medical graduates (IMGs), to be able to continue to provide adequate care to their defined populations. An IMG is defined as a medical graduate who undergoes undergraduate medical training outside the county of practice. The percentage of IMGs in postgraduate training in the United States of America (USA) is said to be about 18% (Rowley *et al.*)[1] and about 20% in Canada.[6]

The medical learning environment (MLE) is a unique organization on its own because it is able to produce and replicate itself. This is because the MLE provides for the education or training of medical students and can potentially see them through their residency period to specialization and later employ them as faculty.

The MLE was well summarized by Morton *et al.*[2] in 1996 as "a threatening environment," whose players must know how to please authority figures and know how to avoid humiliation. In an already perceived toxic environment, integrating IMGs could be seen as another challenge.

In each MLE, there is a hidden curriculum that has been talked about by many researchers. The content of this curriculum includes students' perception of their own treatment by faculty (Haidet and Stein 2006).[7] They stated that "relationship-centered care acknowledges the central importance

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Received: 28-08-2022 **Revised:** 13-11-2022
Accepted: 31-01-2023 **Published:** 21-12-2023

Access this article online

Quick Response Code:

Website: http://journals.lww.com/JFMPC

DOI: 10.4103/jfmpc.jfmpc_1714_22

How to cite this article: Olatunde OA. Differences between International medical graduates and Canadian medical graduates in a medical learning environment: From matching to residency and beyond. J Family Med Prim Care 2023;12:3055-63.

of relationships in medical care." The content examples from the culture of medicine include the premises that doctors must be perfect and that medicine takes priority over everything else.[7] The MLE's main component is also said to be influenced by the intense emotional response to committing errors in patient care with remaining tensions that may limit learning (Fischer *et al.* 2006).[3,8] The MLE is not without its perceived hostility as there had been reports of mistreatment by colleagues and faculty, with humiliation said to be the highest form of mistreatment (Baldin *et al.* 1991).[3] This adverse MLE is also said to generate a lot of moral distress (Wiggleton *et al.* 2010).[4] The MLE that hopes to be a nurturing environment should have faculty that treats medical students as junior colleagues and not ignore them when they are in distress and also not consider that the humiliation of the students would not translate necessarily to patient respect.[8] The MLE is also said to be an environment, whereby those who need help hesitate to seek help due to stigma and fear of documentation on academic records (Givens and Tjia 2002).[5]

In Canada, in 2019, there were 46,132 family physicians, 45,243 specialists, totaling 91,375 physicians (241 physicians per 100,000 population), and 8,525 medical residents.[9] Meanwhile, in 2020, a total of 92,173 physicians in Canada were reported, which was stated to be a 0.9% increase, and there are now 242 doctors over the 100,000 population, with 26% said to be IMGs.[10]

Countries, such as Canada, that have low internal population growth must depend on external sources to increase their numbers. The current population of Canada is estimated at 38,275,749 with an overall employment rate change of 0.6%.[11]

Objective

Boyer in 1990 stated the four pillars of scholarship to be 1) discovery, 2) integration, 3) application, and 4) teaching. Teaching is said to be knowledge transformation to build understating and flexibility so that ideas are transferred to the useable concept.

The goal is to identify the common grounds in performance quality and propose a foreseeable solution and also develop a framework specific to the learning needs of the IMG and identify steps to ensure survival in their new MLE. This future framework will look into the three phases of the immigrant physician. The immigrant physician goes through the first phase before immigration, the second phase is the early years of settling into their new communities, and the last phase is the phase of integration into their new communities.

Methods

The study setting was that of MLE who were English speaking and were similar to Canadian MLE and those who frequently had Canadian citizens study in their MLE. There was an extensive Pubmed database search using the following terms: foreign medical students, evaluation, internship and residency, ethnic groups, minority groups, clinical competence, and educational measurement. We searched all relevant articles that discussed resident evaluation in education programs, especially in family medicine. Those that mentioned cultural differences in the evaluation of IMG were also considered. We also searched Medline and Embase databases for English-language abstracts published since 1990. The extensive search included articles that mentioned IMGs and all those that specifically compared IMGs and non-IMGs in terms of performance during residency training including formal assessments, examination outcomes, and residency program directors. With this search, there were 34 articles found, and 6 articles were chosen. Those articles that had good data but were published over 10 years ago were excluded from the specific analysis. The studies that included those IMGs that were in residency programs with direct sponsorship from their home countries were excluded.

This is a narrative literature review with search terms that include foreign medical students, evaluation, foreign medical graduates, internship, residency, ethnic groups, minority groups, clinical competence, and educational measurement. The inclusion criteria are articles that compared IMGs and non-IMGs in terms of performance during residency training including formal assessments, examination outcomes, and residency program directors. The articles that were excluded were on those IMGs who were non-immigrants and were in the residency programs for a short period or were returning to their home countries at the end of their residency training.

Results

Seventeen medical schools in Canada accept Canadian medical graduates (CMGs) and IMGs into about 40 residency programs in Canada each year. This process occurs through the Canadian resident matching service (CaRMS) through first and second iterations. This process is essential before an independent practice can be allowed. There is also the national assessment collaboration's (NAC) practice-ready assessment (PRA) program, which is an alternative way for physicians, especially IMGs to enter into independent practices, which is available in seven Canadian provinces. In Canada, IMGs hoping to enter medical practice must undergo several regulatory and educational hurdles. The Medical Council of Canada (MCC) sets out several examinations, such as Medical Council of Canada Evaluating Examination (MCCEE), Medical Council of Canada Qualifying Examinations 1 and 2 (MCCQE1 and MCCQE2). The MCCEE is only undertaken by IMGs, whereas the rest of the MCC examinations are taken by both IMGs and CMGs.

British Columbia has a program with funding from the Ministry of Health that enables two IMGs to undergo post-graduate training. This program has been studied and appears to be successful with all IMGs who completed the post-graduate program able to attain full licensure.[12]

A study between 2010 and 2012 of data analysis found a significant difference between White United Kingdom (UK)

medical graduates and non-UK medical graduates. They found IMGs more likely to fail the clinical skills assessments in the member of the royal college of general practitioners (MRCGP) examination.[13] They proposed that the IMG might have failed clinical skills assessment due to subjective bias and racial discrimination. This strong presence of possible subjective bias could be a valid finding. This is because the White UK candidates did much better than the Black and ethnic minority UK candidates who went through the same training. This then erases the issue of poor communication skills and poor physician–patient interaction that could have been used to explain the difference between IMGs or non-UK graduates and UK-trained graduates. This perception of the presence of inferiority goes from the matching process then to residency. This perception, which could be biased, could result in discrimination in the MLE. Minority residents had already reported encountering racially/ethnically motivated behaviors from co-residents, attending or preceptors, and program leadership.[14]

Matching

The CMGs and IMGs matched through canadian resident matching service (CaRMS) undergo a minimum of 2 years of a residency program. In 2022, during the first iteration, CMGs had 3,075 positions, whereas IMGs had 331 positions [Appendix A, Table 1]. This had been mirrored in the previous years with available positions for CMGs and IMGs for 2021 being 3,083 and 322 [Appendix B, Table 2] and in 2020 being 3,089 and 325, respectively [Appendix C, Table 3]. The top 5 programs with the highest number of available positions in the first CaRMS iteration are family medicine, internal medicine, psychiatry, pediatrics and anesthesiology . They also had CMG:IMG rations of 8:1, 9:1, 8:1, 8:1 and 14:1 respectively. [Appendix A, Table 1]. In contrast, in 2022, the programs with the highest CMGs to IMGs ratios were general surgery (20:1), obstetrics and gynecology (17:1), diagnostic radiology (13:1), and anesthesiology (14:1), thus making it almost impossible for IMGs to train in these specialties [Appendix A, Table 1]. In the last 7 years, less than 30% of IMGs who applied through CaRMS were matched compared to over 90% for CMGs [Appendix D, Table 4] and [Appendix E-I: Graphs 1-5].

Residency

Article 1: Canadian family physician journal titled examination outcomes and work locations of international medical graduate family medicine residents in Canada by Mathews *et al*.[22] The study period was from 2005 to 2009 and the authors included IMGs who got into a family medicine residency program. In this article, the IMG was divided into four groups. These were Group 1, which were IMGs and were Canadian citizens or permanent residents before medical school, and Group 2 was like Group 1 but did not attend western or Caribbean medical schools. Group 3 included IMGs who were not Canadian citizens or permanent immigrants before attending medical schools either in western schools or non-western schools, which was Group 4. Their study was of 876 IMGs in the family medicine program across Canada between 2005 and 2009. Their findings revealed that 96.1% of IMGs passed the MCCQE2 with a larger proportion being female (58.3%), older (57.1%), and those who attended medical schools that were non-western and non-Caribbean (78.4%). They also found that about a quarter (23.3%) of these IMG medical residents were not able to obtain a full license. To be eligible for a full license, a medical resident must have passed the MCCQE2 plus Certification in Family Medicine (CCFP) or a specialty designation.

The American health system is reported to not be able to survive without the use of foreign-trained physicians. The system of certification is like that of Canada because the physicians are made to go through several examinations, which for them are called the United States Medical Licensing Examination (USMLE). These IMGs could be US (USIMG) and non-US medical graduates (non-USIMG). These IMGs can bring their experiences, diversity, and uniqueness to healthcare. The proportion of those IMGs who are US citizens is estimated to be 20% and have a poorer performance than their non-USIMG counterparts.[15] IMGs must then make up and cover the void when necessary. In one of the studies, the patients of non-USIMG had a 20% lower relative risk of mortality than those of USIMG.[16] They found this similar to other studies.

Article 2: The Journal of Surgical Education titled: A comparison of objective data for the United States and international medical graduates in a general surgery residency published in 2017 by Lara *et al*.[17] In this journal, the author's sample size was 89 surgical residents with 59 USMGs and 30 IMGs. Sixty-eight (n = 68) of these (58 USMGs and 10 IMGs) did not do a preliminary year of general surgery before being matched into the surgical program. This subgroup, which will be named A for ease of further discussion, did not need to do any preliminary year. Those who did a preliminary year of general surgery before being matched into the surgical program were 1 USMG and 20 IMGs and will be named subgroup B. Subgroup A was found to have scored slightly higher than subgroup B in their main outcome results. Also, in the main outcome, there was a similarity in the scores of the IMGs and USMGs in subgroup A. In the secondary outcome results, there was no significant difference between IMGs in subgroups A and B. The authors also mentioned that Mayo Clinic IMGs had been known to have higher scores in the American Board of Surgery In-Training Examination and the American Board of Surgery qualifying and certifying examinations.

Article 3: Dr. Joanna Bates and Dr. Rodney Andrew's commentary in the 2001 journal is the article that brings to light the questions about the discrepancies in the academic performance of some IMGs in their University of British Columbia (UBC) program.[18] They argued that cultural differences and training patterns and expectations contributed to poor performance. They also mentioned that the absence of adequate communication in English medical terminology could also create a barrier to their

success. Lastly, the differences in core medical education amongst different MLEs in various countries, past trauma of immigrants, and delay in return to a medical learning environment after immigration could be potential culprits. The authors in this article provide the following recommendations: 1) exploration of the trainees' undergraduate experiences, post-graduate experiences and clinical activities, 2) clear articulation of the program's expectations for participation, feedback, work ethics, and commitment, 3) clear articulation of North American Society's expectations of physicians, and 4) experienced faculty with the resources and the interest to explore the roots of academic difficulty.[18]

Article 4: In this article, Jimenez-Gomez *et al.* reviewed the performance of IMGs in pediatric residency.[19] They found that IMGs' overall performance was perceived by their peers and faculty as equal to the US graduates (USGs). The IMGs were perceived to have superior knowledge compared to USGs in areas of clinical knowledge and skills but inferior in areas of communication.[19] These authors then concluded with the resounding fact of the importance of these competent IMGs in the health system that will provide adequate care to the underserved population.

Article 5: This is a study by Schabort I, Mercuri M, and Grierson L.E.M titled predicting international medical graduate success on college certification examinations.[20] They mentioned the discrepancy in the College of Family Physicians Canada (CFPC) examination results in 2007, in which 66% of IMGs, compared to 90% of CMGs, were successful in the certification exams.[20] In the same tone, the authors mentioned that those born outside Canada showed better performance. Part of the results in this article was that 71% of the IMGs passed both the short answer management problems (SAMPs) and simulated office orals (SOOs) examinations and those IMGs with professional experience did better in these exams. The author's trial of confirming the relationship between age and IMGs' CFPC examination success was not confounding because the older IMGs were 14% less likely to be successful. The impact of age on educational success requires more in-depth analysis with the removal of other confounding factors such as socioeconomic status at the time of landing and time of residency. In this article, it was ironic to find out that IMGs with English as their first language were less successful in CFPC-simulated office orals (SOO) examinations.

Article 6: This article is perhaps the most important that speaks to the aim of this study. Andrew in 2010 had an objective to compare the IMGs with CMG that were already in a family practice residency program. This was based again on the perception that IMGs do not do as well as their Canadian-trained residents. The study revealed that 99% of CMG were evaluated to have either exceeded or met their expectation and only 1% were assessed as needing improvement. However, 98% of IMGs were evaluated to exceed or meet expectations with 2% needing more improvement. This was said not to be any significant difference between the two groups.[21] This lack of difference was not echoed in the scores obtained during the certification examinations where the passing rate was 95% for CMG and 58% for IMG in the study. The authors in their discussion pointed out that the IMGs were older, had family responsibilities, and had English as a second language.

Discussion

The first journal debunked their hypothesis and mentioned that there was no difference in examination performances amongst all the groups, especially in certification exams.[22] There was the identification of four specific challenges that faced IMGs at a Canadian residency program when residents in internal medicine, family medicine, and surgery were studied. These were 1) perceived systemic and individual discrimination, 2) navigating the initial transition period, which included surviving culture shock, learning specific differences between old and new working environments and developing strategies for blending in, 3) the desire to help other IMGs, and 4) an identified need for mentorship.[23] All these would be one of the ways forward that can help the IMGs specifically.

All IMGs must be aware of the expectations of their performance in their new MLE, which will include proper knowledge of the model of teaching and training the assessment style and feedback policies. All IMGs might benefit from a skills assessment program that could be included in their program orientation packages. Pairing IMG tutors with IMGs could present a more peaceful transition and better navigation for the IMGs through their new MLE. All IMGs must undergo appropriate cultural orientation into their new MLE and thus should their potential tutors. All IMGs must go through an essential lesson in effective communication in an MLE, which should include English as a second language if needed. Lastly, all tutors who work with IMGs must be regularly trained on culturally acceptable expectations from the IMGs, cultural acceptance, and bias decoding. These tutors must debunk their preconceived ideas that IMGs are failures compared to CMGs and be prepared to be equipped with tools to help the IMGs navigate the MLE with the perceived difficulties faced by the IMGs exclusively. These recommendations must be included in the medical postgraduate programs in all Canadian medical schools.

Conclusion

There is a need to look individually into the atmosphere of the MLE as it pertains to IMG. The studies reviewed above have shown no differences between IMGs and their counterparts in different countries. Why is there still a perception of differences? Why is this perception transported into certification exams? Is there an element of institutional bias, performance bias, halo effect, confirmation bias, or even actor-observer bias? There should be formal and informal assessments of the modes of assessing IMGs. There should be a comprehensive study on the

perception of discrimination or racism and training of members of the MLE in prompt diagnosis and appropriate treatment of any form of visible and subtle bias directed at this specific group of medical graduates. Detailed strategies to eliminate such bias in MLE settings must be put in place and reviewed periodically. This is to further prevent increased stress, which will lead to a continuous cycle of poor performance. Lastly, the MLE must engage teachers or tutors that exhibit the 12 roles of a good teacher and also incorporate a culturally diverse and relevant curriculum that is immigrant focused. This last recommendation was echoed by Levey in 1992 whose study recommended the relevant curriculum includes formal lectures, reading assignments, physical diagnosis sessions, language classes, patient encounter sessions, and a medical culture tutorial.[24]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Rowley BD, Baldwin DC Jr, McGuire MB. Selected characteristics of graduate medical education in the United States. JAMA 1991;266:933-43.
2. Morton KR, Lamberton HH, Testerman JK, Worthley JS, Loo LK. Why does moral reasoning plateau during medical school? Academic Medicine 1996;71:5-6.
3. Baldwin DC, Daugherty SR, Rowley BD, Schwarz MD, Baldwin DC. Cheating in medical school: A survey of second-year students at 31 schools. Academic Medicine 1996;71:267-73.
4. Wiggleton C, Petrusa E, Loomis K, Tarpley J, Tarpley M, O'Gorman ML, *et al.* Medical students' experiences of moral distress: Development of a web-based survey. Academic Medicine 2010;85:111-7.
5. Givens JL, Tjia J. Depressed medical students' use of mental health services and barriers to use. Academic Medicine 2002;77:918-21.
6. Pulse. Can Med Assoc J 1997. p. 157.
7. Haidet P, Stein HF. The role of the student-teacher relationship in the formation of physicians. The hidden curriculum as process. J Gen Intern Med 2006;21:S16-20.
8. Fischer MA, Mazor KM, Baril J, Alper E, DeMarco D, Pugnaire M. Learning from mistakes. Factors that influence how students and residents learn from medical errors. J Gen Intern Med 2006;21:419-23.
9. Canadian Institute for Health Information. Supply, Distribution and Migration of Physicians in Canada, 2019 — Methodology Notes. Ottawa, ON: CIHI; 2020. [Last accessed on 2021 Jun 09].
10. Canadian Institute for Health Information. Physicians. Available from: https://www.cihi.ca/en/physicians-in-canada. [Last accessed on 2022 Aug 06].
11. Available from: http://www150.statcan.gc.ca/t1/tb1/I/en. [Last accessed on 2021 Apr 17].
12. Andrew R, Bates J. Program for licensure for International Medical Graduates in British Columba: 7 years' experience. CMAJ 2000;162:801-3.
13. Esmail A, Roberts C. Academic performance of ethnic minority candidates and discrimination in the MRCGP examinations between 2010 and 2012: Analysis of data. BMJ 2013;26:347:f5662. doi: 10.1136/bmj.f5662.
14. Osseo-Asare A, Balasuriya L, Huot SJ, Keene D, Berg D, Nunez-Smith M, *et al.* Minority resident physicians' views on the role of race/ethnicity in their training experiences in the workplace. JAMA Netw Open 2018;1:e182723.
15. Norcini J, Anderson MB, McKinley DW. The medical education of United States citizens who train abroad. Surgery 2006;140:338-46.
16. Norcini JJ, Boulet JR, Opalek A, Dauphinee WD. The relationship between licensing examination performance and the outcomes of care by international medical graduates. Acad Med 2014;89:1157-62.
17. Lara FC, Naik ND, Pandian TK, Gas BL, Strubel S, Cadeliña R, *et al.* A comparison of objective assessment data for the United States and international medical graduates in a general surgery residency. J Surg Educ 2017;74:e1-7.
18. Bates J, Andrew R. Untangling the roots of some IMGs' poor academic performance. Acad Med 2001;76:43-6.
19. Jimenez-Gomez A, FitzGerald MR, Leon-Astudillo C, Gonzalez-delRey J, Schubert CJ. Performance of International medial graduates in pediatric residency: A study of peer and faculty perceptions. Acad Pediatr 2018;18:728-32.
20. Schabort I, Mercuri M, Grierson LEM. Predicting international medical graduate success on college certification examinations. Can Fam Physician 2014;60:e478-84.
21. Andrew RF. How do IMGs compare with Canadian medical school graduates in a family practice residency program? Can Fam Physician 2010;56:e318-22.
22. Mathews M, Kandar R, Slade S, Yi Y, Beardall S, Bourheault I. Examination outcomes and work locations of international medical graduate family medicine residents in Canada. Can Fam Physician 2017;63:776-83.
23. Najeeb U, Wong B, Hollenberg E, Stroud L, Edwards S, Kuper A. Moving beyond orientations: Amultiple case study of the residency experiences of Canadian-born and immigrant international medical graduates. Adv Health Sci Educ 2019;24:103-23.
24. Levey GS. Internal medicine and the training of international medical graduates: A time for open discussion and new approaches. Ann Intern Med 1992;117:403-7.

Appendix

Appendix A: Table 1 CMG and IMG available positions in numbers and ratio in 2022 CARMS First Iteration.

Discipline	CMG	Ratio	IMG
Anesthesiology	127	14:1	9
Diagnostic radiology	76	13:1	6
Emergency medicine	70	14:1	5
Family medicine	1399	8:1	168
General surgery	80	20:1	4
Internal medicine	461	9:1	54
Obstetrics and gynecology	85	17:1	5
Orthopedic surgery	52	7:1	7
Pediatrics	140	8:1	17
Psychiatry	180	8:1	23

2022: Total CMGs3075, Total IMGs 331, ratio 9:1

Appendix B: Table 2 CMG and IMG available positions in numbers and ratio in 2021 CARMS First Iteration

Discipline	CMG	Ratio	IMG
Anesthesiology	120	15:1	8
Diagnostic radiology	79	20:1	4
Emergency medicine	71	12:1	6
Family medicine	1436	9:1	166
General surgery	79	16:1	5
Internal medicine	456	9:1	53
Obstetrics and gynecology	84	21:1	4
Orthopedic surgery	48	7:1	7
Pediatrics	132	7:1	18
Psychiatry	179	9:1	20

2021: Total CMGs3083, Total IMGs 322, ratio ~10:1

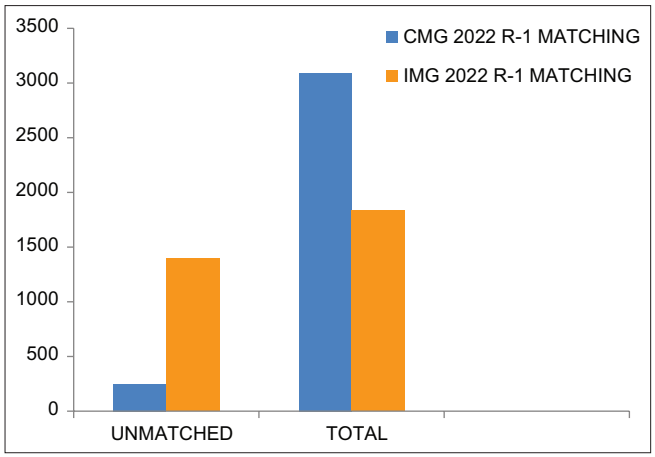
Appendix C : Table 3 CMG and IMG available positions in numbers and ratio in 2020 CARMS First Iteration

Discipline	CMG	Ratio	IMG
Anesthesiology	115	13:1	9
Diagnostic radiology	81	14:1	6
Emergency medicine	72	14:1	5
Family medicine	1421	8:1	168
General surgery	81	20:1	4
Internal medicine	466	9:1	54
Obstetrics and gynecology	81	16:1	5
Orthopedic surgery	49	7:1	7
Pediatrics	137	8:1	17
Psychiatry	182	8:1	23

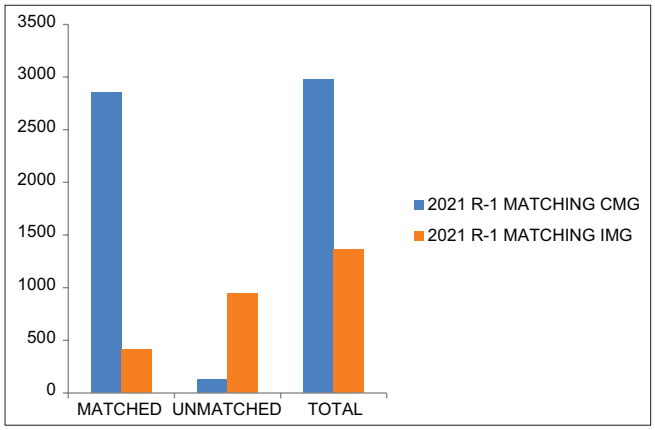
2020: Total CMGs 3,089, total IMGs 325, ratio ~10:1

Appendix D: Table 4 Percentage of CMG and IMG R-1 CARMS Matched 2015-2022

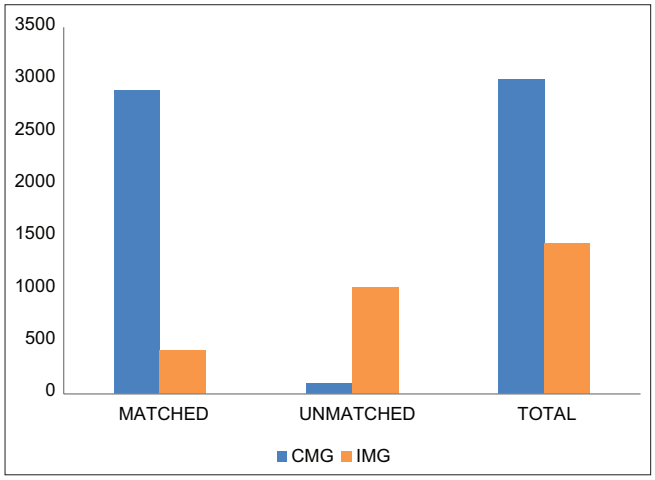
% Matched	Year							
Group	2015	2016	2017	2018	2019	2020	2021	2022
CMG	96	96	95	94	97	97	96	92
IMG	21	23	23	23	23	29	30	24



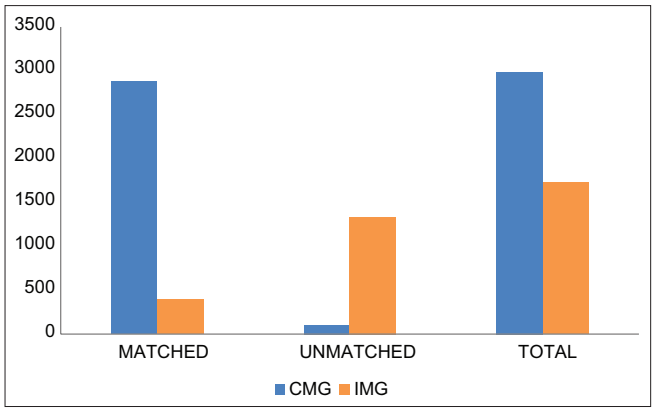
Appendix E: Graph 1 CMG and IMG R-1 CARMS Matching in 2022



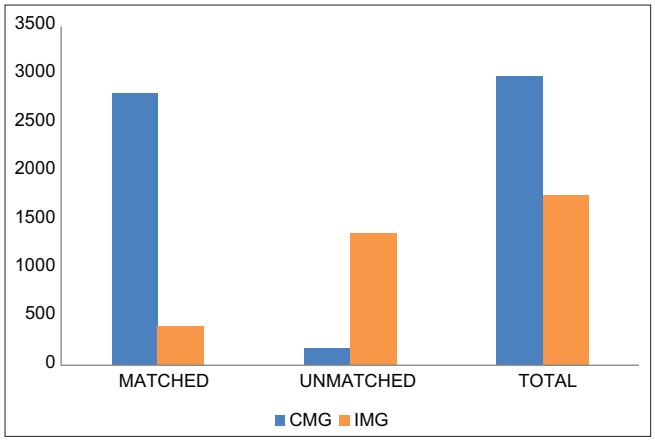
Appendix F: Graph 2 CMG and IMG R-1 CARMS Matching in 2021



Appendix G: Graph 3 CMG and IMG R-1 CARMS Matching in 2020



Appendix H: Graph 4 CMG and IMG R-1 CARMS Matching in 2019



Appendix I: Graph 5 CMG and IMG R-1 CARMS Matching in 2018

Article 1	
876 IMG in FMP	
MCCQE2 passed	MCCQE2 failed
96.10%	3.90%
Females	Males
58.30%	41.70%
Older	Younger
57.10%	42.90%
Obtained full license [Yes]	Obtained full license [No]
23.30%	76.70%

Article 2 [No significant difference in secondary outcome]	
89 Surgical Residents	
59 USMG	30 IMG
Preliminary surgical year [Yes]	Preliminary surgical year [No]
58 USMG	1 USMG
20 IMG	10 IMG

Article 3 [4 situations of some IMGs poor academic performance and root cause in a UBC Family Practice Residency program]

Situation A: An excellent resident who couldn't make clinical decisions because their previous MLE didn't envelope a Socratic method.

Situation B: A resident struggles in the second year of residency after an excellent first year on account of paucity of English medical vocabulary

Situation C: An excellent resident fails a paediatric rotation because of past lived experience.

Situation D: An otherwise excellent resident's performance worsens in their second year of residency because of piled up stress, both financial and family induced and also because of a strong cultural disregard of mental health diagnosis and treatment

Article 4 [IMGs vs.USGs performance in a pediatric residency program and American Board of Pediatrics (ABP) pass rate]

IMGs: 33 Respondents with 100% ABP pass rate

USGs: 98 Respondents with 95% ABP pass rate

Article 5 [Pass rate of IMGs in the College of Family Physicians of Canada (CFPC) examinations SOOs and SAMP, Pass rate of IMGs in the Royal College of Physicians and Surgeons of Canada (RCPSC) examination]

CFPC Exam: Total IMGs 69; Number that passed 49; Pass rate 71%

RCPSC Exam: Total IMGs 85; Number that passed 66; Pass rate 78%

Article 6	
Family practice residency program	
CMG	IMG
99% Exceeded expectation	98% Exceeded expectation
1% Needed improvement	2% Needed improvement
Certification exam success	
CMG	IMG
95%	58%