POST-GRADUATE MEDICAL TRAINING AND CARMS

Becoming a practicing physician in Canada is a lengthy process. Students must complete an undergraduate degree prior to entering medical school, which itself lasts another three to four years. During the final year of medical school, students apply for post-graduate medical training, called a ‘residency’ program. Completion of a post-graduate training program is a requirement for entering independent clinical practice in any medical or surgical specialty, across all Canadian jurisdictions. The length of post-graduate training depends on the medical specialty and ranges from two to six years, not counting additional specialized training junior physicians often choose to complete.

The process of applying for post-graduate medical training is mediated by an online platform called the Canadian Residency Matching Service (CaRMS), an intermediary data company that facilitates the application process. For each program the student wishes to apply to, they must submit an application package consisting of: a personalized letter of intent, a dedicated CV, an online profile, and three to five reference letters from physicians.

Associated with the rigorous application process is a significant financial burden as well. Students pay a mandatory $312 baseline application fee to use the CaRMS service, and an additional $35 per program. Over the last decade, the average number of applications by each applicant has seen a significant increase, with medical graduates applying to twice the number of programs in 2018 (21 programs on average) than they did in 2008 (10 programs on average) (CaRMS Data Reports, 2018). In 2018, students paid an average application fee of $1047 to complete their applications to post-graduate programs. (CaRMS Data Reports, 2018). The cost is much higher once you include travel fares and accommodations that are accumulated as students are invited for interviews across Canada. While there is no official data on the average cost of a residency interview tour, costs have been estimated to range from $3000 to $5000, in addition to baseline application fees (CFMS, 2017).

After the interview process, students must rank the various post-graduate programs through the CaRMS system. Similarly, each residency program at each Canadian medical school ranks their preferred student applicants. The result of this, called “The Match” is a binding, non-negotiable, and non-transferable contract between the student and the post-graduate training program. In 2018, 54% of Ontario students matched to their first choice program. This is a marked decrease compared to 2011, when 63% of Ontario students matched to their first choice program (CaRMS Data Reports, 2018).

Most concerning, there exists the possibility of not receiving a “match” to a post-graduate training program at all, which means students are unable to enter into medical practice and use their long years of training and education for the benefit of all Canadians. The number of students who are “unmatched” has increased over time, and the personal and professional consequences of going unmatched are severe.

FUNDING FOR MEDICAL TRAINING

In Ontario, funding for medical education is provided by the Ministry of Training Colleges and Universities (MTCU) and the MOHLTC. The MTCU funds most aspects of undergraduate medical training, while the MOHLTC is largely responsible for postgraduate training.

Between 2011–2013, the MOHLTC spent $107 million to support medical schools, specifically funding teaching, educational infrastructure, and administrative costs associated with the education of undergraduate medical students (OAG 2013). Ontario invests approximately $780 000 to train one physician (based on four years of undergraduate medical training, and up to five years of postgraduate residency training) (OAG 2013). For medical students specifically, Ontario invests approximately $260 000 per student over a four-year undergraduate medical training program, not including government subsidies such as the Ontario Student Assistance Program (OSAP) or bursaries.
Public subsidization of medical education is seen as a public investment in the health workforce when medical graduates can serve the Canadian population following graduation. If a medical student is able to successfully graduate from medical school, they are by definition fit to enter postgraduate medical training. When medical students go unmatched, the significant provincial investment in the education of a potential physician does not see its intended return, both for the student and the province’s taxpayers.

**RESIDENCY SPOT ALLOCATION**

Within Ontario, there are two key stakeholder groups involved in the allocation of post-graduate training positions: medical schools, which are represented by the Council of Ontario Faculties of Medicine (COFM), and the MOHLTC. Medical schools determine their program capacity for learners while the MOHLTC determines the geographic distribution of residency spots across specialties based on government modelling of Ontario health needs (Fréchette, Hollenberg, Shrichand, Jacob, & Datta, 2013).

Each school in Ontario has a post-graduate medical education committee that reviews and makes recommendations on their program’s respective residency position allocation for the upcoming CaRMS cycle. Medical schools assess their individual capacity and distribution of residency spots on an annual basis, incorporating both internal and external health human resource forecasting data, including the Population Needs Based Physician Model (Fréchette, Hollenberg, Shrichand, Jacob, & Datta, 2013). Over the summer months, post-graduate programs come together to discuss how residency spots will be allocated across the province. The allocation of positions must meet several provincial standards, including a ratio of 60:40 between family medicine and all other specialties, a total of 200 international medical graduate (IMG) positions, and a government-requested provincial ratio of undergraduate Canadian Medical Graduates (CMG) to post-graduate PGY1 positions ("Resident Selection Postgraduate Medical Education", 2015). These proposed numbers are submitted to the MOHLTC for final approval.

Overall, the provincial government plays a large role in deciding the total number and geographical distribution of residency spots across Ontario. Since 2008, the ratio of available residency spots to CMGs has been steadily declining, dropping from 1.11 to 1.01 in the most recent match cycle in 2018 (Figure 1).

**FIGURE 1**: Ratio of the number of post-graduate residency positions to total medical school graduates. *Source: 2018 CCME CaRMS Forum: R-1 Data and Reports.*
This information is not consistently communicated to medical students. The 2015 Ontario Auditor General report states that the MOHLTC’s Health Force Ontario Marketing and Recruitment Agency presents at medical schools and events such as the Ontario Medical Students’ Weekend to inform medical students on career planning services, rural practice opportunities, and the physician workforce (Ontario Ministry of Health and Long-Term Care, 2015). However, there are no indications that these presentations are conducted regularly and that presentation content includes sufficient details regarding long-term physician employment trends (Sit, Smith, & Wang, 2017). This lack of transparency in physician workforce planning has demonstrably impacted medical learners’ abilities to plan for their future careers. A Royal College study conducted in 2012 found that over half of postgraduate medical trainees did not receive career counseling information, contributing to a poor understanding of changes in societal need and how this would drive changes in the physician job market (Fréchette, Hollenberg, Shrichand, Jacob, & Datta, 2013). No equivalent study is available at the undergraduate medical education level.

Currently, few resources exist that compile information on the physician employment landscape in Ontario. Those currently accessible to medical students include a guide developed by Ontario Medical Students Association (OMSA), a bilingual career counselling tool Future MD Canada launched by the Association of Faculties of Medicine of Canada (AFMC), and another online based tool OnBoard MD launched by MD Financial this past year (OMSA, 2016; AFMC, 2019; MD Financial, 2019). However, neither resource is comprehensive and the amount of information made available to students with respect to physician services planning and the residency spot allocation process varies significantly between medical schools.

Given the lengthy time frame between training and practice, the current number and distribution of residency positions will largely dictate what health services are available to the population in future years. As students are consistently influenced by projected job prospects, the MOHLTC along with medical faculties have a duty to report timely and reliable information to medical trainees in order to facilitate socially-accountable career planning (Sit, Smith & Wang, 2017).

THE UNMATCHED MEDICAL GRADUATE

Any unmatched medical students are immediately invited to apply and interview for the second iteration of CaRMS, whereby unfilled post-graduate program spots across Canada are open for a second round of applications (including new application packages and in-person interviews). Many of these unfilled spots are located in rural Quebec, where the populations are primarily French-speaking, and are thus not accessible to the majority of Ontario graduates who are English-speaking. Unfortunately, the number of students remaining unmatched after the second iteration is also on the rise.

Historically, approximately ten to twenty medical students across Canada have gone unmatched each year after the second iteration of CaRMS. This remained relatively stable until 2011 when the number of unmatched medical students began to increase. The issue of unmatched medical graduates is particularly concerning in Ontario. Ontario generally has the largest number of unmatched medical graduates in the country given that our province has the greatest number of medical schools and medical students. Unfortunately, the number of unmatched medical graduates in Ontario has also increased significantly over the last decade. In the 2009 cycle, only one Ontario medical graduate remained unmatched after the second CaRMS iteration. In the 2018 cycle, 32 Ontario current-year medical graduates remained unmatched after the second iteration (Figure 2).
In Ontario, the ratio of residency program spots to applicants has been decreasing since 2009 (Figure 3). Compared to the rest of Canada, the declining ratio of spots-to-applicants in Ontario are disproportionately worse. As seen in Figure 3, in 2014 the ratio has dropped below 1:1 in Ontario after the second iteration. After the second iteration, Ontario has nearly as many unmatched medical graduates as the rest of Canada.

FIGURE 2: Number of current-year Ontario medical graduates unmatched after first and second CaRMS iteration. Source: CaRMS Data Reports, 2009–2018.

With each additional year, the previous year’s unmatched students are added to the current year’s applicant pool, compounding the issue of a rising number of unmatched medical students over time. This issue is projected to worsen, with an estimated 98 unmatched Canadian graduates by 2019, and 141 by 2021 (Figure 4).

RESIDENCY SPOT REDUCTIONS

In July 2015, the Ontario provincial government announced a 50-spot reduction in Ontario residency positions for Canadian Medical Graduates (OMA, 2015). This was declared to come into effect for the graduating class of 2016, for whom the CaRMS application opened in early September. This sudden change left many graduating students uncertain of their future, as they had planned their final year electives, research, and other activities based on the previous year’s residency position numbers. This uncertainty cascaded beyond the graduating class as this mismatch of residency positions to medical students affects all future graduates. Medical school class sizes are determined four years prior to their graduation year, so any change to residency positions results in a fixed mismatch for four consecutive classes. Therefore, this uncertainty extended far beyond the original 2016 graduating class.

However, this cut was not carried through exactly as promised. Beginning with the 2015 – 2016 year, there was a net reduction in 17 Ontario residency positions (Figure 5; CaRMS, 2016). These cuts contributed to a drop in the ratio of post-graduate residency spots to medical school graduates, which now sits at 1.02. This ratio is significantly lower than previous years due in part to the residency program cuts, and is projected to worsen over time with increasing numbers of unmatched graduates competing for the same positions with current graduates (Figure 6). Ideally, it is recommended a ratio of 1.2 be targeted to ensure adequate access to residency positions, while maintaining an appropriate mix of positions offered in all medical specialties (CFMS, 2018; AFMC, 2018).
**FIGURE 5:** Distribution of Canadian medical graduate residency position reductions in 2015 (by medical school). Note: The Northern Ontario School of Medicine had an increase of 7 total spots in the year of the cut, bringing the net change in number of positions to a reduction of 18, not the projected 25. *Source: CaRMS 2016.*

**FIGURE 6:** Trend of the ratio of residency positions to Canadian Medical Graduate applicants over time, including predictive modelling until 2021. *Source: AFMC Report, page 7 (ARMC Technical Subcommittee).*
In 2018, the number of unmatched Canadian medical graduates reached an unprecedented high of 123 after the second iteration (corresponding to 53 graduates from Ontario; CaRMS, 2018). This represents approximately four times more unmatched medical graduates compared to just 10 years ago. Around this time, advocacy initiatives from the OMSA engaged medical students and concerned Canadians. On April 17th, 2018, the provincial government announced a one-time increase in residency positions for Ontario medical school students that had graduated in the last six years (Ministry of Health and Long-term Care, 2018). These 53 positions were contingent on signing of two year return of service agreements, which necessitated two years of practice in an underserved region of the province following completion of training, and included Family Medicine, Internal Medicine, Emergency Medicine, Paediatric Medicine, and Psychiatry positions. At the same time, the Canadian Armed Forces worked with Family Medicine programs to make approximately 12 positions available for students committed to serving after their training (AFMC, 2018). Approximately 8 students began residency in 2018 under this program. While these were successful short-term solutions, without a concurrent permanent increase in residency spots at the provincial level unmatched medical graduates will continue to accumulate.

Additionally, in December 2018 the matching process within Ontario was modified so that the second iteration of CaRMS now includes two parallel streams, one for Canadian medical graduates and one for international medical graduates (CaRMS, 2018). Previously, there was a single stream in which Canadian and international medical graduates competed for the same spots. This change was in accordance with recommendations from the AFMC, with the goal of keeping the provision of total international medical graduate and Canadian medical graduate spots predictably consistent from year to year.

**IMPLICATIONS OF NOT MATCHING**

There are significant financial, psychological, and professional implications for medical graduates who go unmatched. The AFMC reports an average debt of $94 000 for medical graduates by the end of medical school (AFMC Annual Report, 2018). Regardless of the path they choose following an unsuccessful CaRMS match, unmatched graduates face significant financial burden. For instance, if students wish to enrol in an extended clerkship program, they will be expected to pay a reduced form of tuition or risk falling out of practice with their medical skills. If students alternatively choose to pursue graduate studies to improve the strength of their application instead, they will incur tuition costs for this additional training. Additionally, when it comes time for these students to re-apply to CaRMS, they will be required to repeat the costly application and interview process all over again. Repeating some or all of this process can be a significant source of both financial and emotional strain. This situation is further complicated by the fact that students may not have a source of income leading up to their re-application in the following cycle.

Some students may choose to leave medicine and enter fields such as health policy, research, or informatics (AAMC, n.d.). These alternate careers often require additional training or graduate studies, which result in additional expenses for tuition, housing, and living costs. Students who do not pursue further schooling will be required to start paying back their OSAP loans after 6 months, regardless of whether they have found stable employment in their alternate career. According to the announcement from the provincial government regarding changes to OSAP beginning in the 2019–2020 year, interest will start accruing immediately after graduation (Ontario Ministry of Training, Colleges and Universities, 2019). In addition, the decision to leave medicine may result in a significant emotional impact, as many students begin medical school with the intention to pursue clinical practice.

Not only is going unmatched costly for the medical student, it is also costly for the province. Consider that the cost to train one medical student is up to $260 000, much of which is borne by the province itself, and that upon leaving the profession they may use few of the skills for which they were trained at great cost (OAG, 2013). Alarmingly, in 2016 approximately 9.7% of Ontarians were without a family physician, contrasting sharply with the unnecessary waste of future physicians (Statistics Canada, 2016). Considering the cost to train a medical student and the cost
of unnecessary emergency visits that often arise from individuals without family physicians, forcing future physicians to abandon their career path is an ineffective use of taxpayer resources.

In addition to the financial strain, unmatched medical graduates also report significant psychological stress. Previous unmatched medical graduates have spoken candidly about the stigma of being unmatched by colleagues, which they reported to be present even upon successfully matching the following year. These students also reported feelings of isolation, and greater separation from their previous support systems (Izenberg, Marwaha, & Tepper, 2018).

**PHYSICIAN SERVICES PLANNING IN ONTARIO**

Physician services planning is a process in which the supply and distribution of healthcare providers is coordinated across Ontario. While the direct decisions about physician human resources planning are made by policymakers, physicians and physicians-in-training are rightful stakeholders in this process, and are essential in striking the right balance in the quantity, quality, and accessibility of healthcare provided for their patients.

The Ontario government is responsible for physician human resources planning, ensuring that the healthcare needs of Ontarians are met. Several models are created by the Ontario government using various data sources to project physician supply, demand, and distribution in both the present time and in the future.

The Assessing Doctors Inventories and Net-flows (ADIN) model is a key supply-based model that tracks the progression of a physician from medical school, post-graduate training, clinical practice, and retirement to project physician supply in each specialty for up to 19 years in the future (Cole, 2016). The model also accounts for migration, productivity, and attrition. Its utility is limited in isolation however, as it does not reflect whether the supply is appropriate relative to the needs of the population (Cole, 2016).

A needs based model is also utilized and is based on key population factors. The model takes into account disease incidence and prevalence in the context of socio-economic and lifestyle risk factors found in Ontarians (data derived from the Statistics Canada Canadian Community Health Survey). Key factors include: alcohol consumption, physical inactivity, smoking, income, perceived stress, et cetera. Within the module, each risk factor is weighted by disease (i.e. weighted by how much of an impact it has on disease development and physician resources required to treat) (Cole, 2016).

The MOHLTC and the OMA appointed the Conference Board of Canada to develop a Needs-Based Model (NBM; last updated in 2010), which uses a combination of supply and needs-based models to project a gap between the future supply of physicians and the future need for physicians (Figure 7) (Singh et al, 2010). The NBM compares the health needs derived from the needs based model, and compares it to the supply of physician services of the supply model. This is then used to identify mismatches, and thus project a future physician requirement (Singh et al, 2010). Many challenges lie ahead in planning for the future health workforce. Ontario’s population is rapidly aging with an increasing proportion of the population living with multiple chronic diseases. The evolving healthcare needs of the population makes it difficult to plan for the human resources allocation in health workforce (McMaster Health Forum, 2016). Further, the NBM has not been updated since its inception in 2010, leaving physician and health human resource planning as a whole without the most appropriate, up to date information that is desperately needed (Cole, 2016).
RECOMMENDATIONS

The rise in unmatched medical graduates negatively impacts the well-being and career prospects of Ontario’s medical students and diminishes the number of physicians able to serve patients across Ontario. This issue is complex, and requires collective action on the part of Ontario’s parliamentarians, Ministries, and medical faculty.

Below, OMSA details a number of key recommendations targeted towards parliamentarians that are actionable by the government and relevant Ministries. While these are a selection of strategies that address the issue at hand, they are only a part of the work that can be done by the government and its healthcare workers. Moving forward, it is important to engage in long-term, collaborative discussions to ensure the creation of a future physician workforce that meets the needs of Ontario’s medical graduates, but most importantly the needs of the patients we hope to serve.

PRINCIPLE #1: Create an adequate number of residency positions to ensure medical graduates can continue with postgraduate training

RECOMMENDATION #1

Given the rapid increases in unmatched students each year, the provincial government should commit to working collectively with national, provincial and territorial health ministers to establish the funds necessary to reach a minimum of 1.2 postgraduate residency positions per Canadian medical graduate.
The number of unmatched medical students has steadily increased each year, reaching a historic high in 2018 (CMA, 2018). The AFMC has identified the decreased ratio of CMGs to available residency positions as a significant contributing factor to this trend. With previously unmatched graduates re-entering the application pool and competing for a steady or even decreasing number of residency spots, the system has reached an unsustainable bottleneck.

In the past, a buffer between the number of residency positions and applicants accounted for factors such as medical students’ preference over a specialty and career changes or transfers between residency programs. Furthermore, previously unmatched graduates were able to be smoothly integrated back into the system. The idea that medical graduates should have the opportunity to pursue meaningful and desired career paths is greatly supported at the undergraduate and postgraduate level. However, this is becoming increasingly difficult to attain given a falling ratio of available positions (AFMC, 2018). In 2018, only 1.01 residency positions were available for every Canadian medical graduate, while the ratio of English-speaking positions to English-only applicants has dropped below 1, indicating that there are not enough residency positions to allow all medical students to enter the final stage of training required for practicing medicine (CaRMS, 2018). This is even more unfortunate as data has shown that over two thirds of graduates could have matched to their desired program if there was a sufficient number of residency spots available (Figure 8).

Last year, the Ontario government made a one time investment to fund 53 additional residency positions to unmatched Ontario medical school graduates. This announcement was positively regarded by the medical community as an important step in addressing the growing issue of unmatched graduates in a manner that is consistent with population health needs (OMSA, 2018; CMA, 2018). However, further action is necessary to ensure a sustainable long term solution, as it is predicted that the number of unmatched graduates will continue to rise if no additional changes are made (AFMC, 2018).

**FIGURE 8:** Categorizing unmatched Canadian Medical Graduates. Source: 2018 CCME CaRMS Forum: R-1 Data and Reports.
RECOMMENDATION #2

The Ontario government should commit to using the Physician Resource Planning Advisory Committee model to inform their allocation of postgraduate residency positions.

A key concern in the current strategy of residency spot allocation is the use of a national match system that depends on provincial funding and availability of positions. This makes coordination between provinces difficult, especially when some provinces may desire to cut spots while others add them, both without consultation of the others. While some provinces are taking their own steps to address unmatched graduates, such as the one time increase in residency spots by the Ontario government, there is no established national approach to address the outcomes of the residency matching process (AFMC, 2018).

The Physician Resource Planning Advisory Committee (PRPAC) is a national group led by the AFMC and the Federal/Provincial/Territorial Committee on Health Workforce (CHW), and has been mandated to identify and develop collaborative strategies for health human resource planning that meets the needs of the Canadian population. This committee has been working on the issue of unmatched medical graduates as a top priority, with a major pillar of their work plan focusing on ensuring an adequate training capacity for medical graduates. The PRPAC is releasing its final recommendation on the additional number of physicians needed in each province this year based on an evidence-based model of physician supply and demand (AFMC, 2017; CFMS, 2018). The Ontario government should commit to using this model to ensure the appropriate allocation of residency positions and support this goal both financially and logistically.

PRINCIPLE #2: Increasing transparency in physician services planning

There is a need for increased transparency between the MOHLTC, undergraduate, and postgraduate medical training programs, and medical students regarding physician services planning. Without reliable and comprehensive projections of physician workforce needs, medical trainees are left unprepared as they plan for post-graduate training, and are unable to factor in job prospects and the needs of Ontarians into their choices.

The MOHLTC has a duty to inform Ontario medical graduates, our future physicians, of the physician workforce planning process and allocation of post-graduate training program spots.

RECOMMENDATION #1

The MOHLTC should recognize medical students as key stakeholders in physician services planning and should directly involve students in consultations and decision-making processes whenever changes are being considered.

Medical students are a key stakeholder in Ontario’s healthcare system, particularly in regards to physician services planning. Currently, a member of the Ontario Medical Students Association (OMSA) is invited to the Health Workforce Planning Advisory Table, which meets one to two times each year. However, many changes to physician services planning, including allocation of post-graduate training spots, happen year-round and are not discussed at length at this Advisory Table. This suggests that there is very little consultation by medical students. As a result, students are both unable to provide input and unaware of potential changes that may affect their future career planning. OMSA recommends that students be involved in this work year-round, so that their unique perspective may be used to both inform new policy development, and to evaluate the potential effects of any past policy change from the student perspective. Committees working on HHR decision making should formally include medical students in its composition, and relevant and timely points from meetings should be shared with the medical student body.

RECOMMENDATION #2

There must be clear, timely, and consistent communication of physician workforce trends and societal needs by the MOHLTC to students and the HFO Marketing and Recruitment Agency.
Students make important decisions about their medical careers years before they actually apply for post-graduate residency positions. As a result, they need to be able to do so fully-informed about their career prospects and how these are tied to societal need. Social accountability is a pillar of medical education, and being able to factor Ontario’s need (which should be necessarily tied to the distribution of positions) into their decision making is paramount. The MOHLTC needs to regularly and consistently communicate physician workforce trends and plans to students to help address this gap. Specifically, any new information regarding health human resource planning should be disseminated to Ontario medical students through 1) OMSA, and 2) the Council of Ontario Faculties of Medicine. Both OMSA and the Deans of Medicine should be responsible to relay information efficiently and clearly to medical students in Ontario.

**RECOMMENDATION #3**

*The HFO Marketing and Recruitment Agency should use annual NBM updates, and the change in postgraduate residency positions to create a formal system whereby they visit each medical school annually to communicate this information to students.*

The HFO Marketing and Recruitment Agency assists in the planning, retention, and transition of health professionals in Ontario. One of their roles is to encourage medical students to select fields of study and geographic areas where there is highest demand. However, these presentations are often not well attended, and do not necessarily focus on the projected physician workforce needed to meet the needs of Ontarians.

OMSA recommends that the HFO publish a physician workforce report that is accessible to medical students and other trainees. An example of such a report is the 2017 Residency and Physician Workforce Trends document developed by Saskdocs, the Physician Recruitment Agency of Saskatchewan. The report provides comprehensive and up-to-date data regarding workforce trends and CaRMS matching. Specialty profiles provide province-specific information on the number of physicians in each specialty, communities with the specialty service available, age of practicing physicians, number of postgraduate residency positions (and location), remuneration statistics, and the results of previous CaRMS matching. These reports also include information at the national level, such as trends in the number of licensed physicians, CaRMS data, new graduates compared to new job postings, average weekly hours worked, and professional and work-life balance satisfaction. This document was created to provide students with the information they need to make informed decisions on career planning.

OMSA recommends producing a similar periodically updated report, informed by the annual updates to the NBM, so that HFO can ensure that students have reliable access to information necessary to plan for their future careers as the need for, distribution of, and allocation of physicians across Ontario changes.
REFERENCES


