

A brief report of aspiring medical student perceptions and behaviours concerning research experiences for selection into Canadian medical schools

Communication brève sur les perceptions et les comportements des futurs étudiants en médecine par rapport à la recherche en lien avec l'admission dans une faculté de médecine canadienne

Irene Chang,^{1,2} Laurie Yang,^{1,3} Asiana Elma,⁴ Stacey A Ritz,⁵ Lawrence Grierson^{1,4}

¹McMaster Education Research, Innovation and Theory, Faculty of Health Sciences, McMaster University, Ontario, Canada; ²Temerty Faculty of Medicine, University of Toronto, Ontario, Canada; ³Michael G. DeGroot School of Medicine, Faculty of Health Sciences, McMaster University, Ontario, Canada; ⁴Department of Family Medicine, Faculty of Health Sciences, McMaster University, Ontario, Canada

⁵Department of Pathology and Molecular Medicine, Faculty of Health Sciences, McMaster University, Ontario, Canada

Correspondence to: Lawrence Grierson, PhD, Department of Family Medicine, McMaster University, 100 Main St. W., Hamilton, ON, L8P 1H6; phone: (905) 525-9140 x22738; email: grierson@mcmaster.ca

Published ahead of issue: Aug 1, 2023; CMEJ 2023 Available at <https://doi.org/10.36834/cmej.76255>

© 2023 Chang, Yang, Elma, Ritz, Grierson; licensee Synergies Partners. This is an Open Journal Systems article distributed under the terms of the Creative Commons Attribution License. (<https://creativecommons.org/licenses/by-nc-nd/4.0>) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is cited.

Abstract

Background: Aspiring medical students behave based on their perception of what is valued in the selection process. While research experience is not explicitly considered in most Canadian admissions policies, it is commonly held as valuable within aspiring medical student communities. The purpose of this study is to describe the perceptions and behaviours of aspiring medical students with respect to gaining research experience in support of their medical school applications.

Methods: We surveyed prospective applicants of Canadian medical schools between August 2021 and November 2021, then compiled descriptive statistics pertaining to their perceptions and behaviours.

Results: Respondents affirmed the belief that research experience is valued in medical school admissions processes. They reported spending approximately 13 hours per week engaged in research, which usually did not yield publication or presentation recognition.

Conclusion: Aspiring medical students invest substantial time and energy in research experiences to benefit their applications. There is room for medical schools to be more transparent about the value of research experience in their admissions processes.

Résumé

Contexte : Le comportement des candidats aux études de médecine est déterminé par leur perception de ce qui est valorisé dans le processus de sélection. Tandis que la plupart des établissements canadiens ne mentionnent pas explicitement l'expérience en recherche dans leurs politiques d'admission, les futurs candidats, eux, voient une telle expérience comme un atout précieux. L'objectif de cette étude est de décrire les perceptions et les comportements des futurs étudiants en médecine par rapport à l'acquisition d'une expérience en recherche en appui à leur demande d'admission dans une école de médecine.

Méthodes : Nous avons interrogé des candidats potentiels à l'admission aux programmes de médecine au Canada entre août 2021 et novembre 2021, et nous avons compilé des statistiques descriptives relatives à leurs perceptions et à leurs comportements.

Résultats : Les répondants ont exprimé la conviction selon laquelle l'expérience en recherche est valorisée dans les processus d'admission aux facultés de médecine. Ils ont déclaré consacrer environ 13 heures par semaine à la recherche, qui, le plus souvent, n'a pas donné lieu à des publications ou des présentations.

Conclusion : Les futurs candidats aux études de médecine investissent beaucoup de temps et d'énergie dans des activités de recherche afin d'améliorer leur dossier de candidature. Les facultés de médecine devraient se prononcer de manière transparente sur l'importance attribuée à l'expérience en recherche dans le cadre de leur processus d'admission.

Background

Canadian medical schools operationalize myriad admissions policies to select students who distinguish themselves in cognitive ability, interpersonal competence, ethical judgement, social features, and life experiences.¹ These policies are meant to support their broader social aim of graduating physicians who will provide high quality healthcare to all Canadian communities.¹ However, the diversity of the admissions policy landscape can make it difficult for aspiring medical students (AMS) to know exactly what medical schools are looking for when choosing matriculants.² Recently, we appraised Canadian medical school admissions policies for evidence that AMS with research experience are favoured in selection decisions,² an idea held by many applicants.³⁻⁵ Notably, we found research experience to be ambiguously considered or explicitly disavowed as important within admissions policies.

This is concerning since policy theory describes that the perceived “*hidden curriculum of admissions*” can shape pre-application behaviours of AMS.⁶⁻¹⁰ Additionally, the ambiguity within admissions policies may lead to the phenomenon of conformity to peers, where the belief that research is tacitly valued within selection policies is shared amongst applicants,⁶ leading them to marshal their time and resources around activities that have little relevance.⁷ Yet, limited evidence exists on how AMS’ perceptions of the value of research experiences impact their pre-application behaviours. This study aimed to describe the perceptions and behaviours of AMS concerning research experience in support of admission to medical school and, to identify the important factors shaping these perceptions.

Methods

The research team developed and distributed an online survey (via LimeSurvey) to Canadian AMS in English and French between August and November 2021. The Hamilton Integrated Research Ethics Board provided ethics approval.

Study population

Eligible participants included current or graduated undergraduate/Collège d'enseignement général et professionnel (CÉGEP) students in Canada, with plans to apply to a Canadian medical school within the 2021-2026 application cycles. Current or former students of graduate programs were ineligible as they are usually required to conduct research as a degree requirement. It is assumed

students who enrol in such programs may perceive and participate in research differently than AMS not enrolled in graduate programs.

Survey

The research team constructed the survey according to the guidelines by Artino and colleagues (2014). First, we confirmed that an existing suitable survey tool had not already been published.¹¹ Then, we constructed our survey, which included questions about social identity, the perceived importance of research experience for admissions and for a physician’s work, and the sources informing these perceptions. Answers were provided via forced-choice, multiple choice, open response, or along 5-point Likert scales spanning responses of *strongly disagree*, *disagree*, *neutral*, *agree*, and *strongly agree* or *very unimportant*, *somewhat unimportant*, *neutral*, *somewhat important*, and *very important*. The survey was piloted with a small group of AMS and medical education experts to promote its utility and validity.

Recruitment

We recruited AMS through the research team’s personal networks, online forums (e.g., Premed 101 Forums), social media platforms (e.g., Facebook), and with the support of the Coalition of Canadian Undergraduate Health Programs, who circulated advertisements to their student bodies.

Data analysis

We generated descriptive statistics for respondents’ social identity characteristics, types of research experiences, perceptions of research experience importance, degree of research involvement, and information sources. Potential gender identity responses reflected the Statistics Canada classification system, which included man, woman, nonbinary, and “*prefer not to say*” options.¹² Since only one respondent indicated a non-binary response, gender analyses only compared man and woman respondents. A chi-square test assessed for associations between gender identity and type of research involvement. Independent samples t-tests assessed for gender differences in responses to questions about “research involvement,” “research output,” and “the ability to balance research work with other commitments.” SPSS 26.0 (IBM Corp., USA) was used for data analysis.

Results

There were 174 respondents ($n=120$, 69.0% women, $n = 51$, 29.3% men, $n = 1$, 0.6% non-binary, $n = 2$, 1.1% undisclosed). With approximately 11,000 Canadian medical

school applicants annually,¹³ we estimate a 1.5% response rate.

Respondents were predominantly enrolled in Bachelor of Health Sciences ($n = 120, 69.0\%$) and Bachelor of Science ($n = 49, 28.2\%$) undergraduate programs, with others in Engineering ($n = 1, 0.6\%$), Arts and Sciences ($n = 1, 0.6\%$), and Nursing ($n = 1, 0.6\%$) programs. Two (1.1%) respondents did not report their undergraduate program. Applications or intention to apply to Canadian medical schools in other provinces varied, with most indicating to apply or having applied to medical schools in Ontario and the fewest to Québec. Most respondents ($n = 102, 58.6\%$) did not intend to apply to an MD-PhD program.

Research involvement

A third of respondents ($n = 59, 33.9\%$) indicated they have never participated in research, and two thirds ($n = 114, 65.5\%$) indicated having some research involvement. Of the respondents who indicated research involvement, 43.0% ($n = 49/114$) have only been involved in unpaid and/or course-based research opportunities. Respondents indicated being involved in research for an average of 11.2 months (± 9.9) and estimated 13 hours (± 13.2) of involvement per week (Table 1). Analyses revealed no significant differences between respondent gender and research output or behaviours. We limited the research output analysis of AMS to respondents who indicated they are or have been involved in research ($n = 114, 65.5\%$). On average, 77.2% ($n = 88/114$) of AMS reported zero first-authored publications, and 71.1% ($n = 81/114$) reported zero co-authored publications (Table 1). In terms of presentations, respondents reported giving an average of 0.6 (± 1.1) presentations; however, 67.5% ($n = 77/114$) reported zero research presentations.

Perceptions of research experience

Fifty-three (30.5%) of all 174 respondents indicated disagreement or strong disagreement with the statement: “doing research is difficult for me to balance other aspects of my life”, compared to 68 (39.1%) who expressed agreement or strong agreement with this notion. Most participants indicated they are “interested in research” ($n = 144, 82.8\%$ agreed or strongly agreed) and feel “research is a worthwhile use of time” ($n = 135, 77.6\%$ agreed or strongly agreed). Most AMS agreed that research involvement would improve their chances of getting into medical school, and that medical schools value applicants with research experience. Despite this, ratings of

agreement to the statement “research experience is not required to gain admissions into medical school” were heterogeneous. Over a third of respondents ($n = 66, 37.9\%$) strongly disagreed or disagreed, and half of respondents ($n = 89, 51.1\%$) strongly agreed or agreed with the statement. Statements affirming the importance of having research publications, presentations, and experiences to gain admission to medical school received similarly mixed to high levels of agreement (Figure 1).

Table 1. Types of research involvement, output and perceived importance of research experience for the medical profession among AMS

No. (%) out of 174 respondents	
Type of Research Experience	Total (%)
Paid	65 (37.4)
Unpaid	72 (41.4)
Course-based	74 (42.5)
None	59 (33.9)
No answer	1 (0.6)
Sources of information that are rated somewhat important or very important in influencing AMS perspectives on the importance of research experiences for admissions	Total (%)
Current medical students and practicing physicians	154 (88.5)
Other premedical students	141 (81.0)
Medical school websites	131 (75.3)
Professors/faculty members	129 (74.1)
Online forums	107 (61.5)
Personal experience with the application process	107 (61.5)
Academic advisors	100 (57.5)
Premedical consulting groups	99 (56.9)
Medical school open houses	94 (54.0)
Social media	78 (44.8)
Friends or family	59 (33.9)
No. (%) out of 114 respondents	
Reported Time Commitment	Mean (SD)
Months of research involvement	11.2 (9.9)
Hours per week of research involvement	13.0 (13.2)
Hours per week seeking research opportunities	1.6 (3.7)
Research Products	Total (%)
First author publications	
0	88 (77.2%)
1	13 (11.4%)
2 or more	6 (5.3%)
No answer	7 (6.1%)
Co-author publications	
0	81 (71.1%)
1	12 (10.5%)
2 or more	15 (13.2%)
No answer	6 (5.3%)
Academic presentations	
0	77 (67.5%)
1	16 (14.0%)
2 or more	14 (12.3%)
No answer	7 (6.1%)

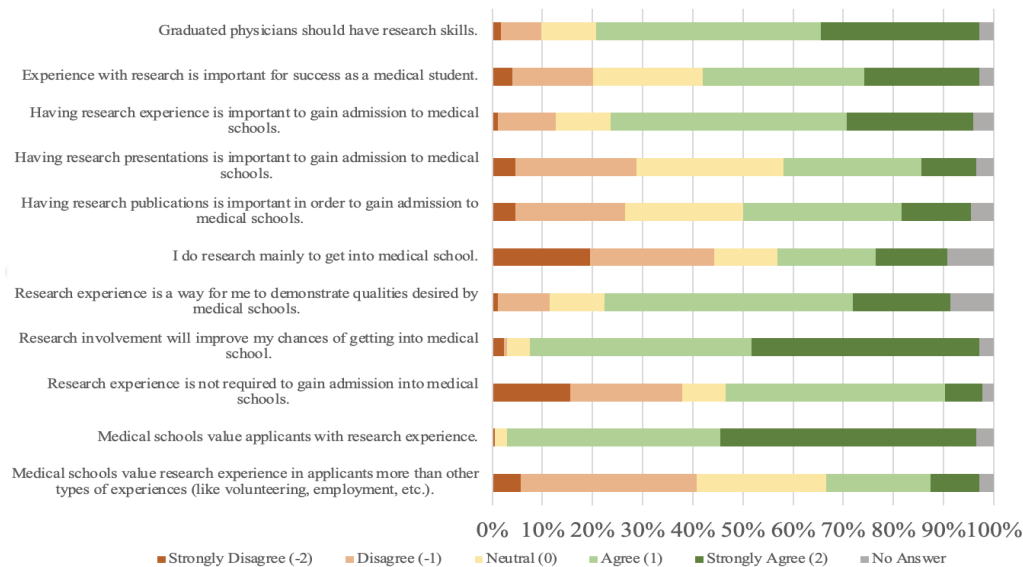


Figure 1. Perceived value of research experiences amongst aspiring medical students

Sources of information that shape AMS perceptions

Numerous sources of information were reported as very important or somewhat important in influencing AMS views on the importance of research experience. These included current medical students and practicing physicians ($n = 154$, 88.5%), other premedical students ($n = 141$, 81.0%), medical school websites ($n = 131$, 75.3%), and professors or faculty members ($n = 129$, 74.1%) (See Table 1 for full responses).

Discussion

Through a recent policy analysis, we determined that research experience is not explicitly considered by any Canadian admissions processes.² However, our survey data show that most AMS in Canada perceive research experiences as important for admission into medical school.

Our participants reported that AMS peers, medical students, and current physicians influenced their perception of the importance of research experiences for admissions. Herein, we speculate that this is an example of social conformity, where AMS adopt the belief that research experience is important because it is the “common-sense” of the wider community, rather than because of policy statements or evidence.¹⁴ Given the competitive nature of medical school admissions, AMS may feel compelled to pursue research experiences to ‘keep up’ with others.⁸ This could be especially problematic for socially- and financially-disadvantaged AMS who may face greater challenges in procuring these experiences.¹⁵⁻¹⁷

While respondents reported mixed opinions when asked whether they participated in research experience primarily to get into medical school, their strong levels of agreement to the statements “research involvement improves chances of getting into medical school” and “medical schools value applicants with research experience” (Figure 1) suggest a perception that research is beneficial to their applications. As would be predicted by policy theory and frameworks that describe the “hidden curriculum of admissions,”⁶⁻¹⁰ this perception likely affects how time and resources are marshalled amongst AMS. Respondents indicated spending an average of 13.0 hours per week on research activities, despite only small portion receiving financial compensation or formal recognition through publications or presentations. If it is not important for selection, then AMS are dedicating effort to endeavours that are seemingly not benefitting their applications or research dossiers. Fortunately, respondents indicated that they are generally interested in research activities.

Respondents to our survey represent a relatively small sample of applicants who apply to Canadian medical schools.⁹ As such, the data may not reflect all medical school AMS across Canada. The results should be interpreted with reasonable caution in the context of this limitation. Nevertheless, our study provides an inceptual description of Canadian AMS’ perception and behaviour regarding research and points to a need for further investigation on the topic.

Conclusion

AMS are engaging in considerable amounts of research—often unpaid and unacknowledged—to support their medical school applications. If research experience before medical school is deemed relevant to one's potential for success as a future physician, then this should be explicitly codified into admissions policies. Until this happens, Canadian medical schools should strive to make clear the true value of research experience within the selection process.

Availability of data and materials: Interested readers can contact the authors for additional material.

Conflicts of interest: The authors declare that they have no competing interests.

Funding: Not applicable.

Authorship: Irene Chang and Laurie Yang contributed equally as co-first authors.

References

1. AFMC. *Admission requirements of Canadian Faculties of Medicine for admission in 2023*. Ottawa, ON.
2. Yang L, Chang I, Ritz S, et al. Research experiences for Canadian aspiring physicians: a descriptive analysis of medical school admission policies concerning research involvement in Canada. *BMC Med Educ* 2022; 22: <https://doi.org/10.1186/s12909-022-03207-y>.
3. MedApplications. *5 tips to find a research position as a pre-med college student*. 2020. Available at <https://medapplications.com/5-tips-find-research-position-pre-med-college-student/> [Accessed on Apr 25, 2021].
4. Kowarski I. What type of research impresses med schools? *US News & World Report*. 2019. www.usnews.com/education/best-graduate-schools/top-medical-schools/articles/2019-05-30/what-type-of-research-helps-you-get-into-medical-school [Accessed on Apr 25, 2021].
5. Princeton Review. *6 ways for pre-meds to gain research experience*. 2021. Available at <https://www.princetonreview.com/med-school-advice/research-experience-for-medical-school> [Accessed on Apr 25, 2021].
6. Lin KY, Anspach RR, Crawford B, et al. What must I do to succeed?: Narratives from the US premedical experience. *Soc Sci Med*. 2014; 119: 98–105. <https://doi.org/10.1016/j.socscimed.2014.08.017>.
7. White J, Brownell K, Lemay J-F, et al. 'What do they want me to say?' the hidden curriculum at work in the medical school selection process: a qualitative study. *BMC Med Educ* 2012; 12: 1–9. <https://doi.org/10.1186/1472-6920-12-17>.
8. Razack S, Lessard D, Hodges BD, Maguire MH, Steinert Y. The more it changes; the more it remains the same: a Foucauldian analysis of Canadian policy documents relevant to student selection for medical school. *Adv Health Sci Educ*. 2014;19:161–81. <https://doi.org/10.1007/s10459-013-9468-2>
9. Hafferty FW. Beyond curriculum reform: confronting medicine's hidden curriculum. *Acad Med*. 1998;73:403–7. <https://doi.org/10.1097/00001888-199804000-00013>
10. Tummers L. Public policy and behavior change. *Public Admin Rev* 2019; 79: 925–930. <https://doi.org/10.1111/puar.13109>.
11. Artino AR, La Rochelle JS, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE Guide No. 87. *Med Teach*. 2014;36(6), 463–474. <http://doi.org/10.3109/0142159X.2014.889814>.
12. Government of Canada SC. *Classification of gender*. 2021. <https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TV=1326727> [Accessed on Apr 19, 2022].
13. AFMC. *Canadian Medical Education Statistics 2020*. Ottawa, ON.
14. Beran T. Research Advances in Conformity to Peer Pressure: A Negative Side Effect of Medical Education. *Health Profess Educ*. 2015; 1: 19–23. <https://doi.org/10.1016/j.hpe.2015.11.004>.
15. De Freitas C, Buckley R, Klimo R, et al. Admissions experiences of aspiring physicians from low-income backgrounds. *Med Ed*. 2021; 55: 840–849. <https://doi.org/10.1111/medu.14462>.
16. Michalec B, Hafferty FW. Examining the U.S. premed path as an example of discriminatory design & exploring the role(s) of capital. *Soc Theory Health* 2022; 1–28. <https://doi.org/10.1057/s41285-022-00175-7>.
17. Grace MK. Subjective social status and premedical students' attitudes towards medical school. *Soc Sci Med* 2017; 184: 84–98. <https://doi.org/10.1016/j.socscimed.2017.05.004>.