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Original Research

A rural practice affinity model: recognizing the role of emergency medicine competency

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Abstract

Introduction: Rural Canadians have poorer health indices than their urban counterparts and struggle with worse access to care due to an undersupply of physicians. Research has identified personal factors, such as being raised in a rural environment, and traits, such as lower harm avoidance, among those drawn to rural practice. As well, the impact of aspects of medical training, such as rural rotations, have been recognized in creating rural practice intentions, but the role of specific clinical competencies here has

yet to be determined. Emergency medicine is often one of the most challenging components of rural practice and thought by some to have its competencies poorly developed in family practice training. We hypothesized a model for rural practice affinity in which a strong sense of general self-efficacy would be independently mediated by the development of emergency medicine competence and rural practice self-efficacy, leading to stronger intentions to embark on a rural practice career.
Methods: This model was tested using the data from a survey of all family medicine residents nearing graduation from 14 of the 17 Canadian medical schools. Demographics and data on factors known to influence a rural career choice were collected and accounted for when determining the strength of the hypothesized relationships. Both existing and specifically designed survey tools were used to assess model components. A partial correlation matrix between the variables of interest (general self-efficacy, emergency medicine competency, rural practice self-efficacy, and rural practice intentions) – controlling for the effects of relationships, financial aspects, personal aspects, and social desirability – was created and subjected to a structural equation model.
Results: Our initial rural practice affinity model resulted in a poor fit of the model to the data. However, the addition of a pathway from emergency medicine competence to rural practice self-efficacy improved the model to one showing significant paths as hypothesized as well as excellent measures of fit.
Discussion: The importance of general self-efficacy is recognized and is itself mediated by the more specific rural practice self-efficacy to rural practice intentions, consistent with the literature. Emergency medicine competency has a central role in both mediating general self-efficacy to rural practice intentions, while also being mediated itself by rural practice self-efficacy to rural practice intentions. This provides new understanding in the development of rural practice self-efficacy. The link of emergency medicine competency to both rural practice self-efficacy and rural practice intentions suggests that this is a curricular area that deserves greater focus and consideration of how to ensure that residents are meeting emergency medicine requirements and receiving robust training in this area. This is especially important as there have been significant concerns from various groups on the efficacy of emergency medicine training in family medicine residency.
Conclusion: These findings will help inform residency program curriculum and pedagogies, underlining the critical role of emergency medicine competence to support rural physician identity formation and to improve physician recruitment to rural Canada.

Keywords

Canada, emergency medicine, medical education, physicians, rural health services, workforce.

Introduction

In Canada, the 18.7% of the population that is rural[1] is served locally by only 12.8% of family physicians and 2.2% of specialists[2]. Rural areas, clearly underserviced by physicians, are challenged with a population known to generally be older, poorer and sicker than the urban population[3], along with poorer patient access to care, an undersupply of healthcare professionals in general, and limited hospital resources[4]. Although medical students and early-career medical graduates interested in or already practicing rurally have been reported as being attracted to the wide scope of practice and have perceptions of tight-knit communities with strong connections and need for rural generalists[5-7], the challenging conditions faced by rural physicians have resulted in a struggle to fill rural practice openings. Between 2018 and 2022 this has resulted in a decrease in the number of rural physicians in some parts of the country[8]. The overall decline in MDs per capita[8] and unfilled family medicine residency spots[9] in Canada suggests that the challenges will continue to get worse, at least in the short term.

Over the years, a body of research has developed in response to the need to attract and retain more physicians in rural family medicine in a number of countries. Much of this research has focused on determining the factors and traits that are associated with medical students and residents choosing to practice in rural settings. These factors include personal aspects such as being raised in a rural setting, financial aspects, family ties, and lifestyle preferences[10,11]. In addition, rural doctors have been found to have particular mixtures of personal characteristics that appear conducive to managing the challenges of a rural and remote medical career. They have lower harm avoidance, being less anxious, more persistent, as well as having higher levels of self-directedness, which indicate a resilient personality[12,13]. Medical residents interested in rural practice have also been found to have similar traits[14]. That said, Eley et al (2019)[15] suggests that most medical learners have personalities that are suitable for rural practice.

Being a rural doctor has been described as requiring 'clinical courage'[16], as care provided may at times stretch physicians beyond their formal training. Rural doctors from a variety of countries describe aspects of this clinical courage including the need to be able to accept uncertainty and consistently strive to prepare, understand and make use of the available resources, know one's limits, and be there for the community as a whole[7]. It is expected that this 'clinical courage' would require a strong belief in one's abilities to do what is required in a rural healthcare setting. Such confidence and belief, ele self-efficacy, have been found to be associated with interest in rural medicine and rural practice intent, including in remote and very remote practice[17,18] as well as being a significant predictor of subsequent rural practice[19].

In considering how to improve the uptake of rural medicine by medical learners, it is important to consider how training and curriculum can influence rural practice intent. Although there have been no studies that we are aware of looking at rural practice self-efficacy at different points in the medical training, it is expected that this measure could be impacted by the medical school experience. Particular aspects of medical education, such as time spent in rural rotations[20] and the development of rural medicine confidence[18], have been studied and found to encourage rural medical careers. Other aspects of training – including exposure to telemedicine, GP role-models, methods to overcome uncertainty

and co-designed medical education – have also been found to explain the perceptions of medical learners interested in rural medicine[6].

Training and curriculum are also expected to impact rural medicine competencies, which in turn could be expected to influence rural practice intentions. The College of Family Physicians of Canada proposes 18 competencies in rural and remote medicine for evaluation in its certification, the majority of which are emergency-medicine-based, such as trauma, acute cardiac presentations and urgent respiratory presentations[21]. However, in their 2018 report, the Collaborative Working Group on the Future of Emergency Medicine in Canada described that those physicians trained in the specialty of emergency medicine did not believe that a general family medicine residency was an effective route to gain the competencies for the practice of emergency medicine[22]. Even The College of Physicians and Surgeons of Ontario had at one time declared that some family medicine graduates were not prepared for rural emergency medicine[23] and suggested a remediation framework but retracted the statement under political pressure. If family medicine residents also believe they are not developing emergency medicine competencies, could this alter their practice plans? Despite the scope of practice inherent in rural medicine, there has been little to no research to date related to the association between specific medical competencies and rural practice intentions.

In the current study, we propose the rural practice affinity model (Fig1) in which general self-efficacy, defined by Bandura as 'the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations'[24], leads to rural practice intentions when mediated by the medical training to develop both emergency medicine competency and rural practice self-efficacy.

In evaluating self-perceptions of competency in rural medicine, we focused on emergency medicine as it is a usual requirement for rural practice and, as previously stated, is a large focus of the College of Family Physicians of Canada's Priority Topics for the Assessment of Competence in Rural and Remote Family Medicine[21]. In addition, emergency medicine is perhaps one of the most challenging aspects of rural medicine, at times forcing one to manage critically ill patients with limited resources. Rural practice self-efficacy is also important to consider as competency and confidence can coexist, but they are not synonymous; they measure different characteristics, develop differently[25] and in medicine have been found to have a complex and weak relationship[26-28]. Demonstrating support for the model and understanding the relationship of its individual components to intentions for a rural career offers the potential to influence family physician resident selection, training and recruitment for rural medicine, all with the ultimate goal of improved access to rural health care.

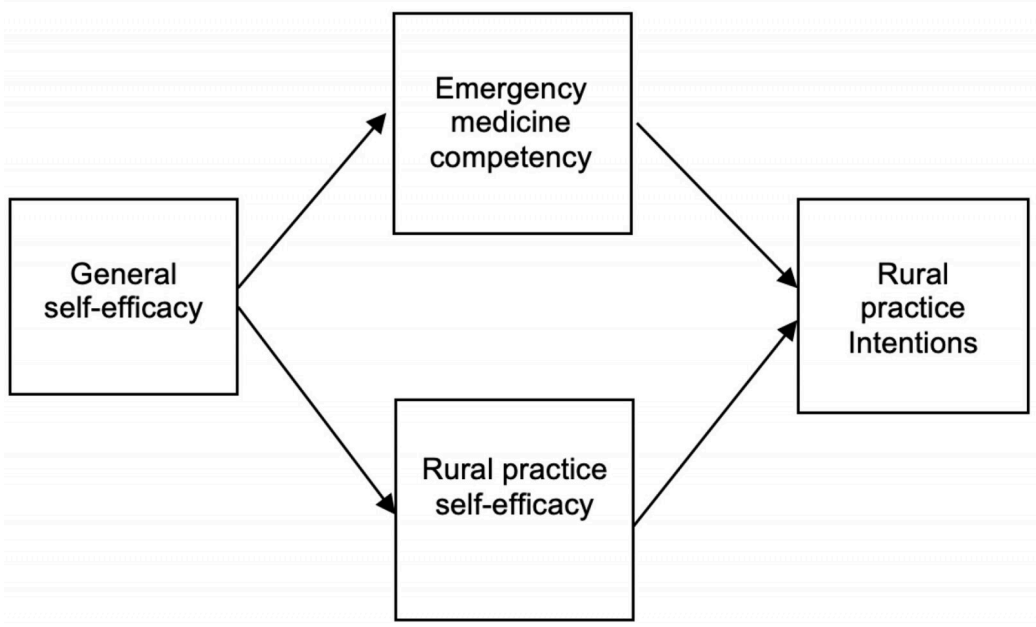

Figure 1: Components of proposed rural practice affinity model.

Methods

The data used to test the model was obtained via a survey of second year Canadian Family Medicine residents. The survey was created with the Qualtrics software tool (Qualtrics; https://www.qualtrics.com [https://www.qualtrics.com]) and was accessed by respondents following an email link. As an incentive, respondents could enter a draw for a CA$300 WestJet gift card, with one draw occurring for each of the Canadian medical schools participating.

A request to participate, along with a survey description and the appropriate research ethics approval, was sent to the academic directors of all 17 Canadian family medicine residency programs. Fourteen approved the proposed research. In 2021, 2 months prior to the usual family medicine graduation date, an email with the survey link embedded was sent to these programs for forwarding to their second-year residents.

Measures

Demographic and data on factors known to influence a rural career choice (personal links to rural communities, relationships supportive of rural practice, and financial incentives for rural

practice) were collected and accounted for when determining the strength of the hypothesized relationships.

Model component measures

General self-efficacy

General self-efficacy was assessed using the General Self-Efficacy Scale (GSE) [29,30]. The GSE has 10 items, each with four response options (1='not at all true' to 4='exactly true'). A sample item is 'I can always manage to solve difficult problems if I try hard enough'. The scores of each item are added to give an overall score. This scale provides a dispositional measure and, having been formally tested, has been found to measure a unitary concept. The overall score based on the items was used in the analyses.

Rural practice self-efficacy

Rural practice self-efficacy was assessed with a six-item scale. Each item had a five-point Likert-type response scale (from 1='strongly disagree' to 5='strongly agree')[18]. This scale was created by Isaac et al (2015)[18] based on the sources of self-efficacy as described by Bandura. A sample item is 'I see people like me taking up rural clinical practice'. When internal consistency was assessed, it was noted that the reverse-coding of two items caused the internal consistency of the measure as a whole to drop, which is not an uncommon problem with reverse-coded items[31]. These two items were removed, leaving a four-item scale. The overall score based on the items was used in the analyses.

Emergency medicine competency

Emergency medicine competency was assessed with a nine-item scale, each with a five-point Likert-type response scale (from 1='strongly disagree' to 5='strongly agree'). The scale was developed for this study, with each item being based on a different topic from the Canadian College of Family Physicians' document *Priority topics for the assessment of competence in rural and remote family medicine*[21]. The topics selected for inclusion in the scale were those that pertained most directly to clinical skills, for example 'I am competent in managing fractures and dislocations'. The overall score based on the items was used in the analyses.

Rural medicine practice intention

Rural medicine practice intention was initially assessed with nine items. One was based on an item from Isaac et al (2015)[18]: 'In which geographical location would you most like to practice on completing your training?' Three were from the SOMERS Index (2011)[32], one using a Likert-type scale of 1–10 for the ease of living in a rural area; two items using a Likert-type scale of 0–10 for interest in working in a city environment and intent to work in a rural environment. Two additional items used a five-point Likert-type scale and asked about the positiveness of rural training experience, and the establishment of relationships with specialists that serve rural areas. Two questions asked about the number of months selected to spend in a rural environment during medical school and in residency. Finally, participants were asked whether they were in a rural family medicine residency program. Because of the varied response formats of the items, these nine items were standardized to place them on a common metric. When internal consistency was assessed, it was again noted that the reverse-coded items reduced the internal consistency of the measure. These two items were dropped (SOMERS Index: ease of living in a rural area and intent to work in a rural environment). The remaining seven items formed a cohesive measure of rural medicine practice intention as an overall score that was used in the analyses.

Control variables

A number of variables were measured to statistically control for their effects in the test of the model. Three constructs that have been associated with rural practice intent were assessed. Although individual items made up the scales, the overall scores for the constructs were used in the analyses.

- relationships: a three-item, five-point Likert-type scale (from 1='strongly disagree' to 5='strongly agree') asking if partner (if relevant) is receptive to living in a rural area, degree of family ties to a rural environment, and whether raised in a rural environment.
- financial aspects: a three-item, five-point Likert-type scale (from 1='strongly disagree' to 5='strongly agree') asking about loan repayment programs requiring rural service, financial incentives for rural practice, and adequacy of financial remuneration in rural practice. While these three items had low internal consistency, when combined into a single scale there was small but significant correlation with rural practice intentions
- personal aspects: a four-item, five-point Likert-type scale (from 1='strongly disagree' to 5='strongly agree') asking about rural practice offering work–life balance, sufficient practice opportunities, lifestyle opportunities, and/or a satisfactory social network.

Socially desirable responding was assessed and controlled for with the 13-item short form of the Marlowe–Crown Social Desirability Scale[33]. Again, several (n=5) items suffered from the reverse-coding problem and were removed from the analysis, leaving an eight-item scale.

Analyses

Model fit testing

A partial correlation matrix between the variables of interest (general self-efficacy, emergency medicine competency, rural practice self-efficacy, and rural practice intentions) controlling for the effects of relationships, financial aspects, personal aspects, and social desirability was created (Table 1) and subjected to a structural equation model using the LISREL (2017) program. The partial correlations ensured that the effects of the control variables were taken into account prior to running the model analyses.

Structural equation modeling is a regression-based approach that analyzes researcher-specified multiple paths between variables simultaneously. One value of this type of analysis is that it provides statistical support (or non-support) for a hypothesized model as a whole. Various fit indices indicate whether the data collected fit the model the researcher has proposed. Ways to improve the fit of the model to the data are also provided as part of the results. Another value of this analysis is that it tests the statistical significance of each hypothesized relationship specified in the model. For models that include a measurement component, structural equation modeling also ascertains the coherence of the measurement aspect of the proposed model. Because our model used single indicators (each construct was measured by its single scale value), this measurement assessment was not part of the model. Another

advantage of this type of analysis is that it is possible to assess reverse-flow (eg feedback loops) between variables. However, our model hypothesized all forward-flow relationships between variables.

Table 1: Partial correlations of the rural practice affinity model variables

	General self-efficacy	Emergency medicine competency	Rural practice self-efficacy	Rural practice intentions
General self-efficacy	–	0.297	0.320	0.022
Emergency medicine competency	0.297	–	0.357	0.327
Rural practice self-efficacy	0.320	0.357	–	0.407
Rural practice intentions	0.022	0.327	0.407	–

Ethics approval

The primary research ethics approval (Romeo File No. 1467269) was obtained from Lakehead University Research Ethics Board.

Results

Sample and descriptive statistics

Approximately 1254 graduating family medicine residents from the 14 medical schools participating in the study received surveys[34]. Of those, 416 submitted responses for a 33.1% response rate. Seventeen respondents for whom large amounts of data were missing (one or more of entire scales were missing all items) were removed. Mean substitutions were made for three missing data points in the multi-item scales. The results following represent the 399 remaining respondents with little to no missing data.

Table 2: Respondent demographics and medical school

Characteristic		*n*	%
Age group (years)			
	<25	10	2.5
	25–29	255	63.9
	30–34	96	24.1
	35–39	20	5.0
	≥40	18	4.5
Gender			
	Female	264	66.2
	Male	132	33.1
	Non-binary	1	0.25
	Cis woman	1	0.25
	(Missing)	1	0.25
Medical school			
	University of British Columbia	55	13.8
	University of Toronto	51	12.8
	Dalhousie University	41	10.3
	Université de Montréal	36	9.0
	Université de Sherbrooke	35	8.8
	Université Laval	29	7.3
	McMaster University	29	7.3
	Northern Ontario School of Medicine University	26	6.5
	University of Ottawa	22	5.5
	University of Manitoba	21	5.3
	University of Western Ontario	19	4.8
	University of Calgary	15	3.8
	Memorial University	11	2.8
	Queen's University	4	1.0
	(Missing)	5	1.3

The description of the sample by age, gender, and medical school are summarized in Table 2. In addition, 373 (93.5%) were graduating in the year of the study and 121 (30.3%) were in a rural family medicine program.

Table 3 shows the scale, number of items, alphas, means, standard deviations, and ranges. Interestingly, neither age (r=0.03, p=0.57) nor gender (r=0.03, p=0.62) was related to rural intent. Thus, these were not included as control variables in the model.

Table 3: Scale descriptive statistics for model component measure scales

Scale	Number of items	Alpha	Mean	SD	Range
General self-efficacy	10	0.837	3.19	0.34	2–4
Emergency medicine competency	9	0.854	3.46	0.64	1–5
Rural practice self-efficacy	4	0.826	3.53	0.86	1–5
Rural practice intentions	7	0.768	0.00	0.65	–1.26–208
Relationships – rural	3	0.791	2.65	1.28	1–5
Financial	3	0.336	2.01	1.54	1–5
Personal – rural	4	0.718	3.68	0.78	1–5
Social desirability	8	0.747	2.50	0.65	1–5

SD, standard deviation.

Rural practice affinity model fit

Our initial rural practice affinity model resulted in a poor fit of the model to the data (Table 4). Modification indices suggested that there was a significant path from emergency medicine competency to rural practice self-efficacy that should be added for an improved fit. This made sense in that competence in the area highly relevant to rural practice should have a positive effect on residents' self-efficacy in rural practice. The revised model (Fig2) shows significant paths as hypothesized as well as excellent measures of fit (Table 4).

The paths are noted as beta values (similar in interpretation as are beta values in regression) and their significance is noted by the magnitude of the *z*-values (above 1.96 is significant). Fit indices should be at 0.90 and above, and the standardized root mean residual should be at 0.05 or below for a good fit of the model to the data.

Table 4: Rural practice affinity model fit statistics

Goodness of fit measure	Initial model index	Final model index
Goodness of Fit Index	0.95	0.99
Adjusted Goodness of Fit Index	0.73	0.85
Normed Fit Index	0.78	0.94
Comparative Fit Index	0.79	0.95
Standardized Root Mean Residual	0.10	0.05

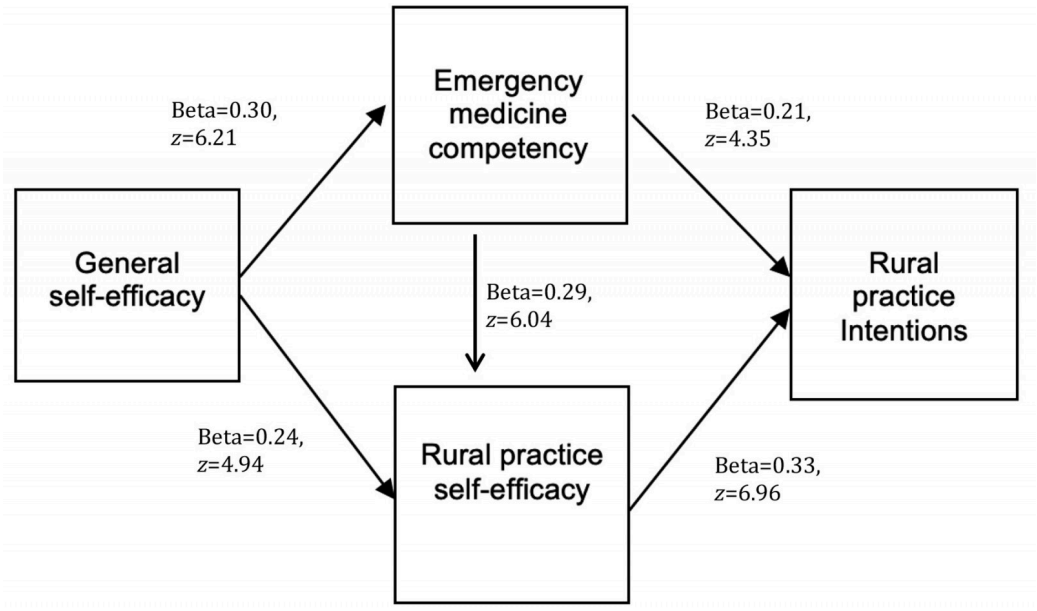

Figure 2: Final rural practice affinity model.

Discussion

While the initial configuration of our proposed rural practice affinity model was a poor fit, the modified model with the addition of the pathway of emergency medicine competency, mediated by rural practice self-efficacy, had excellent measures of fit with the data. The importance of general self-efficacy, a known mediator of personality traits and career intentions[35], is recognized and is itself mediated by the more specific rural practice self-efficacy to rural practice intentions, a finding consistent with previous findings in the literature[17,18]. Furthermore, emergency medicine competency, which has not to our knowledge been previously studied in terms of its association with rural practice intentions or rural self-efficacy, has a central role in both mediating general self-efficacy to rural practice intentions, while also being mediated itself by rural practice self-efficacy to rural practice intentions. The unpredicted pathway between emergency medicine competency and rural practice self-efficacy provides us with some new understanding of the development of rural practice self-efficacy.

The addition to the original model of the path from competence in emergency medicine to rural medicine confidence made sense theoretically, practically, and statistically. The relationship of competence with confidence in medical learners has not been found to be straightforward in studies[26-28]. However, our study finds a significant positive association between them. This supports the proposed model of competencies that are important in the practice of rural and remote medicine[21]. Furthermore, the link of emergency medicine competency to both rural practice self-efficacy and practice intentions suggests that this is a curricular area that deserves greater focus and consideration of how to ensure that residents are meeting emergency medicine requirements and receiving robust training in this area. This is

especially true when there are significant concerns from various groups on the efficacy of emergency medicine training in family medicine residency, as previously discussed.

It has been observed elsewhere that students encounter fewer patient presentations and procedures than recommended during emergency medicine rotations[36,37]. In rural settings, encountering all the required presentations may be even more challenging as emergency medicine volumes would be lower than in urban emergency medicine settings. Consequently, consideration may need to be given to alternative ways of ensuring that the required skills are acquired, particularly for learners interested in rural medicine. For example, there is evidence supporting the use of simulations as a way to improve confidence and skills for at least some types of presentations and procedures[38-40]. Further research is needed to better understand in which aspects of emergency medicine residents feel they require more training to be confident and competent, and the impact of initiatives to improve training. There may also be factors associated with the rural locations, such as remote support from larger centres, that would impact residents' feelings of emergency medicine competency. While this model included the competency of emergency medicine, future studies could evaluate the relative importance of other competencies as they relate to rural practice self-efficacy and career intentions.

This study has a number of shortcomings. The data are based on a cross-sectional survey and all measures are self-reported. Self-reporting of emergency medicine competency is known to not correlate well when compared with formal evaluations carried out by external observers[41]. Perhaps the self-reported competency is more reflective of confidence or self-efficacy in emergency medicine rather than actual competency. In addition, since the respondents had not yet graduated, this study measures rural practice intentions that may not reflect the actual outcomes. However, over 90% of the respondents were near graduation and soon establishing their practice location. At this end stage in medical training, intention is the most strongly associated with actual work location (rural/urban)[42] and the level of certainty of practice location and specialty is highest, within the order of 70% or higher having a strong certainty[43]. Unlike other studies that have focused on a single question to measure rural practice intentions[18,44], this study incorporates a number of elements into the measure of rural practice intentions that demonstrate previous pro-rural behavior and perceptions, such as time spent in rural placements and positiveness of rural training experience. We suggest that this approach provides a stronger likelihood of forecasting actual future behavior, although this deserves further study and analysis.

Conclusion

Deciding on launching a rural medical career is influenced by many factors, and this study establishes how the relationships between the personal trait of self-efficacy, the medical education outcome of emergency medicine competency and that of rural medicine self-efficacy relate to this professional outcome. The proposed model was supported and should lead us to consider who we encourage to embark in rural medicine and how we support them through their medical education in being successful in this goal.

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Conflicts of interest

The authors declare no conflicts of interest.

References

1 Statistics Canada. *Population growth in Canada's rural areas, 2016 to 2021*. 2022. Available: web link (Accessed 23 July 2025).

2 Canadian Institute for Health Information. *State of health workforce in Canada, 2022*. 2024. Available: web link (Accessed 23 July 2025).

3 Rourke JT. Postgraduate medical education for rural family practice in Canada. *Journal of Rural Health* 2000; **16(3):** 280-287. DOI link, PMid:11131775

4 Mitton C, Dionne F, Masucci L, Wong S, Law S. Innovations in health service organization and delivery in northern rural and remote regions: a review of the literature. *International Journal of Circumpolar Health* 2011; **70:** 460-472. DOI link, PMid:22030009

5 Woolley T, Larkins S, Gupta TS. Career choices of the first seven cohorts of JCU MBBS graduates: producing generalists for regional, rural and remote northern Australia. *Rural and Remote Health* 2019; **19(2):** 4438. DOI link, PMid:30943751

6 Charter L, Scully R, Laidlaw A. Charter L, Scully R, Laidlaw A. *Rural and Remote Health* 2023; **23(1):** 6750. DOI link, PMid:36802716

7 Konkin J, Grave L, Cockburn E, Couper I, Stewart RA, Campbell D, et al. Exploration of rural physicians' lived experience of practising outside their usual scope of practice to provide access to essential medical care (clinical courage): an international phenomenological study. *British Medical Journal Open* 2020; **10(8):** e037705. PMid:32847915

8 Canadian Institute for Health Information. *Supply, distribution and migration of physicians in Canada, 2022 - methodology notes*. Ottawa, ON: Canadian Institute for Health Information, 2023.

9 Duong D, Vogel L. Ontario, Quebec and Alberta lead record family medicine residency vacancies. *Canadian Medical Association Journal* 2023; **195(15):** E557-E558. DOI link, PMid:37068806

10 Royston PJ, Mathieson K, Leafman J, Ojan-Sheehan O. Medical student characteristics predictive of intent for rural practice. *Rural and Remote Health* 2012; **12(3):** 2107. DOI link, PMid:22873948

11 Davies L, Pace R. Rural versus urban general internal medicine - what factors are influencing resident's choice of practice? *Canadian Journal of General Internal Medicine* 2023; **18(2):** 31-42. DOI link

12 Eley DS, Leung JK, Campbell N, Cloninger CR. Tolerance of ambiguity, perfectionism and resilience are associated with personality profiles of medical students oriented to rural practice. *Medical Teacher* 2017; **39(5):** 512-519. DOI link, PMid:28281843

13 Eley D, Young L, Przybeck TR. Exploring the temperament and character traits of rural and urban doctors. *Journal of Rural Health* 2009; **25(1):** 43-49. DOI link, PMid:19166560

14 Eley D, Laurence C, Cloninger C, Walters L. Who attracts whom to rural general practice? Variation in temperament and character profiles of GP registrars across different vocational training pathways. *Rural and Remote Health* 2015; **15(4):** 3426. DOI link

15 Eley DS, Cloninger CR, Power DV, Brooks KD. The personalities of most medical students are suited to rural practice: Implications for rural education program recruitment. *Medical Teacher* 2019; **41(10):** 1160-1167. DOI link, PMid:31203681

16 Wootton J. President's message. Clinical courage. *Canadian Journal of Rural Medicine* 2011; **16(2):** 45-46.

17 Raftery D, Isaac V, Walters L. Factors associated with medical students' interest in remote and very remote practice in Australia: A national study. *Australian Journal of Rural Health* 2021; **29(1):** 34-40. DOI link, PMid:33556203

18 Isaac V, Walters L, McLachlan CS. Association between self-efficacy, career interest and rural career intent in Australian medical students with rural clinical school experience. *British Medical Journal Open* 2015; **5(12):** e009574. DOI link, PMid:26671960

19 Williams S, Gonzalez-Chica D, Morgan K, Herde B, McArthur L, Walters L. Undergraduate rural medical training experiences and uptake of rural practice: a retrospective cohort study in South Australia. *BioMed Central Medical Education* 2023; **23(1):** 217. DOI link, PMid:37020211

20 Lee YH, Barnard A, Owen C. Initial evaluation of rural programs at the Australian National University: understanding the effects of rural programs on intentions for rural and remote medical practice. *Rural and Remote Health* 2011; **11(2):** 1602. DOI link, PMid:21568620

21 College of Family Physicians of Canada. *Priority topics for the assessment of competence in rural and remote family medicine.* Available: web link (Accessed 30 April 2021).

22 Sinclair D, Abu-Laban RB, Toth P, LeBlanc C, Eisener-Parsche P and the Collaborative Working Group on the Future of Emergency Medicine in Canada (CWG-EM). Emergency medicine training and practice in Canada: celebrating the past & evolving for the future. *Canadian Journal of Emergency Medicine* 2017; **19(S2):** S1-S8. DOI link, PMid:28756801

23 Motluk A. Call for family doctors to have more emergency medicine training sparks debate. *Canadian Medical Association Journal* 2018; **190(28):** E864-E865. DOI link, PMid:30012805

24 Bandura A (Ed.). *Self-efficacy in changing societies.* New York, NY: Cambridge University Press, 1995.

25 Clanton J, Gardner A, Cheung M, Mellert L, Evancho-Chapman M, George R. The relationship between confidence and competence in the development of surgical skills. *Journal of Surgical Education* 2014; **71(3):** 405-412. DOI link, PMid:24797858

26 Davis DA, Mazmanian PE, Fordis M, Van Harrison R, Thorpe KE, Perrier L. Accuracy of physician self-assessment compared with observed measures of competence: a systematic review. *The Journal of the American Medical Association* 2006; **296(9):** 1094-1102. DOI link, PMid:16954489

27 Lai NM, Teng CL. Self-perceived competence correlates poorly with objectively measured competence in evidence based medicine among medical students. *BioMed Central Medical Education* 2011; **11(1):** 25. DOI link, PMid:21619672

28 Shah D, Haisch CE, Noland SL. Case reporting, competence, and confidence: a discrepancy in the numbers. *Journal of Surgical Education* 2018; **75(2):** 304-312. DOI link, PMid:29396274

29 Rosenberg, M. Rosenberg Self-Esteem Scale. *Rosenberg Self-Esteem Scale (RSES) [Database record]. APA PsycTests. 1965. (Society and the adolescent self-image).* Available: web link (Accessed 1 October 2018).

30 Schwarzer R, Jerusalem M. The general self-efficacy scale (GSE). *Anxiety Stress and Coping* 2010; **12:** 329-345.

31 van Sonderen E, Sanderman R, Coyne JC. Ineffectiveness of reverse wording of questionnaire items: let's learn from cows in the rain. *PLoS ONE* 2013; **8(7):** e68967. DOI link, PMid:23935915

32 Somers G, Jolly B, Strasser R. The SOMERS Index: a simple instrument designed to predict the likelihood of rural career choice. *Australian Journal of Rural Health* 2011; **19(2):** 75-80. DOI link, PMid:21438949

33 Reynolds WM. Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology* 1982; **38(1):** 119-125. DOI link

34 carms. *Quota and applications by discipline.* Available: web link (Accessed 1 October 2018).

35 Nauta MM. Self-efficacy as a mediator of the relationships between personality factors and career interests. *Journal of Career Assessment* 2004; **12(4):** 381-394. DOI link

36 Shaban S, Cevik AA, Canakci ME, Kuas C, El Zubeir M, Abu-Zidan F. Do senior medical students meet recommended emergency medicine curricula requirements? *BioMed Central Medical Education* 2018; **18(1):** 8. DOI link, PMid:29304795

37 Avegno J, Leuthauser A, Martinez J, Marinelli M, Osgood G, Satonik R, et al. Medical student education in emergency medicine: do students meet the national standards for clinical encounters of selected core conditions? *Journal of Emergency Medicine* 2014; **47(3):** 328-332. DOI link, PMid:24973051

38 Bayouth L, Ashley S, Brady J, Lake B, Keeter M, Schiller D, et al. An in-situ simulation-based educational outreach project for pediatric trauma care in a rural trauma system. *Journal of Pediatric Surgery* 2018; **53(2):** 367-371. DOI link, PMid:29103789

39 Johnson P, Brazil V, Raymond-Dufresne É, Nielson T. A simulated emergency department for medical students. *Clinical Teacher* 2017; **14(4):** 256-262. DOI link, PMid:27425036

40 Stroben F, Schröder T, Dannenberg KA, Thomas A, Exadaktylos A, Hautz WE. A simulated night shift in the emergency room increases students' self-efficacy independent of role taking over during simulation. *BioMed Central Medical Education* 2016; **16:** 177. DOI link, PMid:27421905

41 Weiss PM, Koller CA, Hess LW, Wasser T. How do medical student self-assessments compare with their final clerkship grades? *Medical Teacher* 2005; **27(5):** 445-449. DOI link, PMid:16147799

42 Playford D, Ngo H, Puddey I. Intention mutability and translation of rural intention into actual rural medical practice. *Medical Education* 2021; **55(4):** 496-504. DOI link, PMid:16147799

43 McGrail M, O'Sullivan B, Gurney T, Eley D, Kondalsamy-Chennakesavan S. Exploring doctors' emerging commitment to rural and general practice roles over their early career.

International Journal of Environmental Research and Public Health 2021; **18(22):** 11835. DOI link, PMid:34831590

44 Fatima Y, Kazmi S, King S, Solomon S, Knight S. Positive placement experience and future rural practice intentions: findings from a repeated cross-sectional study. *Journal of Multidisciplinary Healthcare* 2018; **11:** 645-652. DOI link, PMid:30519033