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A systematic review of reviews: Recruitment and retention of rural family physicians

Abstract

Introduction: The recruitment and retention of family physicians in rural and remote communities has been the topic of many reviews; however, a lack of consensus among them with regard to which factors are most influential makes it difficult for setting priorities. We performed a systematic review of reviews which helped to establish an overall conclusion and provided a set of fundamental influential factors, regardless of the consistency or generalisability of the findings across reviews. This review also identified the knowledge gaps and areas of priority for future research.

Methods: A literature search was conducted to find the review articles discussing the factors of recruitment or retention of rural family physicians. Results were screened by two independent reviewers. The number of times that each factor was mentioned in the literature was counted and ordered in terms of frequency.

Results: The literature search identified 84 systematic reviews. Fourteen met the inclusion criteria, from which 158 specific factors were identified and summarised into 11 categories: personal, health, family, training, practice, work, professional, pay, community, regional and system/legislation. The three categories referenced most often were training, personal and practice. The specific individual factors mentioned most often in the literature were 'medical school characteristics', 'longitudinal rural training' and 'raised in a small town'.

Conclusion: The three most often cited categories resemble three distinct phases of a family physician's life: pre-medical school, medical school and post-medical school. To increase the number of physicians who choose to work in rural practice, strategies must encompass and promote continuity across all three of these phases. The results of this systematic review will allow for the identification of areas of priority that require further attention to develop appropriate strategies to improve the number of family physicians working in rural and remote locations.

Keywords: Family physician, recruitment, retention, rural, systematic review of reviews

Résumé

Introduction: Le recrutement et la rétention des médecins de famille dans les communautés rurales et éloignées ont fait l'objet de nombreuses revues; il est toutefois difficile d'établir les priorités en la matière en raison de l'absence de consensus quant aux facteurs ayant la plus grande influence. Nous avons mené une revue sys-

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tématique des revues qui nous a aidés à tirer une conclusion d'ensemble et à réunir une série de facteurs fondamentaux d'influence, sans égard à l'uniformité des observations des revues ni à la possibilité de les généraliser. Les résultats de cette revue systématique nous permettront de déterminer quels sont les domaines prioritaires auxquels nous devons nous attarder dans le but d'élaborer les stratégies appropriées qui multiplieront le nombre de médecins de famille en région rurale ou éloignée. Cette revue a aussi fait ressortir les lacunes et les domaines prioritaires en recherche.

Méthodologie: La littérature publiée a été recherchée pour trouver les articles de synthèse traitant des facteurs de recrutement ou de rétention des médecins de famille en région rurale. Les résultats ont été dépouillés par deux réviseurs indépendants. Le nombre de fois où chaque facteur était mentionné dans les publications était compté et classé en fonction de la fréquence.

Résultats: La recherche de la littérature a relevé 84 revues systématiques. Quatorze répondaient aux critères d'inclusion; de celles-là, 158 facteurs ont été définis et résumés en 11 catégories: personnel, santé, famille, formation, pratique, travail, professionnel, rémunération, communauté, régional et système/législation. Les trois catégories qui sont revenues le plus souvent étaient formation, personnel et pratique. Les facteurs individuels mentionnés le plus souvent dans la littérature étaient « caractéristiques de l'école de médecine », « formation rurale longitudinale » et « grandi dans un village ».

Conclusion: Les trois catégories citées le plus souvent ressemblent à trois phases distinctes de la vie d'un médecin de famille: avant l'école de médecine, école de médecine et après l'école de médecine. Pour augmenter le nombre de médecins qui choisissent la pratique rurale, les stratégies doivent inclure et favoriser la continuité entre ces trois phases.

Mots-clés: médecin de famille, recrutement, rétention, rural, revue systématique de revues

INTRODUCTION

Recruiting and retaining family physicians in rural and remote practice is challenging.¹ Numerous strategies have been implemented,² but there is still an inadequate number of physicians choosing rural practice.¹

There are several systematic reviews involving rural recruitment and retention factors;³⁻⁵ however, to our knowledge, there is no study to summarise the findings of these reviews for decision-makers. The purpose of this study was to summarise the evidence to date regarding the factors that influence the recruitment and retention of family physicians to rural and remote practice and to identify areas that may benefit most from the strategic implementation of potential solutions.

METHODS

Data sources and search strategy

The literature was reviewed, generating a list of review articles relating to factors that influence family physician recruitment and retention in rural areas. In September 2016, with the assistance of a librarian, electronic databases including EMBASE, MEDLINE via PubMed,

CINAHL, Cochrane and PsycINFO were searched for specific key word search terms as well as MESH terms to identify the articles of relevance [Figure 1]. Review articles were deemed relevant for inclusion in this review if they discussed factors of recruitment or retention of rural family physicians. Articles were not excluded based on language, review type or review quality. Each review article was assessed using the GRADE approach,⁶ which grades systematic reviews based on the level of evidence provided, on a scale of 1-4, with 1 being poor and 4 excellent. Two independent reviewers assessed the quality of each article, and a third reviewer was used to reach a consensus, when necessary.

The list of recruitment and retention factors that were used as a guide for the extraction of data during this systematic review of reviews was taken from the primary author, Asghari *et al.*'s, previously published article.⁷ The 158 specific factors were organised into 11 categories: personal, health, family, training, practice, work, professional, pay, community, regional and system/legislation.

The review team (including the members of the research team, a librarian, members of the College of Family Physicians Canada and Advancing Rural Family Medicine [AFRM]) applied a

(recruit*[tw] OR retention[tw] OR retain*[tw] OR attract*[tw] OR "Personnel Selection"[MeSH] OR "manpower"[sh] OR "supply and distribution"[sh] OR "Training Support/economics"[Mesh] OR "Physician Incentive Plans"[Mesh] OR "Job Satisfaction"[Mesh] OR "Career Choice"[Mesh] OR "Professional Practice Location"[Mesh] OR "Residence Characteristics"[MeSH] OR "School Admission Criteria"[Mesh]) AND ("Physicians"[Mesh] OR physician*[tw] OR doctor*[tw] OR "Education, Medical"[Mesh] OR "Internship and Residency"[Mesh] OR "Students, Medical"[Mesh] OR "Schools, Medical"[Mesh]) AND ("Rural Population"[Mesh] OR "Rural Health Services"[Mesh] OR "Rural Health"[Mesh] OR "Hospitals, Rural"[Mesh] OR "Medically Underserved Area"[Mesh] OR remote[tw] OR rural[tw] OR isolated[tw]) AND (systematic[sb] OR review[pt] OR review[tj])

Figure 1: PubMed search terms used to identify the review articles. Mesh = Medical subject headings.

semi-Delphi method to reach a consensus on the comprehensiveness of the factors and to further divide them into three domains: personal, medical training and the practice.⁷ A more detailed explanation of the semi-Delphi method applied to this research can be found in Asghari *et al.*'s article.⁷

For the purpose of this review, the personal domain included attributes about the person (e.g., age, sex and ethnicity), their rural upbringing, health and family factors. The training domain encompassed all the aspects of medical school and residency. The practice domain included workplace, professional, pay, community, regional and system/legislation factors.

Data extraction and summarising

Factors influencing recruitment or retention were extracted from each systematic review to determine the number of times each factor had been cited throughout the literature. To ensure the same factor from the same reference was not extracted twice, the reference of each factor was tracked. Any identical factors originating from a reference that had already been recorded were excluded from the study. Two reviewers independently extracted the factors from each review article that were later collated. Once all the factors from each systematic review had been extracted, the count of each factor was determined, generating a list of the most frequently cited factors throughout the literature.

RESULTS

A total of 84 review articles were identified; however, 60 were removed at the title and abstract review stage because they did not relate to the factors influencing retention and recruitment of family physicians to rural practice. From this,

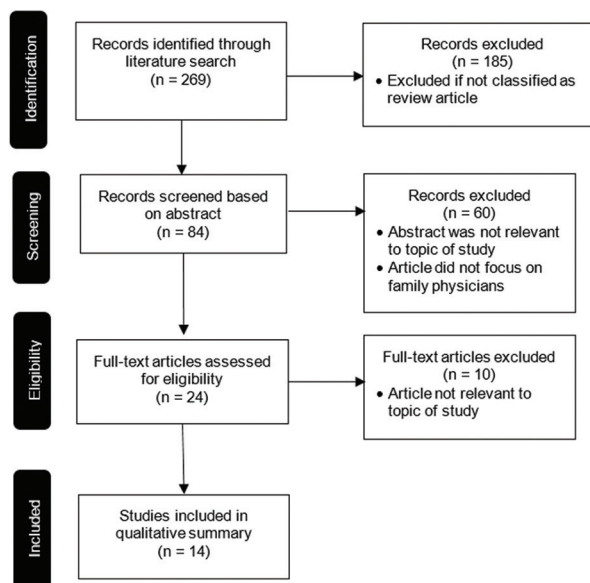


Figure 2: PRISMA diagram of the stepwise exclusion of articles.

a total of 24 full-text papers were screened for eligibility, and 14 review articles were included in the systematic review of reviews [Figure 2]. Table 1 summarises each literature review included in the review process accompanied by a GRADE score of 4, and the individual factor counts are listed in Table 2.

As shown in Table 2, the ten factors cited most frequently in the literature include (1) medical school characteristics (citations = 59); (2) longitudinal rural training in residency or clerkship (citations = 37); (3) rural background (citations = 37); (4) raised in small town (citations = 30); (5) rural rotations (citations = 26); (6) preferential admissions (citations = 26); (7) attitudes about rural practice in medical school (citations = 23); (8) sex/gender (citations = 24); (9) completion of high school in rural area (frequency of report = 18) and (10) choice of residency site (citations = 17).

Table 1: Summary table of each systematic review used in this systematic review of reviews

First author and year	Title	Search dates	Objective	Type of review	Number of studies	Search Terms Provided	Language of Included Articles	GRADE (1=poor 4=excellent)
Goodfellow, A. 2016 ⁴	Predictors of primary care physician practice location in underserved urban or rural areas in the United States: A systematic literature review	2007-November 2015	To review and analyse the medical literature to determine what factors are most strongly associated with localising primary care physicians in underserved urban or rural areas in the United States	Systematic review	72	Yes	Restricted to English	4
Verma, P. 2016 ⁵	A systematic review of strategies to recruit and retain primary care doctors	Inception-January 2015	To evaluate interventions and strategies used to recruit and retain primary care doctors internationally	Systematic review	51	Yes	No language restriction	4
Myhre, D.L. 2015 ¹⁶	Determinants of an urban-origin student choosing rural practice: A scoping review	January 1970-November 2014	To determine what factors are responsible for rural recruitment and retention of urban-origin students	Scoping Review	17	Yes	Restricted to English	3
Lee, D.M. 2014 ¹¹	Physician recruitment and retention in rural and underserved areas	1997-2014	To identify the challenges when recruiting and retaining rural physicians and to ascertain methods that make rural physician recruitment and retention successful	Literature review	Not reported	Yes	Restricted to English	2
Viscomi, M. 2013 ⁸	Recruitment and retention of general practitioners in rural Canada and Australia: a review of the literature	January 2000-June 2012	Exploration of the factors that attract and retain family practitioners in rural and remote areas of Canada and Australia and highlight similarities and differences between the countries	Literature review	86	Yes	Not reported	4
Ballance, D. 2009 ¹⁰	Factors that influence physicians to practice in rural locations: A review and commentary	1966-2008	To learn what strategies strengthen students' and residents' intentions to practice in rural areas, and how to retain physicians once they are located in such areas	Literature review	Not Reported	Yes	Restricted to English	2

Contd...

Table 1: Contd...

First author and year	Title	Search dates	Objective	Type of review	Number of studies	Search Terms Provided	Language of Included Articles	GRADE (1=poor 4=excellent)
Wilson, N. W. 2009 ¹²	A critical review of interventions to redress the inequitable distribution of health-care professionals to rural and remote areas	Inception to July 2008	To provide a comprehensive overview of the existing evidence regarding the efficacy of various strategies to recruit health-care professionals and retain them in rural communities	Critical review	110	Yes	Restricted to English	4
Ranmuthugala, G. 2007 ¹⁸	Where is the evidence that rural exposure increases uptake of rural medical practice?	Not reported	Examines the concepts of rural exposure and highlights the need to identify which aspects of rural exposure contribute to a positive attitude towards rural practice, thereby influencing students to return to rural areas	Literature review	11	Yes	Not Reported	2
Curran, V. 2004 ⁹	The role of medical education in the recruitment and retention of rural physicians	Not reported	To elaborate on some of the key strategies that have been identified in the literature	Narrative review	Not Reported	Not Reported	Not Reported	3
Hsueh, W. 2004 ¹³	What evidence-based undergraduate interventions promote rural health?	Not reported	The article identifies published reports of medical undergraduate rural programmes from international medical schools and investigates the features making these programmes successful in recruiting and retaining rural physicians	Literature review	59	Yes	Not reported	4
Laven, G. 2003 ³	Rural doctors and rural backgrounds: how strong is the evidence? A systematic review	1973-October 2001	To summarise the evidence for an association between rural background and rural practice by systematically reviewing the national and international published reports	Systematic review	12	Yes	Restricted to English	4

Table 1: Contd...								
First author and year	Title	Search dates	Objective	Type of review	Number of studies	Search Terms Provided	Language of Included Articles	GRADE (1=poor 4=excellent)
Brooks, R.G. 2002 ¹⁴	The roles of nature and nurture in the recruitment of primary care physicians in rural areas: A review of the literature	1990-2000	A systematic review on factors associated with recruitment and retention of primary care physicians in rural areas	Literature review	21	Not reported	Not reported	4
Humphreys, J. 2001 ¹⁷	A critical review of rural medical workforce retention in Australia	1991-April 2001	To identify what constitutes retention in the non-metro medical workforce and how it is best measured; to ascertain the correlates and determinants of non-metro medical workforce retention; to identify overlap and differences between medical workforce recruitment and retention; to outline why a specific research agenda focusing on clearly defined measures and definitions of retention is required and to put forward a conceptual framework around which this research might be conducted	Critical review	28	Yes	Not reported	3
Geyman, J.P. 2000 ¹⁵	Educating generalist physicians for rural practice: How are we doing?	Not reported	Focus on medical education programmes as well as other issues, including the effectiveness of programmes designed to select, recruit and retain generalist physicians in rural practice	Literature review	125	Yes	Not reported	4

In addition, a complete list of all factors extracted from each systematic review article is available from the authors on request.

Factors related to the person

Having a rural background before medical school was the strongest personal factor associated with choosing and remaining in rural practice. This factor was split into rural background (37 citations),^{3,8-12} raised in a small town (30 citations),^{3-5,8-16} completion of high school in rural area (18 citations),^{3,4,8,10,12} spouse from small town (9 citations),^{3,8,12,16} attracted to rural lifestyle (4 citations)^{8,9,11} and friends or family living in the area (3 citations),¹⁰ based on each article's definition. Having one or a combination of these factors was attributed to increased rural recruitment and retention. Another personal factor commonly reported was the person's sex (24 citations).^{3,8,10,12,14,15} Most of the reviewed studies found that males were more likely to choose and remain in rural practice than females; however, four of them found no effect between sex and rural practice.^{3,10,12,14} Another category related to the person was family factors. Although not well cited, a few studies found that spousal satisfaction (13 citations),^{8,10,11,15,17} likelihood of spousal employment (5 citations)^{8,15,17} and long distance from family (7 citations)^{8,15,17} influenced rural recruitment and retention. If the spouse was unable to find employment (2 citations), this deterred family practitioners from choosing that rural area.^{8,15}

Factors related to medical training

In addition to the personal characteristics, training a physician received influenced the likelihood of choosing and remaining in rural practice after completing residency. The most cited training factor was medical school characteristics (59 citations),^{3,4,8-18} as attending a medical school in a rural area with a rurally-focused curriculum increased the likelihood of choosing rural practice. Furthermore, schools that selectively recruited students with rural backgrounds produced more rural physicians than schools with no selective admission criteria (26 citations).^{5,9-11,13-15,18} The positive image of rural practice depicted by medical schools can instil positive attitudes towards rural

practice in medical students and this psychological influence has been cited in a number of articles as having a positive effect on rural physician recruitment (23 citations).^{8-10,11,15,16,17} Another aspect medical schools share is early and frequent exposure to rural rotations. Participating in rural rotations (26 citations)^{3,8-11,13-15} and longitudinal rural training clerkships and residency programs (37 citations)^{3,4,8-14,16,18} increased the likelihood of choosing and remaining in rural practice, particularly if these rural training exposures were perceived as positive experiences.

Factors related to rural practice

There was no single practice factor that dominated the literature. Instead, citations were widely disbursed among the factors, implying that multiple, interrelated factors contribute to an attractive and enjoyable rural practice. The most commonly cited practice factor was scope of practice (10 citations);^{8,11,16} rural jobs that offered a wide scope of practice and were within a physicians' realm of interest were more likely to attract and retain physicians. In terms of work factors, flexible work hours (11 citations)^{5,8,11,15,17} and manageable call schedules (11 citations)^{8-11,13,15,17} were attractive features of a rural practice and led to long-term retention. Opportunities for professional development, such as paid sabbaticals, attracted physicians to rural practice (14 citations)^{5,8,9,12,13,16,17} and similarly, a lack of opportunity for professional development deterred physicians from rural practice (4 citations).^{5,8,9,13}

The importance of pay factors was commonly cited, particularly in terms of financial incentives (14 citations).^{5,8,11,13,15,16} Communities who were willing to provide financial incentives were more likely to recruit physicians than those who were not. In terms of the specific community of rural practice, physicians placed value in the standard of education system for children, when choosing a practice location (10 citations).^{8,11,13,15,17} Once there, integrating into and enjoying the community were positive community factors in retaining physicians (8 citations).^{8,11,16,17} In addition, the presence of support networks in the form of consultants was cited as the most important regional factor when choosing a practice location (5 citations).^{8,11-13} System and legislation

Table 2: Factors Influencing Rural Recruitment and Retention

PERSON	
Personal	Health
Rural Background (37)	General Health (2)
Raised in Small Town (30)	Burnout (1)
Sex (24)	Family
Completion of High School in Rural Area (18)	Spousal Satisfaction (13)
Spouse from Small Town (9)	Long Distance Connection to Family (7)
	Likelihood of Spousal Employment (5)
	Family Enjoy Community (3)
	Childcare (3)
MEDICAL TRAINING	
Training	
Medical School Characteristics (59)	
Longitudinal Rural Training in Residency or Clerkship (37)	
Rural Rotations (26)	
Preferential Admissions (26)	
Attitudes about Rural Practice in Medical School (23)	
Choice of Residency Site (17)	
Rural Skills Loading (12)	
Early Visions of the Type of Doctor Students Want to become (11)	
PRACTICE	
Practice	Pay
Scope of Practice (10)	Fulfillment of Compulsory Services (14)
Innovative Practice Structure (5)	Financial Incentives (14)
Workload (4)	Adequate Amount and Mode of Remuneration (12)
Generalism (4)	Higher Salary (7)
Work	Medical School Loan Repayment (5)
Manageable Call Schedule (11)	Community
Flexible Hours (11)	Education System (10)
Locum Relief (8)	Integration into and Enjoying the Community (8)
Positive Work Environment (7)	Housing (7)
Collegiality of Physicians in Community (6)	Leisure Activities (6)
Professional	Feeling Appreciated by Larger Community (5)
Opportunity for Professional Development (14)	Regional
Research Opportunities (3)	Consultants (5)
Pursue a Professional Interest (1)	Regional Recruitment (4)
Legal Coverage (1)	Regional Support Networks (3)
System/Legislation	Assistance with Finding Spousal Employment (3)
Promotion (3)	Critical Access Hospital (2)
Burden of Bureaucracy (2)	
Involvement in Academic (1)	

factors [Table 2] were not deemed important predictors of rural recruitment or retention.

DISCUSSION

Rural background versus rural exposure – Are they one and the same?

Policies and processes that encourage/facilitate the admission of students who have a rural

background are one of the most well-documented strategies, leading to increased rural recruitment and retention.¹³ Being raised in a small town was one of the top three cited factors in the literature that lead to increased rural recruitment and retention. The advantage of coming from a rural background is having rural experiences to shape perception of rural living and practice. A rural background promotes stronger, more direct ties

from person to community;⁵ since this exposure happens before medical school, these students already have an idea of whether they are attracted or deterred from rural practice.

Studies differ on whether rural exposure in medical training remains predictive after adjustment for other factors. When controlling for rural background, Ranmuthugala *et al.* found that rural exposure in training was not a significant predictor of rural practice;¹⁸ however, another study showed that after controlling for other factors, both rural background and rural exposure during training independently impact the odds of working in rural practice.¹⁹

What driving factors are embedded during childhood rural exposure and can these factors be instilled in those without a rural background?

Rural background provides a connection to a community.⁵ However, rural exposure can also be a significant predictor of rural recruitment for urban-origin students;¹⁸ these students gain exposure from different experiences. We found that factors constituting rural exposure independent of rural background, such as having a rural partner, attending a rural medical school, rural undergraduate rotations, clerkship and residency, were also strongly cited predictors of rural recruitment. Urban-origin students felt that rural exposure during training helped them to feel appreciated and integrated into a community, leading to the development of a passion for rural practice.¹⁶ Exposing physicians to a rural lifestyle and practice during training may entice urban-origin trainees to practise rurally, even if it was not considered before, and this exposure may affirm whether rural practice suits them. More to the point, any rural exposure will not suffice; personalised matching to a practice and community suited specifically for the trainee will ensure the best rotation experience possible. Not surprisingly, it has been shown that a positive placement experience will attract a physician to rural medicine, whereas a negative experience will deter,^{8,9} particularly for students with no rural background and no solidified rural exposure from childhood to rely on.¹⁶ Ultimately, positive rural exposure, whether through background or training

placements, may be the ultimate attractor for rural practice, therefore highlighting the vital role of rural medical training in the recruitment and retention pathway.

Medical training – The missing link from person to rural practice

The three domains of recruitment and retention factors identified in this article fall into a sequential pattern: pre-medical school, medical school (medical training) and post-medical school. Within each of these domains, various factors have been frequently identified as important when attempting to increase the number of rural physicians. However, even though this information has been available for numerous years, there are still not enough family physicians choosing rural practice.¹ The problem could be that this continuum of recruitment and retention factors is being addressed in a piecemeal fashion, whereas a more holistic approach addressing multiple factors simultaneously might be more successful. Rural practice is currently viewed as homogeneous during medical training; preparing medical trainees for rural practice in general will entice them to choose a rural community for practice.¹⁵ However, once in practice, undesirable on-call schedules, inadequate considerations for families and not being integrated into the community are the factors that deter physicians and reduce retention. The communities are often blamed for not offering an attractive practice.^{9,16} To be retained, the rural community they choose must offer a practice that meets their desired 'wish list'.²⁰ The solution to this problem is not to promote homogeneous community practice but promote matching of students to these heterogeneous practices during medical training. It has been shown that physicians are more likely to practise where they train,⁹ so why not train physicians in a place they are more likely to practise? Enhancing continuity between the person and community practice through training may ensure that the appropriate physicians are matched to the appropriate community, based on their desires and individual circumstance. Testing students on their 'wish list' for practice and personal attributes may help to highlight community practices that would be a good fit. In a qualitative study, a rural physician explicitly

stated, 'we need to train physicians in the location that best approximates their future practice'.⁷

Limitations

This systematic review of reviews identified factors which are consistently reported as having a high degree of influence with regard to the recruitment and retention of physicians in rural and remote areas. We could not perform, or find articles, that included meta-analysis which is due to a lack of systematic reviews that reported summary statistics in a manner that would allow for the determination of which factors were found to be the strongest predictors and which showed inconsistent or weak associations.

A relatively small number of reviews reported that having a 'rural background', 'spouse with rural background' or having experienced 'rural training in residency or clerkship' were the strong predictors for rural and remote recruitment and retention. However, this was not corroborated by the majority of the reviews captured in our search. A deeper scan of the individual studies included in the captured reviews provided evidence that effect size, and statistical significance varied by location, time and sample size.

There is an inherent bias towards the older literature, as newer articles have fewer potential systematic reviews to be included in. We attempted to control for this bias by ensuring that each reference associated with a factor was only counted once, regardless of the number of reviews the reference appeared in. Furthermore, the quality of the information extracted from the review articles reflects the quality of the article itself.

CONCLUSION

The results of this systematic review of reviews revealed that the categories with the most influence over recruitment and retention were personal factors, training factors and practice factors, which relate to three different stages of a family physician's life: childhood experiences, educational experiences and in-practice experiences. To recruit and retain more physicians in rural and remote settings, it is important that policies are implemented to address all these three stages. With this, it is evident that future strategies must encompass and promote continuity across

all three of these phases to successfully increase the number of physicians who choose to work in rural practice. We anticipate that this review will be beneficial to policy and decision-makers alike, in that it will provide a clear and concise summarisation of the vast information that is currently available.

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REFERENCES

1. Bosco C, Oandasan I. Review of Family Medicine Within Rural and Remote Canada: Education, Practice, and Policy. Mississauga, ON: College of Family Physicians of Canada; 2016.
2. 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. *Int J Circumpolar Health* 2011;70:460-72.
3. Laven G, Wilkinson D. Rural doctors and rural backgrounds: How strong is the evidence? A systematic review. *Aust J Rural Health* 2003;11:277-84.
4. Goodfellow A, Ulloa JG, Dowling PT, Talamantes E, Chheda S, Bone C, *et al.* Predictors of primary care physician practice location in underserved Urban or rural areas in the United States: A Systematic literature review. *Acad Med* 2016;91:1313-21.
5. Verma P, Ford JA, Stuart A, Howe A, Everington S, Steel N. A systematic review of strategies to recruit and retain primary care doctors. *BMC Health Serv Res* 2016;16:126.
6. Atkins D, Best D, Briss PA, Eccles M, Falck-Ytter Y, Flottorp S, *et al.* Grading quality of evidence and strength of recommendations. *BMJ* 2004;328:1490.
7. Asghari S, Aubrey-Bassler K, Godwin M, Rourke J, Mathews M, Barnes P, *et al.* Factors influencing choice to practise in rural and remote communities throughout a physician's career cycle. *Can J Rural Med* 2017;22:92-9.
8. Viscomi M, Larkins S, Gupta TS. Recruitment and retention of general practitioners in rural Canada and Australia: A review of the literature. *Can J Rural Med* 2013;18:13-23.
9. Curran V, Rourke J. The role of medical education in the recruitment and retention of rural physicians. *Med Teach* 2004;26:265-72.
10. Ballance D, Kornegay D, Evans P. Factors that influence physicians to practice in rural locations: A review and commentary. *J Rural Health* 2009;25:276-81.
11. Lee DM, Nichols T. Physician recruitment and retention in rural and underserved areas. *Int J Health Care Qual Assur* 2014;27:642-52.
12. Wilson NW, Couper ID, De Vries E, Reid S, Fish T, Marais BJ. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. *Rural Remote Health* 2009;9:1060.

13. Hsueh W, Wilkinson T, Bills J. What evidence-based undergraduate interventions promote rural health? *N Z Med J* 2004;117:U1117.
14. Brooks RG, Walsh M, Mardon RE, Lewis M, Clawson A. The roles of nature and nurture in the recruitment and retention of primary care physicians in rural areas: A review of the literature. *Acad Med* 2002;77:790-8.
15. Geyman JP, Hart LG, Norris TE, Coombs JB, Lishner DM. Educating generalist physicians for rural practice: How are we doing? *J Rural Health* 2000;16:56-80.
16. Myhre DL, Bajaj S, Jackson W. Determinants of an urban origin student choosing rural practice: A scoping review. *Rural Remote Health* 2015;15:3483.
17. Humphreys J, Jones J, Jones M, Hugo G, Bamford E, Taylor D. A critical review of rural medical workforce retention in Australia. *Aust Health Rev* 2001;24:91-102.
18. Ranmuthugala G, Humphreys J, Solarsh B, Walters L, Worley P, Wakerman J, *et al.* Where is the evidence that rural exposure increases uptake of rural medical practice? *Aust J Rural Health* 2007;15:285-8.
19. Rourke JT, Incitti F, Rourke LL, Kennard M. Relationship between practice location of Ontario family physicians and their rural background or amount of rural medical education experience. *Can J Rural Med* 2005;10:231-40.
20. Laurence CO, Williamson V, Sumner KE, Fleming J. 'Latte rural': The tangible and intangible factors important in the choice of a rural practice by recent GP graduates. *Rural Remote Health* 2010;10:1316.

COUNTRY CARADIOGRAMS

Have you encountered a challenging ECG lately?

In most issues of CJRM an ECG is presented and questions are asked.

On another page, the case is discussed and the answer is provided.

Please submit cases, including a copy of the ECG, to Suzanne Kingsmill,
Managing Editor, CJRM, 45 Overlea Blvd., P.O. Box 22015, Toronto ON M4H 1N9;
manedcjrm@gmail.com

CARDIOGRAMMES RURAUX

Avez-vous eu à décrypter un ECG particulièrement difficile récemment?

Dans la plupart des numéros du JCMR, nous présentons un ECG assorti de questions.

Les réponses et une discussion du cas sont affichées sur une autre page.

Veuillez présenter les cas, accompagnés d'une copy de l'ECG, à Suzanne Kingsmill,
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