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The Importance of Attachment to Place in Growing a Sustainable Australian Rural Health Workforce: A Rapid Review

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The Importance of Attachment to Place in Growing a Sustainable Australian Rural Health Workforce: A Rapid Review

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Lisa Beccaria: Conceptualisation (lead); funding acquisition; methodology (lead); writing original draft; formal analysis; project administration; writing (review and editing). **Peter McIlveen:** conceptualisation, formal analysis, original draft preparation, writing (review and editing). **Erich Fein:** conceptualisation, methodology, formal analysis, original draft preparation writing (review and editing). **Tricia Kelly:** conceptualisation (supporting), methodology, resources, data curation, writing (review and editing). **Rowena McGregor:** conceptualisation (supporting), methodology, resources, data curation, writing (review and editing). **Rana Rezwanul:** data curation, writing (review and editing).

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Abstract

Introduction: Personal, community and environmental factors can influence the attraction and retention of regional, rural and remote health workers. However, the concept of place attachment needs further attention as a factor affecting the sustainability of the rural health workforce.

Objective: The purpose of this rapid review was to explore the influence of a sense of place in attracting and retaining health professionals in rural and remote areas.

Design: A systematic rapid review was conducted based on an empirical model using four dimensions: place dependence, place identity, social bonding, and nature bonding. English-language publications between 2011 and 2021 were sought from academic databases, including studies relevant to Australian health professionals.

Findings: A total of 348 articles were screened and 52 included in the review. Place attachment factors varied across disciplines and included (a) intrinsic place-based personal factors (b) learning experiences enhancing self-efficacy and rural health work interest, (c) relational, social and community integration and (d) connection to place with lifestyle aspirations.

Discussion: This rapid review provides insight into the role of relational connections in building a health workforce, and suggests that community factors are important in building attachment through social bonding and place identity. Results indicate that future health workforce research should focus on career decision-making and psychological appraisals including place attachment.

Conclusion: An attachment to place may develop through placement experiences or from a strong rural upbringing. The importance of the relational interactions within a work community and the broader community are seen as important factors in attracting, recruiting and sustaining a rural health workforce.

Keywords: place, health workforce, attraction, retention, rural

What is already known on this subject:	What this study adds:
• Personal, community and environmental factors can influence the attraction and retention of health workers within a regional, rural and remote setting.	• Using an empirical model of place attachment, this rapid review provides further insight into the important role of relational connections in the general community for building a health workforce. • Future rural health workforce research should focus on career decision-making and psychological appraisals incorporating place attachment. • The need to examine place attachment in a wider allied health group of regulated and self-regulated allied health professionals. • Place attachment needs to be further explored in remote locations in Australia • Need for policy to establish longitudinal surveys for Allied Health and Nursing across Australia

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Introduction

Calls for a national strategy for improving rural health[1] include political sentiments about decentralization such as “regional Australia is ready to welcome…people with open arms”.[1] However, these allusions to a bucolic life are incomplete without evidence to suggest what “lifestyle” factors impact upon the recruitment and retention of healthcare workers in rural and remote locations.

Notable job-related factors predict recruitment, retention and turnover of healthcare workers. For example, organisational commitment, job satisfaction, and turnover cognitions, are predictors of actual turnover in nurses.[2] In contrast, financial incentives for recruitment and retention of GPs may have inconsistent effects and, moreover, are a short-term strategy unsuited to long-term retention of healthcare workers.[3] Indeed, broader meta-analytic research reveals a small correlation between pay level and job satisfaction ($r = .15$; CI 95% .12–.18; $N = 18{,}460$).[3]

Beyond job-related factors and financial incentives, there are social determinants, or psychosocial factors associated with attracting and retaining healthcare workers in regional areas.[3,4] Cosgrave et al. conceptualised the findings of their systematic review of research into the social determinants of retention highlighting the potential influence of sense of belonging and attachment to place and identity in place on practitioners’ reasons to stay in a regional location.[4] Critically, Cosgrave et al[4] argued for the use of conceptual frameworks and further research into place-based social processes within research on retaining healthcare workers in regional areas.

The present rapid review extends from the findings of Cosgrave et al[4] in two ways. First, we specifically focus on research into the effects of one of the social determinants, place attachment[5,6] by using an empirically-derived model of place attachment developed by Raymond et al to inform the review.[6] Much of the research on rural health workforce retention has produced lists of factors (e.g., financial incentives, access to training, and family), but it is not coherently interpreted in terms of a theoretical framework. Thus, in response to Cosgrave et al[4] recommendation for employing conceptual frameworks, our second aim is to enhance the findings by using a predominant theory of career decision-making, namely the social cognitive career theory (SCCT) which has accreted more than two decades of empirical evidence and applications to career decision-making and satisfaction.[7]

The idea of place attachment outlined by Raymond et al can be is viewed within a combination of personal, community and environmental connections, and that attachment to

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place can conceptualised within personal, community and natural environment context. Raymond et al (2010) hypothesised and tested four dimensions related to place attachment via four dimensions: place dependence, place identity, social bonding, and nature bonding.[6] Place dependence pertains to physical context and resources, the "functional connection based specifically on the individual physical connection to a setting; … it reflects the degree to which the physical setting provides conditions to support an intended use" (p. 426). Place identity involves defining oneself with respect to place, the "dimensions of self, such as the mixture of feelings about specific physical settings and symbolic connections to place, that define who we are" (p. 426). Social bonding pertains to emotional connections and belonging to others, the "feelings of belongingness or membership to a group of people, such as friends and family, as well as the emotional connections based on shared history, interests or concerns" (p. 426). Nature bonding is meaningful and historical connections to the non-human, natural environs, as an "implicit or explicit connection to some part of the non-human natural environment, based on history, emotional response or cognitive representation (p. 426). Raymond's empirical model[6] and its operational definitions of place attachment act as the parameters of our rapid review and allow us to address the definitional problem noted in research literature.[5,8] Whilst there is some evidence that place attachment is negatively associated with workers' intent to quit or relocate[9], place attachment's effects on recruitment and retention are unclear. The present research closes that gap by addressing the research question: What factors related to place attachment, influence health practitioners' career decisions about working in rural and remote Australia?

With respect to our second aim of deploying a theoretical framework of career decision-making, Figure 1 depicts the SCCT model of factors that should be considered significant for attracting and retaining health care workers. Here "choice actions" represent healthcare practitioners' ultimate decision to work in a rural location, and thus serve as the core concern of our review. Choice actions are a response to goals and career interests, which are driven by a practitioner's self-efficacy and outcome expectations. For example, a practitioner who believes, "I have the confidence in myself to work in rural practice setting (self-efficacy) and that work will benefit myself and my family (outcome expectation)" will likely be sufficiently interested to set goals and ultimately commit to a decision about rural practice. This putative chain of cognitive effects is influenced by contextual factors which are frequently evident in the research literature as supports and barriers to rural practice. With respect to the present research, place attachment is conceptualised as a personal input that affects proximal contextual

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influences. Thus, in our present review we aimed to organise findings in terms of the SCCT, as depicted in Figure 1.

Place Figure 1 Here

Method

This research uses a rapid review method. A rapid review enables a systematic approach to the literature within a short timeframe. This review was completed between November 2020 and February 2021. This rapid review followed an established framework[10] which includes establishing a clearly formulated research question, leading to a set of minimum requirements for established searching strategies and data extraction, to additional steps to reduce bias. Measures to reduce bias included searching multiple databases and reviewing all initial screening results and full texts independently by two reviewers. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement[11] was used to represent the initial search results and subsequent screening outcomes.

Search Strategy and Methodological Quality

Using dimensions of the Raymond et al[6] model, the following full search strategy was developed: ("sense of place" OR identity OR connection OR embedded* OR belonging OR attachment OR friend* OR family OR families OR "social network" OR "social bond" OR "social networking" OR "social bonding" OR "social networks" OR "social bonds" OR environment*) AND (rural OR regional OR outback OR remote) AND ("health worker" OR "health workforce" OR "healthcare workforce" OR nurs* OR medic* OR doctor? OR physiotherapist? OR dentist? OR "physical therapist" OR "physical therapists" OR paramedic* OR "allied health") AND (career OR job OR workplace OR recruitment OR retention OR turnover) AND Austral*

This search strategy applied to the databases is outlined in Table 1. Our search terms aligned with the key dimensions of place attachment and how each of these are described by Raymond et al.[6] A preliminary search using the key terms of place dependence, place identity, social bonding, and nature bonding were used. Despite these key words initially used across multiple databases, at times, little to no records were found. Consequently, the authors revised key search terms resulting in more records being retrieved. With respect to *place dependence,* the alternative search term/s used were (embeddedness OR attachment OR sense of place); *place identity* used (identity OR attachment), *nature bonding* incorporated (connection OR

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attachment OR environment, and *social bonding* related to (belonging OR identity OR friend OR families OR social networks). Additionally, three terms are used generally in Australia 'medical', 'nursing' and 'allied health', with Allied Health professionals most commonly represented in regional, rural and remote areas by Psychologists, Pharmacists, Physiotherapists and Occupational Therapists. The search strategy focused on Australian Health Practitioner Regulation Agency registered professionals, and therefore did not include literature such as related to Aboriginal health professionals or Aboriginal health workers.

Table 1 insert here

The search strategy was applied to title, abstract and keyword fields only to improve relevancy of returned results. The scope of the literature searched included English language journal articles and theses published in the last 10 years. To assess the quality and strength of included studies, the Critical Appraisal Skills Programme checklists for qualitative, cohort and systematic reviews were applied (https://casp-uk.net/casp-tools-checklists/). Each study was reviewed independently by authors (e.g. 1, 2 3) and categorised against these quality criteria as high, high/good, good, good/acceptable or marginal acceptable. Consensus was reached with Author 2, reviewing any papers where there were discrepancies between authors.

Inclusion Criteria

Types of Publications

- Publications must have been peer-reviewed, empirical (quantitative, qualitative, mixed methods), including theses.
- English language
- Publications limited to regional, rural and remote
- Publications from 2011 onward. This was to build upon the findings based on the Raymond et al model, developed in 2010.[6] Publications must be related to health professionals working in Medicine, Nursing, or Allied Health occupations, and/or students undertaking a degree, clinical placement, and rural rotation or internship.

Exclusion Criteria

- Records without full-text copy
- Secondary sources such as systematic reviews, literature reviews, letters of

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commentary, editorials, and

- Studies published prior to 2011

Information Sources

The full search strategy was applied to 14 individual databases on 5 platforms – Scopus; EbscoHost Megafile Ultimate (Academic Search Ultimate; APA PsycArticles; APA PsycINFO; CINAHL; eJournals; Health Source: Nursing/Academic; Psychology & Behavioral Sciences Collection; Sociology Source Ultimate); Web of Science (Web of Science Core Collection; MEDLINE); ProQuest Academic One (ProQuest Central; ProQuest Dissertations & Theses Global); and National Library of Australia's TROVE for theses. See Appendix A for the detailed search strategy applied to each database.

Study Selection and Data Extraction

All identified citations were collated and the resultant 791 records were uploaded into EndNote X9 (Clarivate Analytics, PA, USA). Removal of duplicate references was conducted using EndNote functionality and 443 duplicates were removed, providing 348 unique references for screening.

A two-stage review process was conducted by two independent reviewers where titles and abstracts were screened against the inclusion criteria for the review. Potentially relevant studies were then retrieved in full text and were assessed in detail against the inclusion criteria. A PRISMA flow chart (Figure 2) represents the results.

Insert Figure 2 Here. PRISMA Flow Chart

Results

A total of 52 studies were included in the review. Of the 52 studies, 23 were qualitative, 19 quantitative (mostly cross-sectional/cohort studies), and 10 mixed methods. In terms of the quality criteria for the qualitative studies, these were rated as high (2), high/good (1) good (10), good/acceptable (1), acceptable (6), marginal acceptable (3). For mixed methods these were rated as good (5), acceptable (2), marginal acceptable (3). For quantitative studies, high (2), good (11), acceptable (5), marginal acceptable (1). Therefore, most studies were quality reviewed as good or acceptable. Of the quantitative studies, most were related to Medical

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staff/students (15), followed by Nursing (2), and Allied Health (2). Similarly, the qualitative and mixed methods papers related more to medicine (18) rather than Nursing and Allied Health (15). Table 2 outlines the qualitative and mixed methods studies included in this review, and Table 3 outlines the included quantitative studies.

Insert Table 2 Here

Insert Table 3 Here

A final synthesis of the findings outlined in Tables 2 and 3 resulted in the following factors: (a) *personal inputs* influencing intention and interest in working rurally (b) *learning experiences* and role in enhancing self-efficacy and interest in rural health work, (c) *relational integration* and (d) *lifestyle appeal*. Each of these factors have been aligned with Raymond et al model[9], such as place identity, place dependence, social bonding, and nature bonding.

Person Inputs (Place Identity)

A key personal input is the influence of the personality factors.[12,13,14] For example, personality factors such as persistence, agreeableness, self-directedness, self-confidence and openness to experience were found to be common across these studies and has been suggested that these attributes may be positive factors that can contribute to resilience required when working in rural and remote areas.

Rural upbringing of a health professional was a key personal input for the intent to enter or remain in practice in a rural area. Multiple quantitative studies reported associations between rural upbringing and the desire to enter or remain in work in rural areas.[15-21] In addition, several qualitative studies also reported links between health professionals with rural upbringings and the intention to enter or remain in practice in rural areas.[22-25] One study supporting this association reported that rural background had a limited influence on turnover intention compared to other factors such as previous professional experiences.[23] However, given the multiple methods used across separate studies and the convergence of results indicating rural upbringing is associated with the intent to enter or remain in practice in a rural area, this association is an important, consistent finding and worthy of further investigation. While not specified as rural upbringing, the notion of rural familiarity or previous experience in working in rural areas for a lengthy period were other factors associated the intent to enter or remain in practice in a rural area in a number of studies.[21,26] Overall, the evidence of one's self-identity

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as someone who is rural or has a strong rural familiarity appears to be an important aspect of being attracted to work in a rural area and experiencing a "good fit".[27]

The concept of being a "good fit" also extends intrinsically to career goals and aspirations. Several studies have indicated the need for congruence between one's own goals and choices and perceptions of whether working in the rural or remote location will help meet these career goals.[22,23] In the study by Conomos[15], the choice to practice in a rural or urban work environment was influenced by perceived lack of prestige working in a rural area.

Learning Experiences (Place Dependence & Social Bonding)

Learning experiences are at the core of the SCCT decision-making model. Work-based placements have long been recognised as critical in developing real world discipline knowledge and skills, providing opportunities to become professionally socialised, as well as establishing connections which could be helpful for future employment. Whether as a short-term rural health placement or a longer formal training program or rural health pathway, these working experiences are often considered critical in espousing the advantages of working and living rurally, and they form part of an overall workforce strategy to attract and retain a future health workforce.

The majority of studies related to work-based placements were focused on the medical profession, for which undertaking a formal/structured rural program was seen as very valuable for developing discipline knowledge and skills, including clinical reasoning, and developing a greater understanding of the rural health context. One advantage appearing across studies was exposure to a broader range of conditions or circumstances not normally seen in metropolitan areas.[19,40] This included seeing patients with higher acuity or deteriorating chronic conditions due to often a lack of access to specialists. Being in a rural environment provided the chance to practice more specialised procedural skills, especially in general practice and emergency care (e.g., such as imaging), as well as the chance to develop a greater understanding of Indigenous health and mental health.

Additionally, these placements afforded students with the feeling of being members of the community[28-30] and the opportunity to see patients on their own, which meant feeling part of a larger team.[31] Despite the positive aspects identified from these work experiences, a number of studies also found that placement may not necessarily lead to an intent to work rurally[32-34] and in fact the use of mandatory rural placements or experiences have been found to result in more negative rather than positive outcomes.[33,35]

Relational Integration (Social Bonding)

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We identified relational integration with workplace and community as key proximal influences. Critically, during a period of *exposure* to a new workplace, a strong sense of professional support is particularly important to junior practitioners. Professional support may include feeling welcomed on arrival, made feel part of a healthcare team, having access to supportive and highly skilled mentors, supervisors, and preceptors, the provision of additional training and experiences to enhance skills and knowledge. Studies that addresses this aspect of integration, included establishing a professional network with ongoing mentorship[36,37], having positive working relationships with others[22], being satisfied with the work, feeling like you are making a difference and feeling respected by the local community[31,37], feeling a sense of responsibility, and establishing a sense of loyalty and affinity with the community.[38] For those with family commitments, the dependence on place relies on factors such as a spousal employment and dependent children's access to quality education.[25,33,39-42]

Not surprisingly, negative relational factors within the work environment have also been identified as influencing the decision to consider working. A lack of management support, poor leadership skills of supervisors, lack of mentoring opportunities, problematic human resource approaches, and a perceived problematic workplace culture, were identified as aspects that were a deterrent continuing to work in a rural area.[38,43] Additionally, a high turn-over rate, limited perceived capital and economic resources locally, and limited existing business infrastructure, may attribute to health professionals being less likely to invest in developing a private practice[26,38], or wanting to consider relocating to a rural area.[20]

Lifestyle Appeal (Social and Nature Bonding)

Proximal influences related to fulfillment of lifestyle aspirations were associated with intent of health professionals to enter or remain in practice in rural areas. Lifestyle aspirations here referred to goals about an overall desired lifestyle, particularly how work and life domains were experienced together. The notion that employees chose to seek and remain in employment that allows a fulfillment of holistic life aspirations was a focal theme within one study.[4] There were studies that reported results for associations between *indirect* factors that contributed to the experience of the rural lifestyle and decisions to enter or remain in rural employment. For example, a strong potential for enhanced work-life balance an important factor related to the intent to enter or remain in practice in a rural area.[42,44]

Aspects such as connections to green spaces, opportunities to engage in a wide variety of leisure and adventure activities, having less traffic and congestion, having a low perceived cost of living, are all cited as common factors that attract people to rural areas.[36,45-47] Perceiving the community as welcoming was also noted in several studies, indicating that initial positive

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interactions with community members that were inclusive and made the health professional feel valued and welcomed was an important attraction to the community.[29,45,48]

Several studies mentioned that the presence of policy-related variables that enable work-life balance, such as flexible work arrangements[22,38] were also important factors in the retention of rural health professionals. This finding is consistent with broader findings that work-life balance is an enabling condition for overall well-being.[49]

Discussion

Career decisions are a social cognitive process involving personal interests, expectations, goals, and actions, and subjective appraisals of objective contextual factors. The findings of this rapid review are consistent with the factors identified by Raymond et al[6] including: (a) place dependence, (b) place identity, (c) social bonding (relational social and community integration), and (d) nature bonding (connection to place with lifestyle aspirations). Moreover, the findings reveal that diverse clinical and training opportunities that are available in rural locations offer a definitive professional experience that is place dependent. Furthermore, the economic strength of the local community may also be seen to be a contributing factor which extends to the amount and type of local businesses that are present.[50] Similarly, fulfilment of life aspirations and lifestyle aspects of rural practice are consistent not only with place dependence on resources but also upon bonding to the natural environment which affords a lifestyle of choice. For example, factors associated with lifestyle behaviours and lifestyle activities desired by health professionals, such as activities within a pleasant natural environment[13,25,45] and the match between actual lifestyle opportunities and the expectations held by the health professional were important factors in retaining and attracting health professionals. With respect to place identity and social bonding, this review found evidence that a rural upbringing, a sense of rurality and identity, and relational integration in the workplace and community as identifiable influences on practitioners' careers. In fact, the factor mostly frequently mentioned as an antecedent for positive perceptions of rural practice was rural and regional personal background, especially a rural and regional upbringing of health professionals. [16,17,20,40]

Thus, in terms of the SCCT model of career decision-making, the review identifies place attachment as a crucial personal input that effects appraisals of contextual affordances. This notion of place attachment was also related specific consequences of place, such as perceptions that the rural or regional setting offering a good work life balance [21,41] or a more stable, friendly, and safe community for children and families.[24,41] However, the weight of place attachment varied based on the health professionals' and their families' life stages.[26,38,39]

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The present findings taken together with those of Cosgrave et al[4] furnish a consistent conclusion that relational and community influences should be an integral feature of any strategy to attract and retain health workers in rural areas. Our findings further highlight relational influences within workplaces and communities. Individuals will feel connected where there is a strong sense of social cohesion, there is a sense of trust, and a strong sense of community all of which has been found in contributing to rural social inclusion. A social cognitive perspective that integrates practitioners' appraisals of relational and community contextual factors inherent in career decisions is pertinent, given the limitations of ostensibly objective financial strategies[5] which are subjectively appraised and evidently found insufficient.

In respect to implications, our review suggests that workers not from a rural background can experience a period of transition between joining, adjusting and integrating into rural areas until one feels part of the community. Each community offers its unique contextual affordances in culture, values, and infrastructure, and therefore even if one is familiar with their own community, this does not necessarily mean that workers will have the same rural experience in another community. In addition, a rural community may not be able to enhance its natural features; in fact, it may not want to do so because its natural appeal resonates with workers' lifestyle aspirations and bonds to the environment. A key point, however, is that a community can effect change in how health practitioners are welcomed and integrated into relationships, and indirectly affect practitioners' appraisals of their experiences. Such strategies may come at relatively little cost yet have a substantive impact on practitioners' attitudes to remain in the community for work and lifestyle. The results of this review also suggest that individual difference factors such as personality and temperament can be related to "types" of health workers or a taxonomy of worker types. Specifically, research findings suggest that higher levels of agreeableness, self-confidence, and conscientiousness are associated with success in a rural location.[14]

What has also become apparent in this review, is that place attachment research has been explored within a regional and rural workforce, rather than in remote locations. Increasing geographical remoteness has been linked with poorer health outcomes, exacerbated by challenged by issues such as poor access to health services, which in part is contributed to by the well-recognised maldistribution of a remote health workforce[1] and a high turnover of staff [2,3]. Furthermore, this review has also found that most of the aspects related to place attachment related to the recruitment and retention of medical professionals, with even fewer related to Nursing and Allied Health, therefore dedicated efforts should consider these professions. One

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of the major limitations with this rapid review was the narrowed focus on specific professions, and this may have resulted in studies found to reflect regional and larger rural settings, and not remote settings, therefore an exploration of a more diverse range of professional groups and other health care workers would be warranted. From a policy perspective, the development of national longitudinal surveys such as the Mabel survey[36] and Medical Students Outcomes Database[17,40] should also be established for Nursing and Allied Health to track graduate intentions to work rural and remote and employment destinations.

Drawing on key constructs from the SCCT [7] and the findings from this review, we theorise a Social Cognitive Model of Place and Career Decision Making for Rural and Remote Health Professionals. This model is depicted in Figure 3, and proposes a series of direct and indirect paths between a) contextual affordances, b) person inputs, c) workplace experiences, d) self-efficacy for rural and remote practice, e) outcome expectations for career in rural and remote practice, f) career interests and goals, g) psychological experience of place, and h) intention and decision to reside in a rural/remote location. The model reflects affective, cognitive, behavioural and place attachment factors that may influence career decision-making for rural practice.

Insert Figure 3 here. Social Cognitive Model of Place and Career Decision Making

A Research Agenda

Most of the research in this review was qualitative, which is useful for exploratory research; however, qualitative research does not enable testing of hypotheses and has limited generalisability. With few exceptions, most of the quantitative research involved frequency counts of lists of factors, which is likewise for exploratory purposes but not hypotheses testing.

From a social cognitive perspective, the present findings are reason to assume the relevance of practitioners' appraisals of their personal inputs, learning experiences, and proximal contextual influences. Our review reveals that in fact, there is a clear gap in empirically connecting place attachment factors with recruitment and employment outcomes, therefore further research could be undertaken to test specific recruitment strategies based on known place attachment factors. The field needs quantitatively tested hypotheses using samples that enable generalisability to progress solutions to enhance attraction and retention of health workers. With more than two decades of empirical application and scrutinty[7], the SCCT serves a model for establishing hypotheses about directional effects pertaining to practitioners' self-efficacy, outcome expectations, interests, choice goals, actions, workplace performance, and

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contextual influences. These SCCT factors can be empirically operationalised by valid and reliable psychometric measures, using advanced methods of statistical analysis (e.g., structural equation modelling, latent profile analysis, latent growth modelling) may be used to:

1. test the predictive relations among the factors to determine which factor has the most or least effect, and which proximal influences moderate the strength of effect of the factors on one another;
2. test whether there are certain combinations of person inputs to display "types" of health workers or a taxonomy of worker types amenable to rural practice; or
3. test longitudinal changes in health workers' person inputs, interests, goals, actions, and performance, as well as distal factors that affect those changes over time and in context.

Conclusion

Place attachment factors that influence health practitioners' career decisions about working in rural and remote Australia, is a multifaceted phenomenon, where numerous connections are made to place, work and people. An initial exposure to environments surrounding rural health practice can be an important initial step in developing connections to place, and for some health practitioners the exposure to a positive rural health placement or program can be the catalyst to consider seeking employment in a rural environment. Beyond the effects of contextual knowledge and skills within professional disciplines, these experiences are often shaped by incorporating an understanding and appreciation of a rural way of life and the opportunity to develop an affiliation with the land and its people. For those who already have had a strong upbringing and rural identity, the opportunities to be educated, and work locally are a strong motivating factor to wanting to remain where they are. Opportunities that create greater connections for a future health workforce between work, social, lifestyle and place may all contribute to a stronger workforce.

As this review has found, factors that affect rural health workforce retention are multifactorial, and therefore strategies aimed at recruiting and retaining staff in rural and remote areas also need to be varied. Individuals considering a professional and work career do so with their social context in mind. This may be dependent upon an appraisal of weighing benefits to career and personal factors in both the short and long-term, indicating that as one's work or career changes, so too may be competing factors influencing staying in rural and remote areas. This review highlights that beyond intrinsic personal factors, the forging of strong connections between the community and health care professionals cannot be underestimated. Further research should build on the empirical models used in this review, contributing to more

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robust and generalisable findings that would better advance a rural workforce development agenda.

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Competing Interests

No relevant disclosures

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[1,2,3] are members of the Australian Collaboratory for Career Employability & Learning for Living - ACCELL

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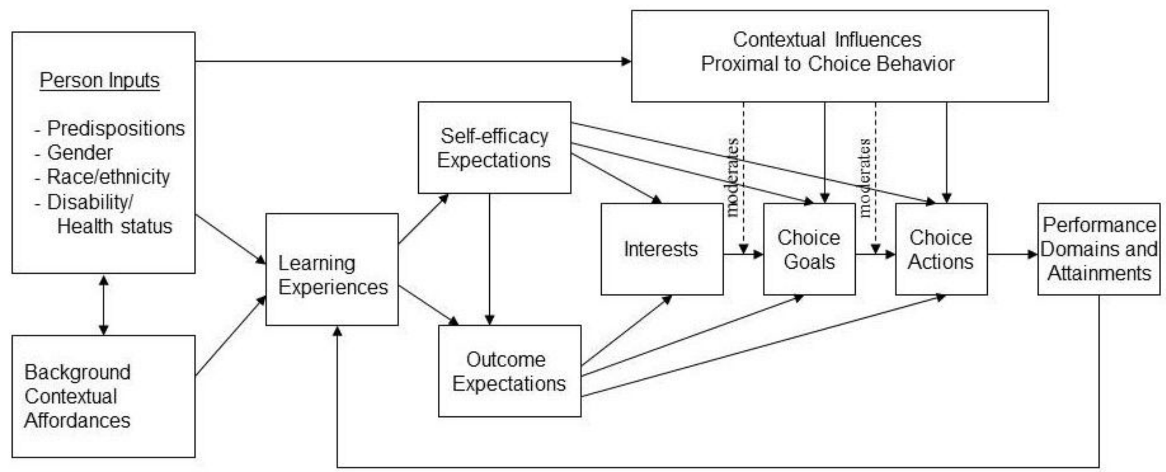

Figure 1. SCCT model of person, contextual, and experiential factors affecting career-related choice behaviour. Copyright 1993 by R.W. Lent, S. D. Brown, and G. Hackett. Reprinted with permission.

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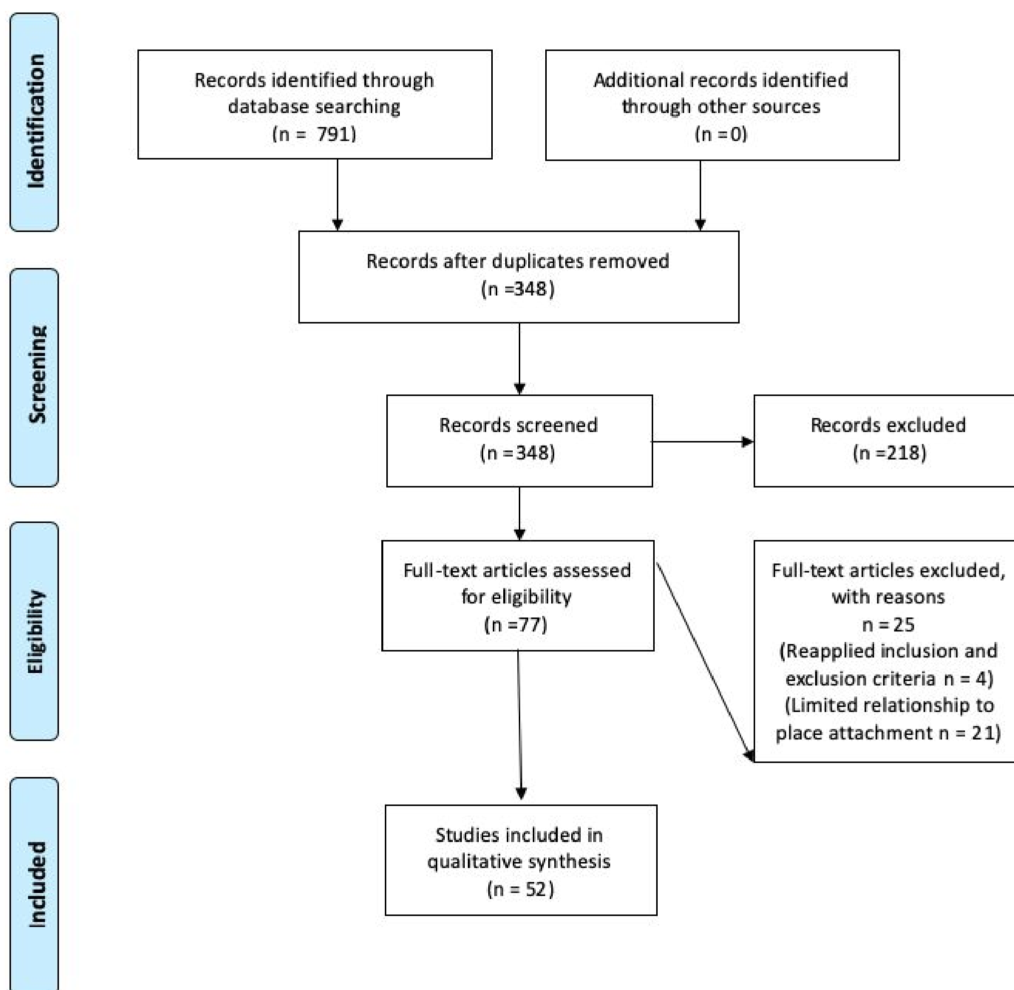

Figure 2. PRISMA Flow Chart

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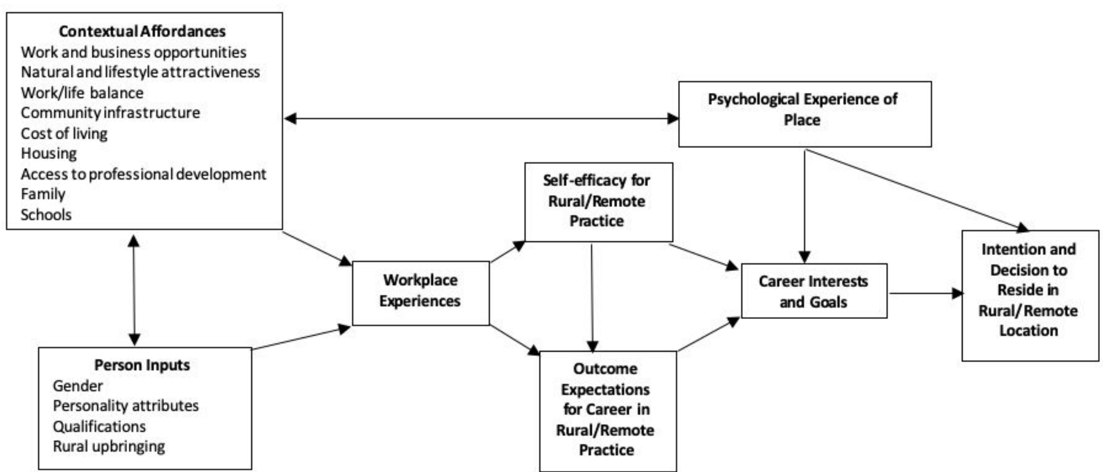

Figure 3. A Social Cognitive Model of Place and Career Decision-Making for Rural and Remote Health Professionals

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TABLE 1. Databases and total results before duplicates removed

Database name	**Number of results**
EbscoHost Megafile Ultimate - Academic Search Ultimate; APA PsycArticles; APA PsycINFO; CINAHL; eJournals; Health Source: Nursing/Academic; Psychology & Behavioral Sciences Collection; Sociology Source Ultimate	155
MEDLINE (via Web of Science platform)	149
ProQuest One Academic - ProQuest Central; ProQuest Dissertations & Theses Global	84
Scopus	214
TROVE – Thesis Collection	21
Web of Science Core Collection	168
Total	791

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TABLE 2. Summary of findings of included studies with qualitative or mixed method study design (N = 33)

Study publication	Study design, setting, sample	Topic	Data collection and analysis	Key findings	Quality rating
Allen P, May J, Pegram R, et al. 'It's mostly about the job'-putting the lens on specialist rural retention. *Rural Remote Health* 2020; 20(1): 1-7	Qualitative (N = 22), Medical specialists, Tasmania	Factors contributing to workforce and retention of specialists	In-depth interviews with 12 staff who were staying, 8 who had left service and 2 intending on resigning	Professional factors dominated retention decision-making. Personal and location factors played a more important role for staff who were remaining. Specialist from rural backgrounds, strong personal connections and prefer rural living more likely to stay	Acceptable/Good
Axtens L, Spruyt T, Grace S. Primary attractors for allied health professionals in Australian rural and regional communities. *J Aust Tradit-Med So* 2019; 25(3): 156-159	Qualitative (N = 12) Southern Cross University Graduates – NSW	Attraction to rural practice by recently graduated osteopaths	Semi-structured interviews with 7 males and 5 females	Relationships with both people and place were important. Place factors included the natural clinical, and transport environments. People linked lifestyle behaviours and activities with the natural environment. Rural people perceived to be open, friendly and welcoming. Mixed place-based factors affected decisions	Acceptable
Bayley SA, Magin PJ, Sweatman JM, et al. Effects of compulsory rural vocational training for Australian general practitioners: A qualitative study. *Aust Health Rev* 2011; 35(1): 81-8	Qualitative (N =15) Registrars from Australian GP postgraduate program	Compulsory vocational training and intention to work in rural areas in future	Semi-structured interviews, modified grounded methodology	Intention to practice in rural areas not enhanced by mandatory training. Participants experienced social dislocation, high job demands. Can increase	Good

				opportunities to improve clinical competence	
Bonney A, Albert G, Hudson JN, et al. Factors affecting medical students' sense of belonging in a longitudinal integrated clerkship. *Aust Fam Physician* 2014; 43(1): 53-57	Qualitative (N = 13), Graduate School of Medicine students undertaking an Integrated clerkship program	Success factors during a community placement and development of a sense of belonging	Semi-structured interviews.	Multiple factors academic leadership, preceptorship by GP's, general practice environment including location, feeling part of the team and community. Participation in local leisure activities and making social connections, feelings of being part of a tight knit community	Acceptable
Cosgrave C. Context matters: Findings from a qualitative study exploring service and place factors influencing the recruitment and retention of allied health professionals in rural Australian public health services. *Int J Environ Res Public Health* 2020; 17(16): 1-27	Qualitative (N = 26) Nursing and Allied Health staff, rural NSW, public sector community mental health (CMH)	Early career retention of health care professionals working in rural and remote Australia. Exploring key factors such as employment and rural-living factors	Grounded theory, in-depth interviews. Beginner staff (0-3yrs), early career (3-5yrs)	Intention to leave related to meeting of personal and professional expectations and life aspirations. Strongest sense of belonging for those working and living in town in their hometown. Choosing to stay also related to life stage. Different descriptions of fitting in and periods of adjustment for non-locals. Early positive professional factors critical	High

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Cosgrave C, Maple M, Hussain R. An explanation of turnover intention among early-career nursing and allied health professionals working in rural and remote Australia – findings from a grounded theory study. *Rural Remote Health* 2018; 18(3)	Qualitative Rural Public Health Services, Victoria (N = 74) allied health executives, managers and newly recruited staff	Recruitment and retention of Allied Health Professionals Exploring contextual factors such as service and place-specific challenges	Semi-structured interviews Constructivist-interpretivist methodology	Housing was identified a priority for those relocating to rural areas. Perceptions of needing social connections especially at work, and linking to local activities. Turnover of staff is constant, different issues for levels of staff for recruitment or retention. Mixed place-based factors affected decisions	Good
Cuesta-Briand B, Coleman M, Ledingham R, et al. Understanding the factors influencing junior doctors' career decision-making to address rural workforce issues: Testing a conceptual framework. *Int J Environ Res Public Health* 2020; 17(2)	Qualitative – Western Australia, (N = 21) junior doctors	Career decision-making of junior doctors for speciality choice and rural location	Semi-structured phone interviews. Phenomenology	People and place were salient themes. Social and recreational activities seen to be important for wellbeing. Rural setting provided a good life/work/balance. Sense of community, personal work relationships seen as important. Lifestyle may influence those to become GP's in future	Good/High
Eley DS, Laurence C, Cloninger CR, et al. Who attracts whom to rural general practice? Variation in temperament and character profiles of GP registrars across different vocational training pathways. *Rural Remote Health* 2015; 15(4): 3426	Mixed methods sequential explanatory design. Rural Clinical School (RCS) Graduates – University of Queensland, 9 years post-graduation	Longitudinal study of career pathways of Rural Clinical School Graduates	Longitudinal study 29 interviews, (N = 115) survey responses	Rural background, lifestyle and time spent at RCS all influenced working in a rural area, with 40% working rural Early drivers of career decision-making include early experiences in RCS, personal, specialty choice. Personal and family reasons significantly impact on career decision making	Good

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Eley DS, Synnott R, Baker PG, et al. A decade of Australian Rural Clinical School Graduates – where are they and why? *Rural Remote Health* 2012;12(1)	Mixed methods (N = 452) GP registrars, (N = 29)	Examining key variables associated with the likelihood settling into practice	Self-report questionnaire and 5 factor personality and resilience scale. Semi-structured interviews	Interest in rural career strongly correlated with being male, identifying as rural, high levels of cooperativeness and following a rural training pathway	Acceptable
Godwin D, Hoang H, Crocombe L. Views of Australian dental practitioners towards rural recruitment and retention: A descriptive study. *BMC Oral Health* 2016; 16(1): 1-10	Qualitative (N = 50), dentists, oral health therapists, dental prosthetists across Australia	Exploring perceptions of factors attracting to rural areas and why they remain	Semi-structured interviews. Content and thematic analysis	Income security in rural practice an issue. Clinical pride identified as a positive professional factor. Social support networks rated high, feeling like not a local was a negative factor, some believed that rural communities have a stronger sense of community engagement, rural background positive factor, rural exposure during training felt also important to seeing realities of rural life. Family needs also play an important role. Feelings of being more laid back and relaxed in rural setting	Acceptable
Godwin DM. Factors influencing recruitment, retention, and turnover of the dental practitioner workforce in Australian rural areas [dissertation]. Tasmania: University of Tasmania; 2017. 276 p	Mixed methods (N = 50) dental practitioners, and (N = 631) online surveys	Exploring attitudes towards living and working rurally, factors that influence recruitment and retention,	Semi-structured interviews and self-reported questionnaire	Positive factors having a sense of belonging to community, belief that they are valued members of the community, and have affection for community. Rural background increased likelihood of rural practice.	Good

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		influence of rural background		Lifestyle preferences and stage of life and family commitments all play a part	
Heidelbeer D, Carson DB. Experiences of non-resident nurses in Australia's remote Northern Territory. *Rural Remote Health* 2013; 13(3): 12	Qualitative – 7 Registered Nurses working in Northern Territory in remote location	Exploring experiences of being a non-resident health care professional in a remote area	Semi-structured interviews	Block-time off had many positive experiences, time on means high job demands. Moving between multiple locations can result in problems in fitting into the community. Can feel like an outsider. Having control of working location seems to be important	Marginal acceptable
Johnson G, Foster K, Blinkhorn A, et al. Exploration of the factors that influence new Australian dental graduates to work rurally and their perspectives of rural versus metropolitan employment. *Eur J Dent Educ* 2019; 23(4): 437-447	Qualitative – graduates from University of Sydney, Dental School (N = 135) interviews with dentist's post-graduation	Workforce factors in employment location decisions	Semi-structured interviews	Positive factors included incentives, broad clinical experience, rural lifestyle /rural community, partner being able to find work, negative factors included moving away from family and social networks in the city, partner factor, lack of specialist support in rural areas	Marginal acceptable
Johnson GE, Blinkhorn AS. Student opinions on a rural placement program in New South Wales, Australia. *Rural Remote Health* 2011; 11(2)	Qualitative (N = 39)	Influence of a rural placement program on rural intention	Questionnaire – pre and post placement	After placement, most students interested in working rurally. Positive factors included good mentors, positive sense of community. Partners and family have a major influence on where to locate.	Marginal acceptable

				Student enjoyed aspects of rural lifestyle	
Johnson G, Foster K, Blinkhorn A, et al. Rural clinical school dental graduates' views on rural and metropolitan employment. *Eur J Dent Educ* 2020; 24(4): 741-752	Qualitative (N = 39) Dental Graduates, NSW	Exploring reasons for work rural	Telephone interviews	Community integration and friendly welcoming community and appreciate patients' rates in top 3 factors of best aspects of rural practice. Being part of the community, achieving work-life balance, feeling of making a difference all positive factors	Acceptable
Keane S, Lincoln M, Smith T. Retention of allied health professionals in rural New South Wales: A thematic analysis of focus group discussions. *BMC Health Serv Res* 2012; 12(1)	Qualitative (N = 30) Allied health staff rural NSW	Exploring intentions to work rurally by allied health staff	Focus groups – grounded theory	Factors such as lifestyle, social connections in local area, low cost of living, engagement in community and perceived advantages for variety of clinical work	Good
Kirschbaum M, Khalil H, Talyor S, et al. Pharmacy students' rural career intentions: Perspectives on rural background and placements. *Curr Pharm Teach Learn* 2016; 8(5): 615-621	Mixed methods (N = 156) Pharmacy students, Bendigo, Victoria.	Examining rural placements and background and intention to practice rurally	Paper-based survey	Students from a rural background more likely to work on rural areas after graduation compared with those from a non-rural background. Social isolation is considered greatest barrier to working rurally, whereas positive patient relationships, sense of community, and lifestyle and job satisfaction considered most positive	Good

Kumar K, Jones D, Naden K, et al. Rural and remote young people's health career decision making within a health workforce development program: A qualitative exploration. *Rural Remote Health* 2015; 15	Qualitative (N = 33) Broken Hill, NSW	Exploring career decision-making and career intentions of rural and remote young people	12 semi-structured interviews and 6 focus groups	A range of personal, contextual and experiential factors influence career-decision making. Links made between community health concerns and career interest. Career decisions partly influenced by family/friends. Local role models/clinicians influencing factor	Good
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 Remote Health* 2011; 11(2)	Mixed methods (N=40). Year 4 graduating cohort from rural and remote areas	To identify the impact of elective and compulsory program components on student intentions to practice in a rural and remote location after graduation	Online survey questionnaire. Survey included forced answer questions and open-ended commentary. Used descriptive and frequency statistics	Rural health experiences is important in influencing students' perceptions of a career in rural and remote health. Despite incentives, it is difficult to recruit medical students, with family commitments, for rural and remote areas	Acceptable
Malau-Aduli BS, Smith AM, Young L, et al. To stay or go? Unpacking the decision-making process and coping strategies of International Medical Graduates practising in rural, remote, and regional Queensland, Australia. *PLoS One* 2020; 15(6)	Qualitative approach and employed grounded theory methods (N=25). Regional, rural, and remote communities of Queensland.	To improve our understanding of how International Medical Graduates make decisions about where to practise	Data sources were transcripts from semi-structured interviews. The analysis involved a three-phase coding process, progressing from specific, inductive coding to abstract, abductive coding	Balancing three inter-related life goals: satisfaction with work, family, and lifestyle, are important in making decisions regarding job location. Importance of these three factors vary based on the medical practitioner's life stage	Good

May JA. Rural and urban? An exploration of medical workforce issues in regional centres of Australia [dissertation]. Victoria: Monash University 2015. 369 p	Mixed-methods (N = 62) medical specialists, regional centres, (N = 66) GP's	Examining factors for recruitment and retention of GP's and specialists in regional areas	Questionnaire, semi-structured interviews	Sense of community ranked highest for social factors in retention, followed by educational facilities for children and employment opportunities for partner. Being known and knowing people seen as important however also some felt that loss of anonymity was not attractive for retention. Access to a capital city important as well as environment – temperature and climate	Good
Peel R, Young L, Reeve C, et al. The impact of localised general practice training on Queensland's rural and remote general practice workforce. *BMC Med Educ* 2020; 20(1)	Qualitative (N=79)	The factors that attract and retain GP registrars in rural and remote areas	A purposive sample with semi-structured interviews and one focus group divided over two phases used thematic analysis	Attractors of rural workplace include family and community lifestyle factors, individual intrinsic motivators, and remote medicine experiences. In contrast, barriers include work related, location, or family factors	Good
Ragusa AT, Crowther A. 'I think it is the best job. I love it!' Engendering workplace satisfaction in rural and remote Australian mental health nursing. *Rural Soc* 2012; 22(1): 45-58	Qualitative (N=32). From geographical areas classified as rural and remote using the ARIA (1998) index	To identify workplace strategies and experiences that mental health nurses working in rural and remote communities	Qualitative focus group data and semi-structured interview	Workplace culture, professional pride and the rewards associated with working with people and in specific workplaces significantly contributed to workplace satisfaction among mental health nurses	Good

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Ramnathan P. The Professional and Social Integration of International Medical Graduates Working in Rural Communities of NSW: A Study Assessing the Utility of Han and Humphreys' (2006) Typological Analysis [dissertation]. Sydney: Western Sydney University (Australia); 2018. 223 p	Qualitative (N = 25) International medical graduates, rural NSW	Professional and social integration into a rural community	Interviews involving IMG's from across 7 non-metro areas.	Four main themes of *professional* e.g. satisfaction working with patients, *family* e.g. job opportunities for partner and opportunities for children, social and cultural e.g. family, friends, community and *personal* e.g. work-life balance, geographic location. Providing continuity of care rewarding and satisfying as well as feeling valued. Family factors important in staying or leaving, and personal theme least influencing. Conscious efforts to become integrated into community. Friendliness of community. Extent to which they could interact with people from home country also important	High
Ray RA, Young L, Lindsay D. Shaping medical student's understanding of and approach to rural practice through the undergraduate years: A longitudinal study. *BMC Med Educ* 2018; 18(1): 1-8	Qualitative (N = 103), James Cook University students (JCU)	Perceptions of rural and urban graduates towards rural practice	Writing exercise – template analysis	Some from urban background perceiving a sacrifice of lifestyle to go rural. Pressures of job and isolation a factor for all students. Rural experience being laid back, calm atmosphere, making a difference in community was positive. Rural life not seen as idyllic. Rural students more likely to describe rural	Acceptable

				practice in positive terms and more practical descriptions	
Ray RA, Young L, Lindsay DB. The influences of background on beginning medical students' perceptions of rural medical practice. *BMC Med Educ* 2015; 15(1)	Qualitative (JCU medical students)	Attitudes and perceptions of students who undertook a recent clinical placement and motivations to undertake rural practice	Survey – content analysis	Scope of rural medical practice and opportunities to practice clinical and procedural skills was advantageous. Aspects of local recreational activities was different dependent upon year level. Positive idea of rural life and rural practice, opportunity to feel part of the community and a community spirit	Acceptable
Robinson M, Slaney GM. Choice or chance! The influence of decentralised training on GP retention in the Bogong region of Victoria and New South Wales. *Rural Remote Health* 2013; 13(1)	Mixed method (N= 30). Bogong Regional Training Network	To examine the impact of the decentralised model of GP training on the retention of GPs in rural areas	Semi-structured interviews. In addition, data from the Interactive Registrar Information System (IRIS), the GP Registrar Information Management and Education system (GPrime) and paper files were used	The decentralised training model has had a positive influence on retention rates in rural practice. Australian-born doctors significantly more likely to remain in rural practice after the completion of training than overseas-born doctors	Marginal acceptable
Steel A, Dingle T, Wardle J, et al. A study of the factors impacting on workforce distribution of Australian osteopaths: The perspectives of osteopathic students, academics and	Qualitative (N=16). Queensland (n = 4), New South Wales (n = 4), Tasmania (n = 2), regional	To investigate the factors affecting osteopaths' choice of clinical workplace and	Semi-structured interviews and focus groups. Digital recordings and transcriptions of the focus groups and interviews were	The unique workforce distribution issues of the Australian osteopathic profession identifies new perspectives beyond the urban/rural divide commonly explored within health	Good

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clinicians. *Int J Osteopath Med* 2020; 36: 11-18	Victoria (n = 4), the greater Melbourne area (n = 2)	their experience practising in their geographical location	analysed for emergent themes using a thematic framework	workforce literature to now include drivers, facilitators and barriers to relocation between urban centres	
Terry DR, Baker E, Schmitz DF. Community assets and capabilities to recruit and retain GPs: The Community Apgar Questionnaire in rural Victoria. *Rural Remote Health* 2016; 16(4)	Mixed methods (N=28), rural north-eastern Victoria, Australia	To examine Community Apgar Questionnaire's utility and develop a greater understanding of the community factors that impact general practitioner (GP) recruitment and retention in Australia	Individual face-to-face structured interview using the CAQ, which lasted 45–60 minutes	Possible solutions for GP recruitment and retention must consider the social, employment and educational opportunities that are available for spouses and children	Marginal acceptable
Terry DR, Nguyen HB, Schmitz D, et al. Lived experiences and insights into the advantages important to rural recruitment and retention of general practitioners. *Rural Remote Health* 2018; 18(3)	Mixed methods (N=40), Hume region, Victoria	To examine the community factors that influence the GP recruitment and retention in rural Australia	Individual face-to-face interviews with thematic analysis framework	The most important advantages of recruiting and retaining GPs were linked to medical support, hospital and community support, and economic factors, while the challenges were related to geographic factors	Marginal acceptable

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Woodhouse AM. The (extra) ordinary experiences and practices of rural family therapists [dissertation]. Melbourne: Monash University; 2015. 375 p	Qualitative (N = 14) Family therapist, including social workers, nurses, psychologists. NSW, Victoria, Tasmania	Exploring experiences and practices of rural family therapy and factors that help sustain them	In-depth interviews	Rurality seen as a relationship about connections and relationships with rural people. Connections are important in the type of work, there is alignment between professional identify and role and what approach taken in small communities. Sense of connectedness strongly associated with own resilience	Good
Young L, Lindsay DB, Ray RA. What do beginning students, in a rurally focused medical course, think about rural practice? *BMC Med Educ* 2016; 16(1): 1-7	Mixed methods (N=103), Townsville, medical students	To examine whether a medical program with a rural, underserved focus has an impact on student perceptions and career intentions for rural practice over time	Participants completed a low stakes essay on the life and work of a rural doctor. All theessays underwent thematic analysis and sentences were coded into three main themes of rural lifestyle, doctor role and rural practice. Statistical analysis of differences between urban and rural background students	Participants from a capital city background reported a significantly higher percentage of responses related to negative views of rural practice than their regional and rural counterparts. Students from capital city areas had significantly more negative views about the rural doctor role, especially related to workload, limited resources and isolation than students from rural and regional areas	Good

Young L, Peel R, O'Sullivan B, et al. Building general practice training capacity in rural and remote Australia with underserved primary care services: A qualitative investigation. *BMC Health Serv Res* 2019; 19(1)	Qualitative (N=39), 14 registrars, 12 supervisors, and 13 practice managers	To explore the factors influencing General Practitioners (GPs), primary care doctors, and those training to become GPs (registrars) to work and train in remote areas	Semi-structured interviews and used thematic analysis	Integrating registrars and supervisors into the local community and ensuring sustainable work-life practice models for their doctors are instrumental in attracting and retaining their medical workforce in remote areas	Good

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TABLE 3. Summary of findings of included quantitative studies (N = 19)

Study publication	Study design, setting, sample	Topic	Data collection and analysis	Key findings	Quality rating
Campbell N, Eley D, McAllister L. What does personality tell us about working in the bush? Temperament and character traits of Australian remote allied health professionals. *Aust J Rural Health* 2013; 21(5): 240-248	Quantitative, cross-sectional, remote allied health care professionals (AHP's), (N = 561).	Temperament and Character Traits of Allied Health Professionals of those working in rural areas	Online survey, Temperament and Character Inventory (R-140) TCI	Remote AHP's were higher in novelty seeking, and self-transcendence, high rewards focused, persistence, self-directedness, cooperativeness	Good
Conomos AM, Griffin B, Baunin N. Attracting psychologists to practice in rural Australia: The role of work values and perceptions of the rural work environment. *Aust J Rural Health* 2013; 21(2): 105-11	Quantitative – cross sectional study, (N = 189) first-year psychology students, (N = 124) registered psychologists	Psychologist's recruitment in rural areas. Key factors career work values, rural background, perceived rural work environment, intentions to work in rural area	Online survey, modified Physician Values in Practice Scale, including question on prestige and recognition	Rural background was a weak predictor to intent to work rurally, although low numbers coming from rural areas. Autonomy and lifestyle seen as important. Having prestige in one's work influenced rural intention and location choices	Acceptable

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Eley DS, Laurence C, David M, et al. Rethinking registrar attributes for Australian rural general practice training. *Aust J Rural Health* 2017; 25(4): 227-234	Quantitative GP registrars across 4 training groups (N = 451)	Attraction to rural general practice and influence of temperament and character	Questionnaire - Temperament and Character Inventory (R-140) TCI	Those intending on working rurally have different results than urban counterparts. Low harm avoidance, high self-directedness, and persistence may contribute to resilience in rural areas	Good
Harding C, Seal, A, McGirr J, et al. General practice registrars' intentions for future practice: Implications for rural medical workforce planning. *Aust J Prim Health* 2016; 22(5):440-444	Quantitative (n = 99) GP registrars	Rural practice intentions	Questionnaire	Those with a rural background more likely to intend to work rurally. Proximity to family and friends influence location	Good
Jones M, Humphreys JS, McGrail MR. Why does a rural background make medical students more likely to intend to work in rural areas and how consistent is the effect? A study of the rural background effect. *Aust J Rural Health* 2012; 20(1): 29-34	Quantitative (N = 7422), Australian medical school students	Exploring impact of rural background in rural work intent and location	Data from Medical Schools Outcomes Database (2006-2009)	Rural background effect found to be a positive predictor of attraction to rural practice. Negative environment factors such as Hot/dry climate, may affect intention to work rurally	Good
Jones MP, Bushnell JA, Humphreys JS. Are rural placements positively associated with rural intentions in medical graduates? *Med Edu* 2014; 48(4): 405-416	Quantitative (N = 372), rural GP's, (N=100) urban GP's, NSW	Role of personality, Rural upbringing, intention to remain in practice	Retrospective case-control design, questionnaire. Personality instruments: NEO-FFI, and Adjective Checklist	Lower openness found in rural GP's, higher levels of conscientiousness and agreeableness. Personality might be important for recruitment more strongly than retention	High

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Jones MP, Eley D, Lampe L, et al. Role of personality in medical students' initial intention to become rural doctors. *Aust J Rural Health* 2013; 21(2): 80-89	Quantitative – commencing medical students across Australia (N = 914)	Role of personality in rural intention by medical students	NEO 5 factor index & Adjective checklist. Logistic regression analysis	Personality may partially affect decision to work rurally and some might be more suited to rural practice. Rural preference related to openness to experience, agreeableness, and self-confidence	Good
Jones MP, Humphreys JS, Nicholson T. Is personality the missing link in understanding recruitment and retention of rural general practitioners? *Aust J Rural Health* 2012; 20(2): 74-79	Quantitative (N = 3268) medical students	Placement timing, location and duration and effects on graduate students' rural intentions	Data from Medical Schools Outcomes Database (2005 – 2008) – Logistic Regression Analysis	Rural origin and early intentions at commencement of medical training best predictors of rural intention	Good
King KR, Purcell RA, Quinn SJ, et al. Supports for medical students during rural clinical placements: factors associated with intention to practise in rural locations. *Rural Remote Health* 2016; 16(2): 3791	Quantitative (N = 454), Rural clinical school medical students	Exploring rural intentions of medical students following rural placement and factoring in rural background	Questionnaire – Multivariate logistic regression	Rural background and placement perceived as being positive on wellbeing, more likely to intent a rural internship	Acceptable
Lennon M, O'Sullivan B, McGrail M, et al. Attracting junior doctors to rural centres: A national study of work-life conditions and satisfaction. *Aust J Rural Health* 2019; 27(6): 482-488	Quantitative (N=4581). Interns up to their fourth postgraduate year	The objectives were to delineate the differences in satisfaction between rural and metropolitan JDs and clarify the perceived advantages and disadvantages of	Medicine in Australia: Balancing Employment and Life survey. Used the repeat cross-sectional data 2008 and 2015, pooled for analysis	Rural junior doctors are more positive about the amount of variety in their work, access to leisure activities, flexible work hours and access to leave. To attract Junior doctors to rural areas, the benefits of rural work, such as leisure and leave opportunities, should be emphasised and any perceived weaknesses	Good

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		working in either setting		mitigated, by strengthening of specialist mentorship and peer networks, and by improving social, employment and educational opportunities for families	
McGrail MR, Humphreys JS, Joyce CM, et al. International medical graduates mandated to practise in rural Australia are highly unsatisfied: Results from a national survey of doctors. *Health Policy* 2012; 108(2-3): 133-139	Quantitative (N = 3502)	To analyse the satisfaction of IMGs in their current work location, and the effect of mandating IMGs to small rural communities	Wave 2 of the Medicine in Australia: Balancing Employment and Life (MABEL) longitudinal study. Multivariate logistic regression models were used	International medical graduates currently obligated to practise in rural communities are significantly unsatisfied with respect to both professional and non-professional aspects. In addition, practice restriction reduces job and social satisfaction	Good
McGrail MR, O'Sullivan BG, Russell DJ. Rural training pathways: The return rate of doctors to work in the same region as their basic medical training. *Hum Resour Health* 2018; 16(1): 1-10	Quantitative (N = 610) including local medical graduates (n=467) and International medical graduates (n=143)	Associations between vocational training location, subsequent practice location and effect of rural origin.	Survey (MABEL – Medicine in Australia: Balancing Employment and Life) 2008-2014	Very strong associations between final vocation training and subsequent practice location. Rural training pathway linked to subsequent rural practice. Rural bonding (early career employment in rural area) and rural origin associated with rural practice	Good
McGrail MR, Russell DJ, Campbell DG. Vocational training of general practitioners in rural locations is critical for the Australian rural medical workforce. *Med J Aust* 2016; 205(5): 216-221	Quantitative (N=4377), GP's, and Specialists	To measure longitudinal associations bet ween the rurality of GPs' work locations and two key non-professional factors, firstly	Medicine in Australia: Balancing Employment and Life (MABEL) national longitudinal study between 2008 and 2014.	Educational stage of a GP's children and having a partner in the workforce play important roles in GPs location choice. However, the findings differ based on the gender of the GP	Good

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		having children at different educational stages and secondly having a partner/spouse in the workforce, investigating how these vary by gender	Generalised estimating equations (GEEs) were applied		
McGrail MR, Russell DJ, O'Sullivan BG. Family effects on the rurality of GP's work location: A longitudinal panel study. *Hum Resour Health* 2017; 15(1)	Quantitative (N = 357) medical graduates, Victoria	Rates at which medical students return t o practice after 12months or more at a rural location. Additional factor of duration of rural exposure in a rural region and those completing scho oling and training in rural area	Longitudinal survey data. Medical student outcomes database 2006-2014	Approx. ¼ of graduates working in same region that they did training. Strong association with medical training and secondary schooling and work in a region	High
Prengaman M, Terry DR, Schmitz D, et al. The Nursing Community Apgar Questionnaire in rural Australia: An evidence-based approach to recruiting and retaining nurses. *Online J*	Quantitative (N=16). District Health facilities, Regional Development Victoria	To examine Nursing Community Apgar Questionnaire's efficacy as an evidence-based	The Nursing Community Apgar algorithm, derived from the community advantage/	Lifestyle, emphasis on patient safety and high-quality care, availability of necessary materials and equipment, perception of quality were among the highest scoring factors and	Marginal acceptable

Rural Nurs Health Care 2017; 17(2): 148-171		tool to better inform nursing recruitment and retention	challenge score, weighted by its relative importance, was calculated	considered to have the most impact on recruiting and retaining nurses	
Schauer A, Woolley T, Sen Gupta T. Factors driving James Cook University Bachelor of Medicine, Bachelor of Surgery graduates' choice of internship location and beyond. *Aust J Rural* 2014; 22(2): 56-62	Quantitative (N = 175), JCU medical graduates	Examining reasons for internship location and subsequent practice locations	Email or telephone survey	Internship location influenced by personal decisions e.g. to be near to family, enjoying the towns lifestyle, travel/adventure, familiarity there if previously did placement, partner. Professional reasons more important in choosing subsequent practice e.g. short-term work, career ambitions, rural scholarship, ballot requirements	Good
Terry DR, Peck B, Smith A, et al. What Australian Nursing Students Value as Important in Undertaking Rural Practice. *Online J Rural Nurs Health Care* 2020; 20(1): 32-56	Quantitative (N=1982), Victoria, nursing students	To examine what nursing students, consider the most important factors for undertaking a rural career in Australia	A questionnaire that included 23 demographic questions and a modified Nursing Community Apgar Questionnaire	The factors identified most important among nursing students when considering rural practice include patient safety and high-quality care, having autonomy and respect from management, the establishment of positive relationships and good communication between different generations of nurses, and the work environment providing job satisfaction	Acceptable

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 Remote Health* 2019; 19(2): 31-40	Quantitative (N=298), northern Australia, medical graduates	To investigated the postgraduate qualifications and key factors that shaped the current career choice of JCU medical graduates	Cross-sectional survey of early career JCU medical graduates from postgraduate year (PGY) 4 to PGY 10 (the first seven cohorts)	The findings suggest JCU medical graduates choose a career that is not only compatible with regional, rural or remote practice, but also involves continuity of care with patients, a wide scope of practice and a good work–life balance, and that this choice has been influenced by a combination of undergraduate and early career experiences	Acceptable
Young L, Kent L, Walters L. The John Flynn Placement Program: Evidence for repeated rural exposure for medical students. *Aust J Rural Health* 2011; 19(3): 147-153	Quantitative (N = 688) students and (N = 566 mentors), John Flynn Placement Program – medical students	Examining relationship between longitudinal placements and intent to practice rurally	Placement Evaluation data	High satisfaction for rural clinical placements and social experiences. Community contact rated highly and they spent time building connections in community, socialising with people similar age and interest and regional discovery. Sense of connectedness within community important and with student-mentor relationship.	Acceptable

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Appendix A. Search strategy applied to each database limiting to English language results published from 2011 to 2021 (Search undertaken Feb 2021)

Database Name	Search Strategy Applied	Fields searched
Scopus 1 database	("sense of place" OR identity OR connection OR embedded* OR belonging OR attachment OR friend* OR family OR families OR "social network" OR "social bond" OR "social networking" OR "social bonding" OR "social networks" OR "social bonds" OR environment*) AND (rural OR regional OR outback OR remote) AND ("health worker" OR "health workforce" OR "healthcare workforce" OR nurs* OR medic* OR doctor? OR physiotherapist? OR dentist? OR "physical therapist" OR "physical therapists" OR paramedic* OR "allied health") AND (career OR job OR workplace OR recruitment OR retention OR turnover) AND Austral*	Title-Abstract-Keyword
Web of Science Core Collection 1 database	("sense of place" OR identity OR connection OR embedded* OR belonging OR attachment OR friend* OR family OR families OR "social network" OR "social bond" OR "social networking" OR "social bonding" OR "social networks" OR "social bonds" OR environment*) AND (rural OR regional OR outback OR remote) AND ("health worker" OR "health workforce" OR "healthcare workforce" OR nurs* OR medic* OR doctor? OR physiotherapist? OR dentist? OR "physical therapist" OR "physical therapists" OR paramedic* OR "allied health") AND (career OR job OR workplace OR recruitment OR retention OR turnover) AND Austral*	Topic (Title-Abstract-Author Keywords-Keywords Plus)
MEDLINE (via Web of Science platform) 1 database	("sense of place" OR identity OR connection OR embedded* OR belonging OR attachment OR friend* OR family OR families OR "social network" OR "social bond" OR "social networking" OR "social bonding" OR "social networks" OR "social bonds" OR environment*) AND (rural OR regional OR outback OR remote) AND ("health worker" OR "health workforce" OR "healthcare workforce" OR nurs* OR medic* OR doctor? OR physiotherapist? OR dentist? OR "physical therapist" OR "physical therapists" OR paramedic* OR "allied health") AND (career OR job OR workplace OR recruitment OR retention OR turnover) AND Austral*	Topic (Title -Vernacular Title Abstract-Other Abstract-MeSH Terms-Keyword List-Chemical-Gene Symbol-Personal Name Subject-Space Flight Mission)
[EbscoHost Megafile Ultimate] - Academic Search Ultimate; APA PsycArticles; APA PsycInfo; CINAHL	("sense of place" OR identity OR connection OR embedded* OR belonging OR attachment OR friend* OR family OR families OR "social network" OR "social bond" OR "social networking" OR "social bonding" OR "social	Title-Abstract-Subject Terms

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with Full Text; E-Journals; Health Source: Nursing/Academic Edition; Psychology and Behavioral Sciences Collection; Sociology Source Ultimate 8 databases	networks" OR "social bonds" OR environment*) AND (rural OR regional OR outback OR remote) AND ("health worker" OR "health workforce" OR "healthcare workforce" OR nurs* OR medic* OR doctor? OR physiotherapist? OR dentist? OR "physical therapist" OR "physical therapists" OR paramedic* OR "allied health") AND (career OR job OR workplace OR recruitment OR retention OR turnover) AND Austral*	
ProQuest One Academic - ProQuest Central; ProQuest Dissertations & Theses Global 2 databases	("sense of place" OR identity OR connection OR embedded* OR belonging OR attachment OR friend* OR family OR families OR "social network" OR "social bond" OR "social networking" OR "social bonding" OR "social networks" OR "social bonds" OR environment*) AND (rural OR regional OR outback OR remote) AND ("health worker" OR "health workforce" OR "healthcare workforce" OR nurs* OR medic* OR doctor? OR physiotherapist? OR dentist? OR "physical therapist" OR "physical therapists" OR paramedic* OR "allied health") AND (career OR job OR workplace OR recruitment OR retention OR turnover) AND Austral*	Topic (Title-Abstract-Subjects)
TROVE 1 database	(friend* OR family OR families OR "social network" OR "social bond" OR "social networking" OR "social bonding" OR "social networks" OR "social bonds" OR environment* OR place OR belonging) AND (rural OR remote) AND ("health workforce" OR "healthcare workforce") AND (Australia OR Australian)	Advanced search > Research & Reports. Keyword field; restricted format to Thesis