

Factors influencing nursing and allied health recent graduates' rural versus urban preferred principal place of practice: A cross-sectional data linkage study

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Abstract

Introduction: Disparities between metropolitan and non-metropolitan health workforce must be addressed to reduce inequities in health care access. Understanding factors affecting early career practitioners' choice of practice location can inform workforce planning.

Objective: To investigate influences on rural practice location preferences of recent graduates.

Design: Cross-sectional analysis linked university enrolment, Graduate Outcomes Survey (GOS) and Australian Health Professional Regulation Agency (Ahpra) principal place of practice (PPP) for 2018 and 2019 nursing and allied health graduates from two Australian universities. Chi-squared tests and logistic regression compared rural versus urban PPP and locational preference.

Findings: Of 2979 graduates, 1295 (43.5%) completed the GOS, with 63.7% ($n = 825$) working in their profession and 84.0% of those ($n = 693$) in their preferred location. Ahpra PPP data were extracted for 669 (81.1%) of those working in their profession. Most reported influences were 'proximity to family/friends' (48.5%), 'lifestyle of the area' (41.7%) and 'opportunity for career advancement' (40.7%). Factors most influential for rural PPP were 'cost of accommodation/housing' (OR = 2.26, 95% CI = 1.23–4.17) and 'being approached by an employer' (OR = 2.10, 95% CI = 1.12–3.92). Having an urban PPP was most influenced by 'spouse/partners employment/career' (OR = 0.53, 95% CI = 0.30–0.93) and 'proximity to family/friends' (OR = 0.41, 95% CI = 0.24–0.72).

Discussion: While the findings add strength to the understanding that graduates who originated from a rural area are most likely to take up rural practice in their preferred location, varied social and professional factors are influential on decision-making.

Conclusions: It is imperative to recruit students from non-metropolitan regions into health professional degrees, as well as addressing other influences on choice of practice location.

KEYWORDS

early career, employment, health professional, metropolitan, rural, urban

1 | INTRODUCTION

Despite attempts in many developed countries to increase the number of health professionals practicing in rural and remote locations, there remains disparities in health workforce supply and skill imbalances between metropolitan and non-metropolitan regions.¹ Workforce shortages contribute to reduced access to and use of health care services, particularly in locations with lower population density.^{2,3} As a result of locational variations in patterns of health care access, health status and health outcomes are poorer for rural and remote populations, with the greatest disparity for Indigenous people.⁴ Ensuring an adequate supply of skilled health workforce is not only essential to reduce inequities of locational variations in health care access but also to enhance access to health care in non-metropolitan locations.

A review of health workforce planning models in OECD countries explored the balance between supply and demand in the context of the education system, such as the number of students and graduation rates.⁵ The report highlighted that ‘inflows’ of health professional students into the education system can be increased by setting quotas for government-funded university training places and encouraging students from rural backgrounds to enter university.⁵ Meanwhile, ‘outflows’ occur as graduates leave the workforce or redeploy for various reasons, including to address their choice of practice location.^{5,p.9} Some OECD countries, such as Australia, employ relatively sophisticated health workforce strategies and initiatives to address perceived shortfalls in rural and remote locations,⁶ which anecdotally can be less attractive places to work for early career practitioners than larger population centres.

Australian Government incentives for health professionals to ‘go rural’ have focused largely on general practitioners, with less support for nurses and allied health professionals.⁷ Other recent State-based initiatives have targeted nursing, allied health and ancillary staff to work in ‘the bush’.⁸ While those initiatives may contribute to filling the health workforce gaps in rural and remote locations, it remains unclear whether the location where health professionals are actually living and working is their preferred location and what the motivating influences are for

What this paper adds

- Insights on strategies to attract urban graduates to rural practice strengthen the evidence-base for recruiting students with urban and rural origin into health professional degrees.
- A crucial factor for all graduates includes proximity to family and friends, which favoured urban practice, from where most graduates originated.
- Cost of accommodation and housing and being approached by an employer for work are more important influences for graduates working in rural practice, than in urban practice.

What is already known on this subject

- Disparities in health workforce supply and skill imbalances between metropolitan and rural and remote regions contribute to poorer health outcomes in rural locations.
- Factors influencing practice location preferences of early career nursing and allied health graduates requires further exploration.
- Previous studies suggest that graduate health professionals’ preferences for rural practice are influenced by various spatial, social, and psychological factors and professional factors.

their choice of practice location. Understanding the factors that affect early career practitioners’ choice of practice location could help inform workforce planning initiatives and strategies aimed at nursing and allied health, as well as medicine.

Studies exploring the locational preferences of graduate health professionals point to spatial, social and psychological influences. Roberts et al.⁹ outlined the relationship between place and practice, highlighting that professional practice is enacted in place, shaped and shaped by professionals and their practices. The importance of ‘place’ has also been reported by Gillepsie et al.¹⁰ suggesting that relationships and bonds such as place, attachment, and

belonging are central to graduates' choice of practice location. Such factors were also reported by Sutton et al.,¹¹ who indicated that *'decisions about where to work and live following graduation was informed by connections to people, place and community creating a sense of belonging (rural or urban) and positive work life balance'*. Similarly, Campbell et al.¹² found that personal factors were important, such as rural lifestyle, family, friendships and community connectedness were important.

Other factors that influence health graduates practice location include experience, knowledge and the availability of support. The literature reports that several factors can be influential, including rural background,¹³ past or current knowledge about the nature of rural practice,¹¹ and undergraduate professional placement experience,¹³ as well as mentoring and support.⁴ One Australian study of nurses and allied health professionals between 15 and 17 years following completion of an undergraduate rural placement, found associations with previously having lived in a rural area and having their first job after they graduated in a rural location after they graduated.¹⁴ Another study found that the three highest ranked influences on allied health professionals' choice of practice location were 'type of work/clients', 'work/life balance' and 'career advancement'.¹⁵ That study highlighted that professional and employment-related factors become more influential as the practitioners' careers development. Factors that influence long-term retention, therefore, can differ from those influencing early-career choices and may include employee autonomy, work schedule flexibility, specific types of work, continuing education opportunities and the capacity to innovate or extend their practice roles.¹⁶

There is a need for more information about the factors that influence health professionals to gain employment in their actual, current practice location and whether it is their preferred choice. There is also a need to better understand what encourages them to stay, why they might ultimately choose to leave, and whether those factors differ between metropolitan and non-metropolitan practitioners. Data needs to be longitudinal to assess changes over the span of their careers. The Nursing and Allied Health Graduate Outcomes Tracking (NAHGOT) Study¹⁷ aims to collect and link such data from multiple sources to investigate the practice location intentions and outcomes for nursing and allied health graduates over a 10-year period. This article reports initial findings for recent graduates, collating routinely collected graduate employment and university enrolment data in order to investigate the reasons for graduates' choice of practice location. Comparisons are made to explore whether those reasons differ for nursing and allied health practitioners from rural versus metropolitan locations.

2 | METHODS

This study examined data for 2018 and 2019 graduates in nursing and allied health from two Australian universities. The main campuses of Monash University are in the capital city of Melbourne, with the main body of enrolments surrounding urban area, while the University of Newcastle has a catchment extending into regional and rural parts of New South Wales.¹⁴ The disciplines or professions included were Nursing, Midwifery, Occupational Therapy, Physiotherapy, Medical Radiation Sciences, Pharmacy and Paramedicine.

Human research ethics committee approval received from both universities.

Graduate information was linked from three sources, as follows:

- University enrolment data were used to determine the university of attendance, gender, age at course completion, citizenship and location of origin (home address).
- Graduate Outcomes Survey (GOS) data was accessed for 2019 and 2020. All graduates of Australian universities are invited to participate in the online GOS. The survey is administered by the Social Research Centre (SRC), under the Quality Indicators for Learning and Teaching (QILT) initiative to explore short-term labour force outcomes.¹⁸ In addition to the standard questions, the two universities entered into separate agreements with the SRC to include 15 NAHGOT-specific questions, which are shown in Table 1. For clarity, those included in the study sample who answered those questions will subsequently be referred to herein as 'NAHGOT-GOS responders', to distinguish them from others who did not respond and were not included in the final sample.
- Australian Health Practitioner Regulation Agency (Ahpra) data for registration status and principal place of practice (PPP) in their first year of practice was accessed for the targeted graduates.

The two universities separately allocated unique identifiers based on the student identification numbers for their own graduates. Student number is a field entered on the GOS and on new graduates' applications for professional registration with Ahpra. Lists of graduates' student numbers were sent to Ahpra by each university for matching to professional registration numbers. Registration numbers were then used to access data via the Practitioner Information Exchange portal on the Ahpra website.

Each university cleaned and coded their own data according to an agreed protocol before to aggregating data

TABLE 1 Questions on the Graduate Outcome Survey (GOS) that are specific to the Nursing and Allied Graduate Outcomes Tacking (NAGHOT) study.

Question number	Question wording	Response options		
1	Are you currently practicing in the health profession for which you most recently qualified?	Yes	No	
2	Are you currently working in your preferred geographic location?	Yes	No	
3	Which, if any, of the following factors influenced your decision to work in this location? (multiple responses possible, below)			
3A	Spouse/partner's employment or career	Yes	No	Not applicable
3B	Being approached by an employer for work	Yes	No	Not applicable
3C	Lifestyle of the area	Yes	No	Not applicable
3D	Previous placement/internship location	Yes	No	Not applicable
3E	Proximity to family or friends	Yes	No	Not applicable
3F	Access to professional/clinical supervision	Yes	No	Not applicable
3G	Good environment for raising children	Yes	No	Not applicable
3H	Cost of accommodation/housing	Yes	No	Not applicable
3I	Opportunity for career advancement	Yes	No	Not applicable
3J	Access to professional development opportunities	Yes	No	Not applicable
3K	Scope of practice within the role	Yes	No	Not applicable
3L	Desire to return to/remain in hometown	Yes	No	Not applicable
3M	Specialise/sub-specialise in a particular clinical area	Yes	No	Not applicable
3N	It was the only job available	Yes	No	Not applicable
3O	Other factors influenced the decision	Yes	No	Not applicable

in a common repository prior to analysis. Locational data was coded for Australian Statistical Geography Standard - Remoteness Areas (ASGS-RA),¹⁹ Modified Monash Model (MMM) classification,²⁰ and Socio-Economic Indexes for Areas (SEIFA).²¹

2.1 | Statistical analysis

Chi-square tests for difference in proportions were used to analyse cohort characteristics and stated factors related to practice location. Variables included were: age at course completion; university of attendance; gender; remoteness (ASGC-RA and MMM) and SEIFA-IRSD status of enrolment address; citizenship; discipline or profession; and Ahpra registration status and PPP. Characteristics of NAHGOT-GOS responders were compared to other graduates from the same years. Analysis was also performed of surveyed variables that affected practice location among all Ahpra registered GOS responders, for those working in their preferred geographic location, and for rural versus urban PPP.

Logistic regression explored the odds of rural PPP by university of attendance, location of origin and SEIFA-IRSD status. Discipline and MMM were not included in regression analyses due to small numbers within some

strata. Survey responses about the choice of practice location were modelled for two sub-groups:

- all Ahpra registered respondents regardless of preferred geographic location (Model 1); and
- those who said they were working in their preferred location (Model 2).

For each sub-group, the eight most selected survey responses were included in regression models, as well as those that differed significantly ($p < 0.05$) by rural and urban PPP on Chi-square analysis. Not all 15 questions were included in the regression models, considering the low frequency of selection for some questions. After consideration of plausible factors based on background knowledge,²² variable selection was based on a combination of response frequency and significance; the number of variables, sample size and events fraction criteria.²³ Univariate odds ratios with 95% confidence limits were generated for each factor, before full multivariate modelling to produce adjusted odds ratios, controlling for all other factors in the model. For precision of estimates, in recognition that the most important factors guiding decisions on practice location may not be differentiated by rural versus urban differences, the full model was retained. Further model reduction was not relevant to this study.

3 | RESULTS

A combined total of 2979 graduates from two universities completed their studies in the relevant disciplines in 2018 and 2019. Of those, 1295 (43.5%) responded to the GOS survey sent to all university graduates. Eight hundred and twenty-five graduates, or 63.7% of relevant GOS responders, indicated that they were working in the profession in which they had most recently qualified and were thus included in the sample of NAHGOT-GOS responders. Of those, 693 (84.0%) said they were working in their preferred geographic location, with no significant difference between those located in urban versus non-urban PPPs ($p=0.655$). Ahpra records were able to be linked for 669 (81.1%) of the NAHGOT-GOS responders.

Compared to non-responders from the same graduate cohort, NAHGOT-GOS responders were more likely to be females, Australian citizens and Ahpra-registered ($p<0.05$) (see Table 2), although the differences were less than 7%. There were no significant differences between responders and non-responders in relation to age at completion, rural origin, SEIFA-IRSD status of their home address at enrolment or in having a rural PPP in their first postgraduate year (Table 2). There was a marginally higher proportion of NAHGOT-GOS responder among Monash University graduates than University of Newcastle graduates (29.7% vs. 26.0%, $p=0.025$). In general, Monash University graduates were significantly younger and more likely to be non-citizens ($p<0.001$). Monash University graduates were also less likely to originate from a rural area (10.4%) compared to University of Newcastle graduates (28.3%) ($p<0.001$) and less likely to have a rural PPP (7.4% vs. 22.6%, $p<0.001$).

The relative importance of different survey factors by rural and urban PPP for Ahpra-registered NAHGOT-GOS respondents is shown in Table 3. Overall, the three most reported influences on practice location were 'proximity to family and friends' (48.5%), 'lifestyle of the area' (41.7%) and 'opportunity for career advancement' (40.7%). Those factors remained the most important factors within each group, when broken down by rural versus major city PPP. The influence of lifestyle was not significantly different between those with rural (48.0%) versus urban PPP (40.3%) ($p=0.115$). For those working in major cities, 'proximity of family or friends' was a statistically significant stronger influence ($p=0.035$). 'Cost of accommodation and housing' and 'being approached by an employer for work' were more influential factors for the rural compared to the urban PPP group, though less influential overall compared to other factors.

3.1 | Logistic regression for working in a rural location

Binary logistic regression was used to investigate the likelihood of graduates' PPP being in a rural location. Table 4 shows the analysis of factors affecting the odds of survey respondents working in a rural location, regardless of whether or not their PPP was in their preferred location (Model 1). University of attendance, socio-economic disadvantage and rural origin were significant demographic influences related to graduates' PPP being in a rural location ($p<0.05$). The most influential factor was graduates' home address at enrolment having been in a regional, rural or remote area, with odds ratio 13 times greater than those from major cities. University of enrolment was also influential, University of Newcastle graduates having three times the odds of having a rural PPP compared to Monash University graduates. After controlling for the least influential survey and demographic factors in the model, 'cost of accommodation/housing' and 'being approached by an employee for work' were significant influences on graduates having a rural PPP ($p<0.05$; OR >2.0). Meanwhile, 'proximity to family or friends' and a 'spouse/partner's employment or career' were significantly more influential on graduates having an urban PPP ($p<0.05$; OR <0.6).

Table 5 shows Model 2, analysis limited to those respondents who indicated that they were working in their preferred location. The odds ratio for having a rural PPP for those who originated from a non-urban location was considerably greater, being more than 20 times that for respondents of major city origin. However, having a home address in a location with a SEIFA-IRSD score in the lowest quintile was no longer associated with having a rural PPP. The 'cost of accommodation/housing', 'proximity to family or friends' and being 'approached by an employer for work' remained significantly influential factors for those with a rural versus urban PPP, with the 'cost of accommodation/housing' yielding a higher odds ratio than in Model 1. Meanwhile, proximity to family or friends remained more important for those with a major city PPP but spouse/partner's employment or career was no longer a significant factor.

4 | DISCUSSION

As was expected, not all nursing and allied health new graduates succeeded in getting a job in their preferred geographic location. The findings of this study reinforce findings of previous studies,^{14,19} add strength to the understanding of the key factors that influence the choice of practice location and encourage reflection on

TABLE 2 Characteristics of health graduates who answered at least one NAHGOT-specific GOS question (respondents) compared to non-respondents from the same graduate years.

Graduate characteristics	Graduates of University of Newcastle (UON) and Monash University (MU) combined			
	Total <i>n</i> (%)	GOS respondents <i>n</i> (%)	GOS non-respondents <i>n</i> (%)	<i>p</i> value ^b
Total relevant graduates	2979	825 (27.7%)	2154 (72.3%)	–
University of attendance				
Monash University (MU)	1364 (45.8%)	405 (29.7%)	959 (70.3%)	0.025 ^a
University of Newcastle (UON)	1615 (54.2%)	420 (26.0%)	1195 (74.0%)	
Age at course completion				
Median age (IQR) (years)	2979 (100%)	24 (IQR = 22–29)	24 (IQR = 22–28)	–
Graduate age <25 years (%)	1714 (57.5%)	465 (56.4%)	1249 (58.0%)	0.423
Gender (where stated <i>n</i> = 2967) (<i>n</i> , %)				
Male	600 (20.2%)	128 (15.5%)	472 (22.0%)	<0.001 ^a
Female	2367 (79.8%)	696 (84.5%)	1671 (78.0%)	
ASGC-RA classification of home address at enrolment (where known <i>n</i> = 2870) (<i>n</i> , %)				
Regional/Rural/Remote (RA2-5)	574 (20.0%)	173 (21.5%)	401 (19.4%)	0.197
Major cities (RA-1)	2296 (80.0%)	630 (78.5%)	1666 (80.6%)	
SEIFA-IRSD for SA2 of home address at enrolment (where known <i>n</i> = 2870) (<i>n</i> , %)				
Most disadvantaged quintile	368 (12.8%)	95 (11.8%)	273 (13.2%)	0.322
Least disadvantaged quintile	2502 (87.2%)	708 (88.2%)	1794 (86.8%)	
Citizenship (<i>n</i> , %)				
Australian citizen	2704 (90.8%)	766 (92.9%)	1938 (90.0%)	0.015 ^a
Not Australian citizen	275 (9.2%)	59 (7.1%)	216 (10.0%)	
Nursing and allied health disciplines (<i>n</i> , %)				
Nursing	1622 (54.5%)	443 (53.7%)	1179 (54.7%)	
Midwifery	74 (2.5%)	27 (3.3%)	47 (2.2%)	
Occupational therapy	313 (10.5%)	96 (11.6%)	217 (10.1%)	
Physiotherapy	357 (12.0%)	136 (16.5%)	221 (10.3%)	
Medical radiation science (MRS) ^c	309 (10.4%)	58 (7.0%)	251 (11.7%)	
Podiatry	90 (3.0%)	27 (3.3%)	63 (2.9%)	
Paramedicine	214 (7.2%)	38 (4.6%)	176 (8.2%)	
Ahpra registration (<i>n</i> , %)				
Ahpra registered	2265 (76.0%)	669 (81.1%)	1596 (74.1%)	<0.001 ^a
Not Ahpra registered	714 (24.0%)	156 (18.9%)	558 (25.9%)	
Ahpra principal place of practice (where stated <i>n</i> = 2249) (<i>n</i> , %)				
Regional/Rural/Remote (RA2-5)	391 (17.4%)	125 (18.7%)	266 (16.8%)	0.290
Major cities (RA-1)	1858 (82.6%)	544 (81.3%)	1314 (83.2%)	

^aStatistically significant at $\alpha = 0.05$.

^bChi-square test.

^cDue to a course code and administrative changes, 56 Medical Radiation Science GOS respondents from the UON were not asked NAHGOT-specific GOS survey questions in 2020.

the relative importance of those factors. The three most reported influences on practice location were ‘proximity to family and friends’, ‘lifestyle of the area’ and ‘opportunity for career advancement’, each selected by at least 40% of respondents. ‘Cost of accommodation/housing’ and

‘being approached by an employee for work’ were more influential on choice of practice location for those with a rural PPP. For graduates with an urban PPP, ‘proximity to family or friends’ and ‘spouse/partner’s employment or career’ were significantly more influential.

TABLE 3 Responses to NAHGOT-specific questions about choice of practice location from AHPRA registered NAHGOT-GOS respondents from all disciplines, by principal place of practice.

Factors that influenced the decision regarding practice location of AHPRA registrants (response = 'yes')	Total (n = 666)	Principal place of practice (PPP)		p value ^a
		Rural	Major city	
A. Spouse/partner's employment or career	196 (29.4%)	35 (28.0%)	161 (29.8%)	0.697
B. Being approached by an employer for work	96 (14.4%)	27 (21.6%)	69 (12.8%)	0.011 ^b
C. Lifestyle of the area	278 (41.7%)	60 (48.0%)	218 (40.3%)	0.115
D. Previous placement/internship location	220 (33.0%)	40 (32.0%)	180 (33.3%)	0.785
E. Proximity to family or friends	323 (48.5%)	50 (40.0%)	273 (50.5%)	0.035 ^b
F. Access to professional/clinical supervision	195 (29.3%)	30 (24.0%)	165 (30.5%)	0.150
G. Good environment for raising children	83 (12.5%)	17 (13.6%)	66 (12.2%)	0.669
H. Cost of accommodation/housing	113 (17.0%)	34 (27.2%)	79 (14.6%)	<0.001 ^b
I. Opportunity for career advancement	271 (40.7%)	50 (40.0%)	221 (40.9%)	0.862
J. Access to professional development opportunities	198 (29.7%)	35 (28.0%)	163 (30.1%)	0.639
K. Scope of practice within the role	182 (27.3%)	33 (26.4%)	149 (27.5%)	0.796
L. Desire to return to/remain in hometown	193 (29.0%)	32 (25.6%)	161 (29.8%)	0.356
M. Specialise/sub-specialise in a particular clinical area	114 (17.1%)	16 (12.8%)	98 (18.1%)	0.155
N. It was the only job available	76 (11.4%)	17 (13.6%)	59 (10.9%)	0.393
O. Other factors influenced the decision	39 (5.9%)	8 (6.4%)	31 (5.7%)	0.774
P. None of the above	9 (1.4%)	1 (0.8%)	8 (1.5%)	0.554

^aChi-square test.^bStatistically significant difference between Rural versus Major City PPP ($\alpha=0.05$).

Rural origin, university of attendance and socio-economic disadvantage were significant demographic influences related to rural practice. Whether or not the graduates were working in their preferred location, their location of origin or home address at the time of enrolment was the main influential factor. The importance of staying close to home^{24,25} and the location of a spouse or partner's employment or career²⁶ have been noted previously. In this study, those originating from rural areas had the greatest likelihood of taking up rural practice in their preferred location, adding to the evidence that rural origin is an influential factor^{13,27} on new graduates entering rural practice. The University of Newcastle had a significantly higher proportion of graduates with a rural PPP, which reflects the difference in rural origin of graduates from the two universities.¹⁴ To increase the rural and remote health workforce for the future, it is imperative to recruit students from non-metropolitan regions into health professional degrees.

There are instances in this study of cross-over or interference between the factors that affect the choice of rural practice. The apparent influence of coming from a socially disadvantaged location in the logistic regression analysis 'regardless of preferred location' (Table 3), was largely because, in general, rural communities tend to have lower SEIFA-IRSD scores than urban areas.²⁸ Hence, while

having a home address in the lowest quintile of SEIFA-IRSD scores seeming led to higher odds of graduates having non-urban PPP, that finding also reflects the influence of graduates' rural origin. Without further evidence, it cannot be assumed that being from a disadvantaged location is itself a predictor of future rural practice. Further investigation of that factor is recommended.

Though a less common factor overall, the cost of accommodation or housing was also influential on taking up a position in a rural location. According to the Australian Institute of Health²⁹ housing and rental affordability vary across Australia, with some outer metropolitan and regional locations have experienced a decrease in supply. In the longer-term, housing affordability may be eroded by the higher cost of living in a rural location.³⁰ Nevertheless, it suggests a need for short-term financial incentives for nursing and allied health new graduates, as is available for medical graduates³¹ to take up residence in rural areas after leaving university.

Meanwhile, one factor, an approach to a graduate by an employer to take up a position, appeared to be more influential for those with a rural compared to a major city PPP. That points to the desirability of rural employers being proactive in choosing future employees, be that during students' undergraduate studies or even prior to enrolment, perhaps by offering scholarships. It

TABLE 4 Binary logistic regression for principal place of practice (PPP) in a rural location^a for GOS-NAHGOT survey respondents regardless of working in their preferred location (Model 1) ($n = 652$).

Factors related to current practice location (<i>n</i> = 652)		Univariate models (unadjusted)				Multivariate model (adjusted)			
Model 1: Rural PPP regardless of preferred location		<i>p</i> value	Odds ratio	Lower 95% CI	Upper 95% CI	<i>p</i> value	Odds ratio	Lower 95% CI	Upper 95% CI
A priori demographic factors									
Home address in SEIFA-IRSD 'lowest 20%' versus 'highest 80%' ^b		0.053	1.71	0.99	2.95	0.035	2.07	1.05	4.06
Home address in 'RA2-5' ^a versus 'RA1' ^{a,b}		<0.001	12.12	7.73	19.01	<0.001	13.16	7.91	21.88
University of Newcastle versus Monash University ^b		<0.001	3.38	2.10	5.46	<0.001	2.92	1.65	5.15
A priori reasons given in GOS survey for current practice location ^c									
A. Spouse/partner's employment		0.858	0.96	0.62	1.48	0.028	0.53	0.30	0.93
B. Being approached by an employer		0.015	1.86	1.13	3.08	0.020	2.10	1.12	3.92
C. Lifestyle		0.125	1.36	0.92	2.03	0.952	0.98	0.58	1.67
D. Previous placement/internship		0.985	0.99	0.66	1.52	0.320	1.32	0.76	2.29
E. Family or friends		0.031	0.64	0.43	0.96	0.002	0.41	0.24	0.72
F. Professional/clinical supervision		0.175	0.73	0.47	1.15	0.649	0.86	0.46	1.62
H. Accommodation/housing		<0.001	2.35	1.47	3.77	0.009	2.26	1.23	4.17
I. Career advancement		0.927	1.02	0.68	1.52	0.212	1.47	0.80	2.68
J. Professional development		0.702	0.92	0.60	1.42	0.586	1.21	0.60	2.44
L. Return to or remain in hometown		0.400	0.83	0.53	1.29	0.454	1.25	0.70	2.24
M. Specialise/sub-specialise		0.188	0.68	0.39	1.21	0.079	0.52	0.25	1.08

^a Australian Standard Geographical Classification – Remoteness Area (ASGC-RA).

^b Reference group.

^c Univariate results for top eight GOS reasons, plus factors that varied by rural/urban PPP ($p < 0.20$).

TABLE 5 Binary logistic regression for principal place of practice (PPP) in a rural location for GOS-NAHGOT survey respondents working in their preferred geographic location (Model 2) ($n = 550$).

Factors related to current practice location ($n = 550$)	Univariate models (unadjusted)				Multivariate model (adjusted)			
	<i>p</i> value	Odds ratio	Lower 95% CI	Upper 95% CI	<i>p</i> value	Odds ratio	Lower 95% CI	Upper 95% CI
Model 2: Rural PPP for those in preferred location								
<i>A priori</i> demographic factors								
Home address in SEIFA-IRSD 'lowest 20%' versus 'highest 80%' ^{a,b}	0.359	1.37	0.70	2.71	0.182	1.81	0.76	4.32
Home address in 'RA2-5' ^a versus 'RA1' ^{a,b}	<0.001	18.03	10.34	31.40	<0.001	21.08	11.24	39.53
University of Newcastle versus Monash University ^b	<0.001	2.72	1.58	4.67	0.039	2.05	1.04	1.06
<i>A priori</i> reasons given in GOS survey for current practice location ^c								
A. Spouse/partner's employment	0.553	1.16	0.72	1.87	0.147	0.63	0.34	1.18
B. Being approached by an employer	0.096	1.66	0.91	3.01	0.048	2.16	1.01	4.61
C. Lifestyle	0.006	1.93	1.21	3.09	0.507	1.24	0.66	2.32
D. Previous placement/internship	0.992	1.00	0.62	1.62	0.830	1.07	0.56	2.04
E. Family or friends	0.345	0.80	0.51	1.27	0.043	0.51	0.27	0.98
F. Professional/clinical supervision	0.112	0.65	0.38	1.11	0.105	0.54	0.26	1.14
H. Accommodation/housing	<0.001	2.62	1.55	4.42	0.003	2.85	1.42	5.71
I. Career advancement	0.577	0.87	0.55	1.40	0.680	1.17	0.56	2.46
J. Professional development	0.688	0.90	0.54	1.49	0.275	1.61	0.69	3.76
L. Return to or remain in hometown	0.750	1.08	0.67	1.75	0.072	1.82	0.95	3.50

^a Australian Standard Geographical Classification – Remoteness Area (ASGC-RA).

^b Reference group.

^c Univariate results for top eight GOS reasons, plus factors that varied by rural/urban PPP ($p < 0.20$).

is noted that the influence of graduates who had a previous professional placement in a rural location appeared to have less of an influence than suggested by previous studies.^{32,33}

In the logistic regression analysis, both lifestyle and professional factors did not appear to be as influential as perhaps expected on choosing rural over major city practice. Professional factors included access to professional supervision and mentoring, career advancement and professional development, and opportunities for clinical specialisation. The fact that those factors had a less than expected influence on choosing rural practice may be because the study cohort were in the early stages of their career and did not yet prioritise such factors.¹⁵ Further, perceptions about the nature of rural practice and perceived lack of professional development opportunities can negatively impact recruitment. Cleland et al.³⁴ suggests that it is the working conditions that are of greatest importance to trainee doctors and the same is likely to be true for all early career health professionals. While hospitals and other health care institutions are unable to change their location, they can create positive working conditions. Similarly, the influence of university of enrolment is subject to many variables, such as location,³⁵ institutional identities,³⁶ or school student engagement.³⁷ This suggests a need for different models, strategies and initiatives by different universities to produce, attract, sustain and retain students who may graduate and prefer to practice in rural and remote locations.

More needs to be done to promote positive aspects of rural practice³⁸ and further investigation is needed, with longitudinal follow-up of graduates as they mature professionally. Roberts et al.⁹ suggested that fostering professional identity can bring social and structural elements together. With professional maturation, 'place' competencies and capabilities required for rural practice evolve with 'unique, specific combinations of cultural, community and environmental factors'.⁹ Ham³⁹ suggested that social identity, attachment and uncertainty can hinder newcomers' attempts to integrate into the community. It is vital to reinforce graduates' decision making by providing mentoring and social and professional supports to encourage and inspire rural practice in both public and private institutions during their early career. More could perhaps be done in integrating new graduates into the community when they arrive in rural areas, encouraging networking, potentially making friends and reinforcing the positive social and emotional aspects of rural life.^{11,40} It is acknowledged, however, that early career employment in a rural location does not necessarily translate into retention. Hence, the need for long-term tracking of rural and remote health professional graduates and gaining a clearer understanding of factors that affect their employment choices.

4.1 | Strengths and limitations

Linking university enrolment and Ahpra databases, as well as routinely collected GOS data, makes this study a valuable addition to the literature, as it is possible to moderate or adjust for the effect of multiple predictors. However, linkage was limited by some missing data, such as GOS respondents who did not appear in the Ahpra database, and visa-versa, for unknown reasons. Inconsistencies and potential missing data present challenges to the use of administrative data and impose limitations on sample size.

Restricting inclusion to those who participated in the wider GOS survey who also responded to NAHGOT-specific questions and held current Ahpra registration means the overall sample size was relatively small. Differences for non-NAHGOT-GOS responders in terms of age, gender, rural origin and socio-economic status, for example, were not able to be explored. Meanwhile, because of the small respondent numbers for those not working in their preferred location, it was not valid to make comparisons with that cohort using logistic regression. Aggregating data from more Australian universities would be desirable to increase sample size, as would more in-depth, qualitative research to examine the influence of a wider array of influences and their importance.

Care should be taken when interpreting the findings, as not all health professions have the opportunity to choose their preferred early career practice location. For some professions, choice is limited by the requirement to undertake an internship or mandatory period of professional development. Also, some new graduates may be unable to take up a position in a preferred non-metropolitan location because of a lack of job availability outside urban centres, perhaps due to restrictions on funding and staffing levels. Although, NAHGOT-GOS responders were given an open-ended opportunity to identify 'other influences' on their employment choices, most did not respond. Responses that were forthcoming reinforced the answers to closed-ended questions rather than raising issues such as job availability.

5 | CONCLUSIONS

Increasing the size and otherwise developing the rural and remote health workforce is essential to ensure that the population outside major metropolitan centres has access to high-quality health care. It is important, therefore, to monitor progress towards that goal and to better understand factors that may promote or inhibit its attainment. This study provides insight into factors associated with

new graduates' PPP and reasons for their choices, whether or not they were working in their preferred location.

Closeness to family and friends, lifestyle and opportunity for career advancement were important to all graduates. Rural origin, university of attendance and socio-economic disadvantage were significant demographic factors that influenced rural practice. However, for graduates of urban origin, connections to family and friends appear to work against rural practice, while cost of accommodation and being offered work by an employer, worked in favoured of rural practice.

While most graduates in this study were working in their preferred geographic location, more information is needed about those who are not working in their preferred location. Ongoing longitudinal research of larger cohorts and in-depth qualitative research is necessary to better understand the influences on choice of practice location. Nevertheless, the findings of this study may help inform development of models, strategies, and initiatives to attract, sustain, retain and inspire nursing and allied health professionals to 'go rural'.

AUTHOR CONTRIBUTIONS

Karin Fisher: Conceptualization; writing – review and editing; writing – original draft; methodology; project administration; supervision; investigation. **Julie Depczynski:** Writing – review and editing; formal analysis; methodology; conceptualization; writing – original draft; investigation. **Eleanor Mitchell:** Validation; writing – review and editing; writing – original draft. **Anthony Smith:** Validation; writing – review and editing; writing – original draft.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest. All the authors are employed by either Monash University, the University of Newcastle under external funding arrangements with the Australian Government Department of Health via the Rural Health Multidisciplinary Training (RHMT) Program. The funder had no role in establishing the NAHGOT study, the scope of which extends beyond the funding requirement.

ETHICAL STATEMENT

Human research ethics committee approval received for both universities (Monash University, ID: 7962; University of Newcastle, H-2017-0332).

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