

# Comparing rural and regional migration patterns of Australian medical general practitioners with other professions: implications for rural workforce strategies



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## Abstract

### Background

The shortage of professional workers in rural and regional Australia continues as a major policy challenge. There has been substantially more strategy investment for the medical general practitioner (GP) profession than for other professions, particularly at the start of their careers.

### Aims

To examine differences between domestic migration patterns of GPs and other professionals to rural and regional zones in Australia for younger, mid-life and older workers.

### Data and methods

Data from the Australian Bureau of Statistics (ABS) 2011 Census were used to examine five-year migration rates for professionals in five ABS occupational classifications: generalist medical practitioners (GPs); engineering professionals; legal professionals; education professionals; and other health professionals. Migration volumes were benchmarked for GPs and compared both for other professions and career stage.

### Results

GPs were less likely than other professionals to migrate from major urban to rural zones, regional to rural zones, or rural to regional zones. Younger GPs had the highest rural migration rates, while mid-life and older GPs were least likely to migrate to rural and regional zones. In contrast, increasingly age was associated positively with migration to rural zones for those in the other four professions.

### Conclusions

Despite concerted policy efforts to encourage more GPs to move to rural areas, overall rural migration rates for GPs are lower than for other professionals, especially for older workers. Further investigation of the links between GP migration patterns and workforce policies needs to be undertaken to inform the application or otherwise of workforce strategies used by other professions.

### Keywords

Professional migration; medical general practitioners (GPs); counter-urbanisation; rural; regional; workforce; gravity model.

## 1. Introduction

Encouraging professionals to work in rural and regional parts of Australia remains a policy challenge. Different professional groups have adopted diverse strategies for addressing geographic maldistribution and the persistent shortage of workers in rural areas (Corcoran, Faggian and McCann 2010). The health and education professions have developed the most comprehensive strategies (Jenkins, Reitano and Taylor 2011). Other professions, such as engineering and the legal profession, lament having few if any rural workforce strategies (Campbell and Lindsay 2013; Sharma, Oczkowski and Hicks 2016).

Among all the professions, medical general practitioners (GPs) appear to have attracted the most policy attention and resources over at least the past two decades (Walters et al. 2017). In recent times it has been argued that Australia has a sufficient supply of doctors for non-metropolitan areas as a whole, but that significant shortages persist in various kinds of 'rural areas', particularly those with smaller populations and more dispersed settlements (Walters et al. 2017).

National analyses of need and distribution are rare for other professions. Despite differences in the extent of workforce strategies applied to them, there have been few comparative studies of rural workforce issues or migration patterns among other professions (Carson et al. 2010). A better understanding of the similarities and differences in migration patterns is a necessary first step in understanding the applicability and transferability of strategies used for professionals in other sectors to the GP workforce.

Recruitment and retention of labour in rural and regional areas involves stimulating particular migration patterns. Researchers have attempted to track GP movements between major urban, rural and remote locations (Mazumdar and McRae 2015; McGrail and Humphreys 2015; Ricketts and Randolph 2007). However, the extent to which the observed patterns in these studies differ from what might be considered theoretically or comparatively 'normal' has not been considered. Notably, it is not known if the observed migration patterns are unique to GPs or apply across professions, and whether observed patterns are consistent with rural migration theories.

Migration patterns change throughout the life course and as careers progress (Kley 2011). Increasing occupational mobility among all professions (Perales 2014) means that understanding of life course and life stage impacts on locational choice is paramount. A life-stage perspective is thus essential to understanding the spatial distribution of professional workers in Australia (McGrail and Russell 2016).

This paper addresses some of the gaps in knowledge about professional migration in Australia by comparing migration patterns between GPs and other professionals across career stages. The paper limits its discussion to migration within Australia, recognising that drivers of international migration are likely to be substantially different. The findings are interrogated in relation to leading rural migration theories. By using GPs as a benchmark, the research also allows for some insights into how useful workforce strategies for the general medical practitioner profession may be for other professions.

## 2. Rural migration theory

Rural migration theory suggests a number of potential drivers of domestic migration from urban to rural areas. These can be divided broadly into economic and lifestyle drivers which may include, for

example, the prospect of cheaper housing, higher pay and a 'better' or different lifestyle. A substantial focus of the economic literature has been on so-called 'escalator migration' in which younger workers are attracted to rural areas by the promise of rapid career development (Smith and Sage 2014). It is increasingly recognised, however, that economic motivations may apply also at other stages of life (Martel, Carson and Taylor 2013). Likewise, while 'lifestyle' dominates in discussions of push-pull factors for older worker migration to rural areas (Han 2016; Argent et al. 2014), lifestyle motives may apply also to younger workers. Nevertheless, a life stage framework which postulates that there are substantial opportunities for rural migration for younger and older workers, in particular, is a useful foundation for examining professional migration patterns.

Strategies aimed at drawing GPs to rural areas have considered both economic and lifestyle factors. More recently, they have focused additionally on improved career pathways and career development (for an overview of strategies in Australia in the past 20 years, see Walters et al. 2017). Economic inducements in the form of financial incentives may include additional service payments and support for housing and continuing education costs. These tend to be governed by the degree of 'rurality' of the practice location and increase accordingly. Lifestyle strategies may include support for partners and children to assist the family unit to embed more fully in the community.

There is some evidence of the effectiveness of career development strategies for GPs, such as providing opportunities for postgraduate vocational training in rural areas, mixed evidence of the effectiveness of financial incentive programs and little known about the effectiveness of lifestyle related strategies (Verma et al. 2016). Nevertheless, the importance of 'life stage' is implicit in the suite of strategies developed for GPs in Australia. Most rural workforce strategies focus on encouraging graduate doctors to select rural clinical training early in their career with the hope that some will 'step down' from the larger regional training centres to smaller rural practices in subsequent years (Farmer et al. 2015; Mullan, Chen and Steinmetz 2013).

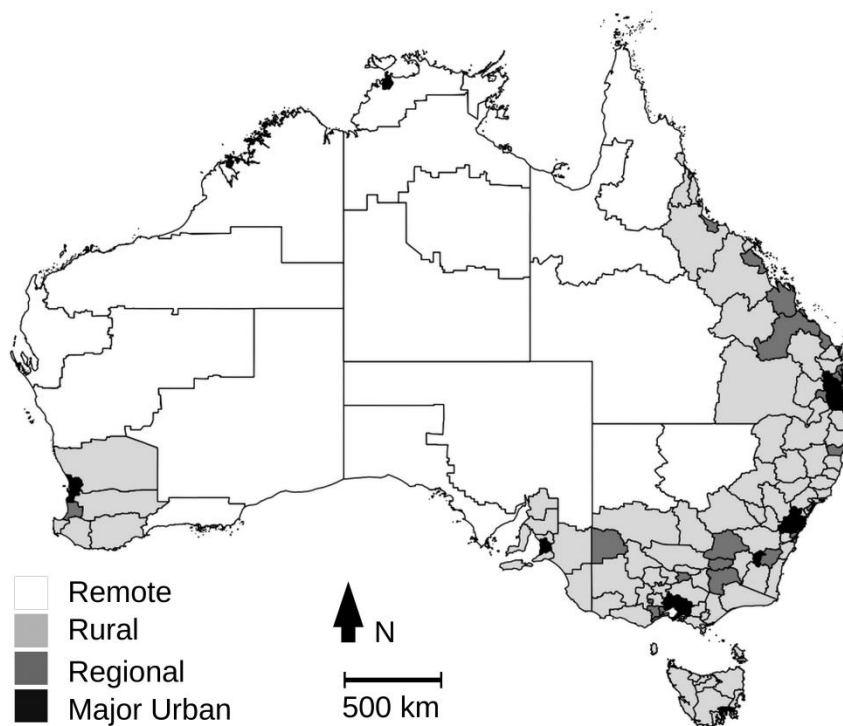
In addition to rural-based education, substantial effort has been invested in encouraging people of 'rural origin' or 'rural background' (meaning they spent part or all of their childhood in rural areas) to, firstly, undertake medicine and, secondly, specialise in rural relevant medicine, predominantly as GPs (Sureshkumar et al. 2017). The principal outcome of rural workforce strategies for GPs has been to create a 'rural specialisation' which is selected very early in a doctor's career. Meanwhile, rural strategies targeting older GPs have focused largely on retention with little consideration given as to how lifestyle or amenity migration may also be stimulated for GPs whose family responsibilities, for example, are no longer so tightly tied to larger regional or major urban centres. Other health professions have also been keen to adopt some of the strategies used to encourage spatial redistribution of the GP workforce, with particular attention to early career oriented strategies (Hay et al. 2017).

The education profession also has a long history of rural-focused workforce strategies which include rural practicum placements and career advancement incentives for periods of rural service (Kelly and Fogarty 2015). In other professions, rural workforce strategies have tended to be less systematically employed. However, there are now increasing calls for lessons from the health and education sectors to be learned in professions such as the legal profession (Browne 2016) and engineering (Sharma, Oczkowski and Hicks 2016).

Rural workforce strategies may well be transferable between professions because of the universality of some of the rural migration theories considered above. However, structural differences in professions may mean that strategies which are effective for one profession may be less so for others (Perales and Vidal 2013). Clearly, arguments could be made that each profession will have its own enablers of, and constraints to, rural migration. However, empirical evidence of migration patterns between professions is yet to be published. Along with differing demands for particular professions, factors such as age of entry into the workforce, gender balance within occupations and options for career pathways may provide varying opportunities for, and barriers to, rural migration at different life stages. This paper provides some insights into how such opportunities may be grown and barriers lowered.

### 3. Data and methods

This research utilises the Modified Monash Model (MMM) developed for use in GP retention policies in Australia (Hudson and May 2015). This model distinguishes four types of geographical zone: major urban; regional; rural; and remote. For the purposes of our research the zones are defined at the national level (Figure 1) with no distinction made between moves within or between the states and territories.



**Figure 1:** Major urban, regional, rural and remote zones based on SA3s.

*Source:* ABS SA3 shapefile with concordance to zones by authors.

The MMM as one of many systems for classifying urban, regional, rural and remote areas in Australia. It closely relates to the Australian Statistical Geography Standard – Remoteness Areas (ASGS-RA) classification, but provides a more nuanced distinction within the two ‘regional’ categories based on population size rather than remoteness. The MMM is selected and used in this research because of its immediate relevance to GP workforce distribution strategies.

In this paper, the ‘major urban’ zone consists of all major cities (MMM category 1, which is nearly identical to ASGS-RA 1). MMM distinguishes between ‘regional’ centres with more than 50,000 residents (MM category 2), and more sparsely populated ‘rural’ areas with under 50,000 residents (MM categories 3–5). The MM also incorporates ‘remote’ and ‘very remote’ locations (MM categories 6–7), which are nearly identical to ASGS-RA 4 and 5 and include small populations that are isolated from larger urban centres.

The substantial differences in human geography between rural and remote locations (Taylor 2016) mean that modelling patterns of migration to the latter requires separate attention. Migration to remote and very remote locations consequently is not considered in this paper. Likewise, the substantial impact of recent overseas immigrants on the geographic distribution of health and other professionals in Australia warrants separate attention (Golebiowska et al. 2016; Negin et al. 2013; Terry, Woodroffe and Ogden 2013). Hence, professionals who had arrived in Australia within the past five years were also excluded from this study.

Data drawn from the ABS 2011 Census (Australian Bureau of Statistics 2011) included:

- occupation – separately identifying ‘generalist medical practitioners’ (GPs), other health professionals, education professionals, engineering professionals and legal professionals
- age – divided into ‘younger’ (less than 40 years), ‘middle’ (40–54 years) and ‘older’ (55 years and over) as broad proxies for career stage
- place of residence on Census night 2011
- place of residence five years’ prior to Census night.

Place of residence was defined at Statistical Area Level 3 (SA3), which is a classification intended to represent regional agglomerations identified for district-level activities like health, education or natural resource management (Peters et al. 2016). SA3 units were then categorised as major urban, regional, rural and remote zones. ‘Migrants’ were identified as individuals who had a residential address in one zone on Census night 2011 and in a different zone five years’ earlier. Observed migration matrices were constructed separately for each profession, and for younger aged, middle aged and older aged populations in each profession.

A gravity model (see Anderson 2011) was used to estimate the proportion of migrants from one zone who would be expected to move to another zone, given the size of the professional group and the initial geographic distribution. The gravity model approach accounts for the substantial differences in job availability in different zones for different professions. The gravity model assumed that the distance between zones was identical, and that there were no intervening factors which would influence migration between any two zones (such as differences in income).

Following Shen’s approach (Shen 2016),

$$M_{ij} = P_i P_j$$

$M_{ij}$  is the expected migration between zone  $i$  and zone  $j$ , and  $P_i$  and  $P_j$  are the 2011 population of professionals in the respective zones. An estimated migration matrix was constructed using this equation for each profession and each career stage within each profession. An attractiveness error (AE) was then calculated:

$$AE = \frac{O_{ij} - M_{ij}}{O_{ij}}$$

where  $O_{ij}$  is the observed migration and, as above,  $M_{ij}$  is the expected migration. While the error values for a single professional group do not reflect the 'normality' of its observed migration patterns well (Simini et al. 2012), comparison of error values between professional groups highlights differences in migration patterns. The error differential (ED) for each profession was calculated as

$$ED_p = AE_p - AE_{gp}$$

where  $gp$  is GPs and  $p$  is the comparison professional group. Professional groups with positive EDs were more attracted (in the technical sense of more likely to migrate) than GPs to the focus zone, whereas those with negative EDs were less attracted than GPs to the focus zone.

While there are no tests of statistical significance of these differences, given that census (whole of population) data are used, a value of +/- 5 per cent was assumed to have some practical importance. The gravity model accounted for differences in the geographical structure of each professional group. The most significant example was the relative lack of GPs in the younger age groups in the rural zones when compared with other professional groups. This was largely a result of the concentration of postgraduate training in the regional and major urban zones.

Census data have previously been used to analyse the geography of the GP workforce in Australia and other professions (Johnston and Wilkinson 2001; Joyce and Wolfe 2005). The use of Census data for this purpose can be problematic because of the requirement for professional self-identification, aggregation of data at the SA3 level and the potential disconnect between place of residence (which is used in migration analysis) and place of work. Nevertheless, the Census remains the only data set in Australia which allows for direct comparisons between professions.

#### 4. Results

GPs (10%) were less likely to be living in the rural zone in 2011 than other health professionals (15%) and education professionals (16%), but similarly likely to be living in a rural zone as engineering and legal professionals (Table 1). While overall migration rates were similar among the five professional groups examined, GPs were more likely to migrate to a different zone at younger ages, and legal professionals were less likely to migrate to another zone at younger ages.

**Table 1:** Zone of residence (2011) and inter-zonal migration rates (2006–2011) by professional group

	<b>GPs</b> (n = 36,914)	<b>Other health</b> (n = 35,1731)	<b>Education</b> (n = 418,474)	<b>Engineering</b> (n = 262,544)	<b>Legal</b> (n = 149,019)
<b>Zone of residence</b>					
Reside: major urban zone	74%	66%	65%	74%	74%
Reside: regional zone	15%	17%	17%	13%	13%
Reside: rural zone	10%	15%	16%	11%	11%
Reside: remote zone	1%	2%	2%	2%	2%
<b>Migration rates</b>					
Overall migration between zones	11%	9%	8%	10%	8%
Migration: early career	19%	14%	14%	14%	11%
Migration: mid-career	8%	6%	6%	6%	7%
Migration: late-career	4%	5%	4%	4%	6%

Source: ABS 2011 Census.

**Table 2:** Patterns of migration into the rural zone, 2006–2011

	Percentage of migrants who moved to the rural zone (observed value on top line; expected on second line)					Standardised differences in observed and expected migration ('Error Differential', compared to GPs)			
	GPs	Other Health	EDU	ENG	Legal	Other health	EDU	ENG	Legal
All migrants	21% (21)	28% (25)	30% (26)	24% (22)	27% (23)	8%	12%	7%	14%
Migrants: from major urban	33% (38)	41% (44)	45% (46)	40% (41)	43% (42)	8%	14%	12%	17%
Migrants: from regional	17% (11)	31% (18)	37% (19)	23% (12)	26% (12)	8%	15%	13%	20%
Migrants: from remote	24% (10)	26% (15)	25% (16)	19% (11)	24% (11)	-18%	-23%	-18%	-4%
Migrants: early career	20% (16)	25% (22)	30% (24)	23% (20)	24% (19)	-10%	-4%	-11%	-4%
Migrants: mid-career	23% (22)	31% (26)	29% (26)	28% (24)	28% (24)	13%	6%	11%	13%
Migrants: late-career	25% (25)	37% (28)	33% (28)	32% (26)	36% (26)	25%	18%	20%	27%

Source: Authors' construction based on gravity model analysis of ABS 2011 Census data. Notes: EDU = Education; ENG = Engineering.

Table 2 shows the percentage of migrants of various types who moved to the rural zone, and the error differential for each non-GP professional group compared to GPs. While the gravity model showed that all professions had a higher than expected rate of migration to the rural zone, the rural zone was substantially more attractive for all other professionals than for GPs (only 21 per cent of GPs overall moved to the rural zone), and particularly attractive for education (30%) and other health professionals (28%).

Only 33 per cent of GPs migrated from the major urban zone to the rural zone, compared to at least 40 per cent of all other professionals and 45 per cent of education professionals. GPs were also substantially less likely than other professionals to move from the regional zone to the rural zone, once the gravity model accounted for differences in starting distributions. Legal professionals were 20 per cent more likely than GPs to migrate from the regional to rural zone. In contrast, GPs in remote zones were more likely than other professionals to move to the rural zone.

Table 3 (next page) shows that the regional zone was substantially more attractive to GP migrants than to all other professional groups except 'other health'. GPs were far more likely than other professionals to migrate from the major urban zone to the regional zone. However, GPs were less likely than other professionals to migrate from the rural zone to the regional zone.

**Table 3:** Patterns of migration into the regional zone, 2006–2011

	Percentage of migrants who moved to the regional zone (observed value on top line; expected on second line)					Standardised differences in observed and expected migration ('Error Differential', compared to GPs)			
	GPs	Other health	EDU	ENG	Legal	Other health	EDU	ENG	Legal
All migrants	36% (30)	33% (28)	28% (27)	29% (27)	30% (28)	-1%	-11%	-11%	-7%
Migrants: from major urban	61% (58)	49% (51)	40% (48)	45% (51)	47% (52)	-9%	-25%	-18%	-17%
Migrants: from rural	31% (17)	41% (20)	39% (20)	35% (15)	38% (15)	3%	2%	11%	14%
Migrants: from remote	14% (15)	24% (18)	22% (17)	18% (14)	19% (13)	33%	27%	30%	34%
Migrants: early career	40% (34)	33% (30)	27% (27)	28% (28)	31% (30)	-5%	-15%	-16%	-12%
Migrants: mid-career	29% (30)	34% (28)	32% (27)	31% (27)	32% (27)	20%	16%	15%	17%
Migrants: late-career	30% (27)	32% (26)	28% (26)	33% (26)	27% (25)	7%	0%	11%	-3%

Source: Authors' construction based on gravity model analysis of ABS 2011 Census data. Notes: EDU = Education; ENG = Engineering.

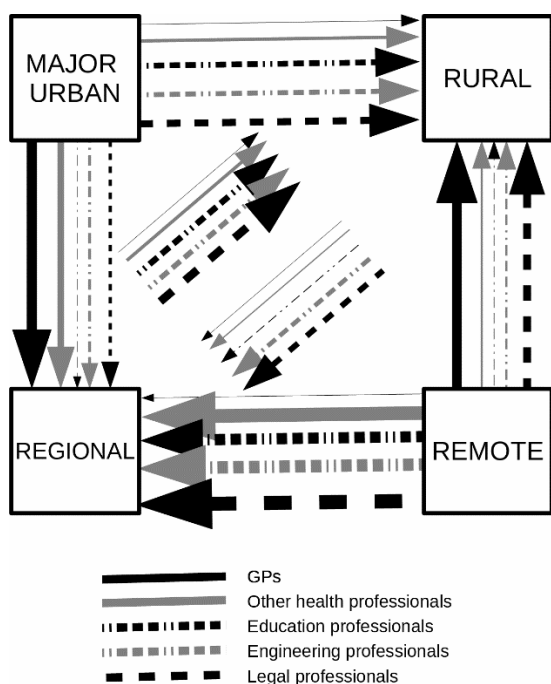
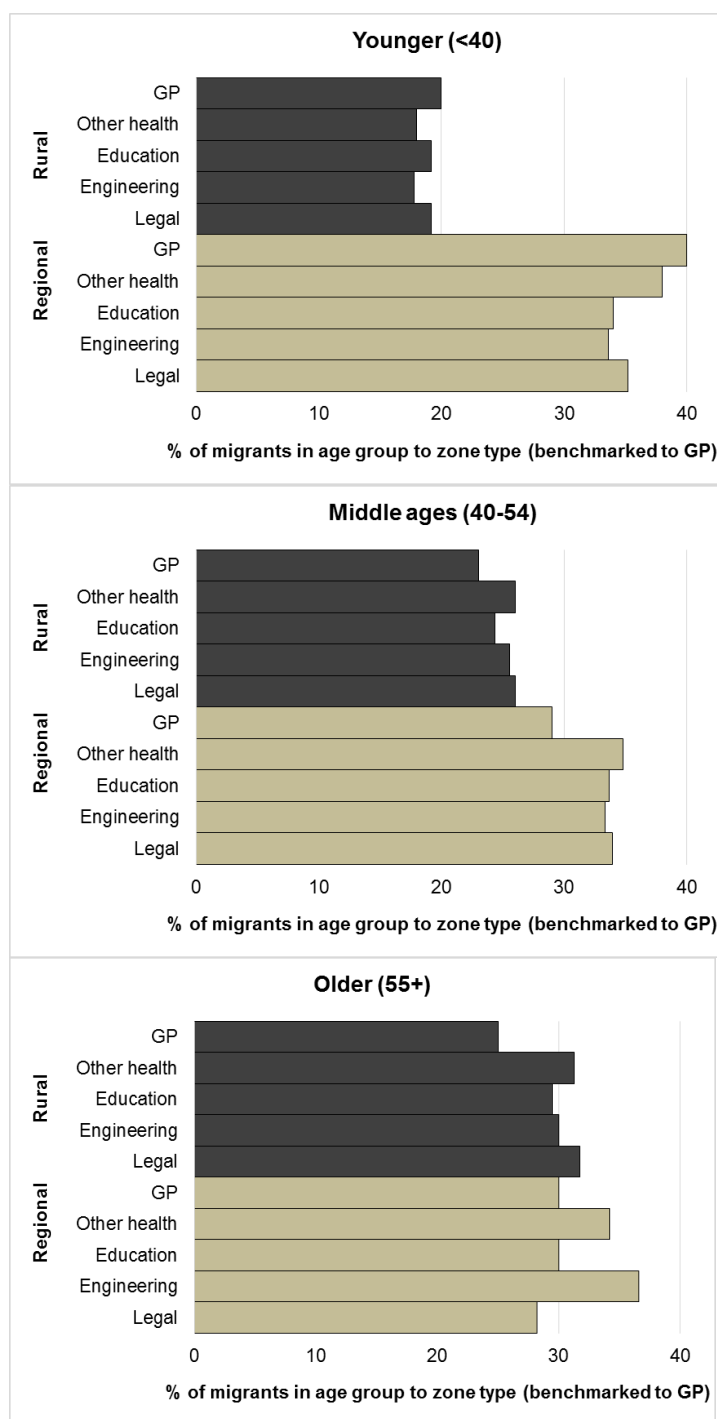


Figure 2 summarises the flows of the various professions between zones. Figure 3 (next page) provides a visual comparison of relative migration rates to both rural and regional zones for each profession for each age group. Non-GP professions are benchmarked against GPs using the error differentials in Tables 2 and 3. The figure shows the relatively low likelihood of rural migration at younger ages for all professions, and the relatively high likelihood of rural migration (compared to regional migration) at older ages (40 years or above) for all professions except GPs.

**Figure 2:** Stylised view of migration to rural and regional zones by various professional groups

Source: Authors' construction based on gravity model analysis of ABS 2011 Census data. Note: The width of the arrow represents the relative likelihood of the move.





**Figure 3: Relative levels of migration into rural and regional zones by profession and broad age group**

Source: Authors’ construction based on gravity model analysis of ABS 2011 Census data.

Younger GPs were more likely to move to a rural zone than younger engineering and other health professionals, despite a lower observed rural migration rate due to fewer rural job opportunities. GPs in the middle and older age groups migrated to rural zones less frequently than other professionals. Education professionals in these age groups also were relatively unlikely to migrate to the rural zone compared to those in the remaining three professions. Younger GPs were substantially more attracted to the regional zone than other professional groups. GPs aged 40–54 years were substantially less attracted than their peers in other professions to regional practice in their middle years. Regional migration patterns for individual professions were relatively stable in the latter years

(55 years plus) with other health and engineering professionals being more attracted and legal professionals being less attracted to regional living than GPs.

## 5. Discussion

GPs were substantially less likely than other professionals to migrate to rural locations in the 2006–2011 period (Table 2), despite being slightly more mobile overall (Table 1). However, they were generally more likely to migrate to locations in the regional zone than professionals in the other groups (Table 3).

The migration patterns of professionals in engineering, other health, education and the legal profession were broadly similar with migration to the rural zone increasing with age and relatively stable levels of migration to the regional zone. This was in contrast to GP migration patterns, which demonstrated only a small increase in rural migration after age 40 and a decrease in regional migration relative to their younger years.

Migration rates for GPs in the middle (45–54) and older (55 plus) age groups were much lower than those of their peers in other professional groups. Significantly, there was substantially lower GP migration from regional to rural areas than for other professionals. The greatest diversity of migration patterns between professions was in major urban to regional zones and remote to rural zones. GPs and other health professionals were substantially more likely than other professionals to engage in the former; GPs and legal professionals were substantially more likely to engage in the latter.

There is some evidence of younger GPs being more likely to engage in migration for rapid career advancement to the regional zone, which may be driven in part by more recent policies supporting Rural Pathway training for GPs in such areas (McGrail, Russell and Campbell 2016). However, it is of great concern that the high migration to the regional zone evidenced for GPs in the under 40 age group does not appear to lead to substantial ‘step down’ or migration of GPs to the rural zone in the older age groups. By way of contrast, there was great similarity in the rates of migration to rural and regional areas in the older age groups for all other professions.

This research makes a case for ‘GP exceptionalism’ (GPs having distinctive migration patterns compared to other professions) when it comes to professional migration to regional and rural Australia. While exceptionalism cannot be ascribed to specific workforce strategies with the methods used in this study, some insights may be offered.

- The focus of GP workforce training and development strategies on early career location decisions does appear to make a difference to rates of migration to both rural and regional zones.
- The similar focus of the education profession on rural exposure and incentives for early career rural service might also have impacted the high levels of rural migration for neophyte teachers but is not apparent in levels of regional migration.
- The lack of attention to rural pathways for older GPs is likely also reflected in the data, with barriers to the sorts of occupational changes required in different zones (particularly rural) possibly a factor.

In this regard, the ‘rural specialisation’ strategy adopted by the GP profession may be counter-productive when trying to attract more experienced workers. Other professions may be well served by considering how to balance the benefits of early specialisation on early career location decisions with strategies that facilitate rural migration in mid or later career stages.

The other crucial aspect of GP exceptionalism is the lack of movement from regional to rural areas. This may be a reflection of the increasing focus of 'rural' medical education programs in 'regional' areas. Other professions may pay particular attention to this issue, and ensure that rural exposure occurs in those areas where workforce growth is most needed. For GPs, at least, it is apparent that 'regional' is not 'rural'.

## 6. Conclusions

Despite concerted policy efforts to encourage GPs to move to rural areas, overall rural migration rates remain low when compared with other professions. The literature suggests that strategies which involve the exposure of medical students and GPs to rural training environments are more effective in determining ultimate work location than economic or lifestyle strategies promoting financial incentives or rural lifestyle advantages. However, most of these exposure strategies are targeted at younger GPs and typically involve exposure to regional rather than rural areas.

The data reveal that younger GPs are more likely than professionals in equivalent age groups to work in rural locations, but are particularly more likely to locate to regional zones. A substantial challenge for the GP profession is to stimulate increased rural migration for experienced practitioners in the middle and older age groups, and to stimulate migration from regional to rural areas. That these two types of migration flow are more common in other professions suggests that those professions may receive additional benefit from strategies targeting younger workers. Likewise, GP workforce policy may well benefit from an improved understanding of the drivers of migration in other professions. There must be some caution taken, however, when considering the potential of 'exposure' type strategies used by other professions. There is a possibility that the counterpoint to strategies for early career 'lock in' to regional and rural practice may be a 'lock out' for older workers.

Our research explored the impacts on a simple gravity model of the workforce age distribution for five professions: generalist medical practitioners; education professionals; legal professionals; engineering professionals; and other health professionals. There is potential to expand the model considerably to examine economic (e.g. income, housing costs, financial incentives) and lifestyle factors (e.g. working hours, leisure opportunities, quality of spousal/partner employment) which might provide for more insights into the causes of GP exceptionalism. This work should be done within the theoretical frameworks outlined in this paper. While life stage influences on migration patterns have been clearly established, evidence for 'escalator', 'step' and 'amenity' migration drivers is yet to be investigated. More work is required also to analyse out-migration and the net effects of in- and out-migration on workforce distribution.

As occupational mobility increases there will be demand for knowledge about how the processes for career development and career transition impact the identification and take up of employment opportunities and choice of residential location. Analysis of these processes within and across vocations can provide insights beyond those which arise from the interrogation of a single profession. While this research has investigated migration patterns across a range of professions at the national level, further investigation is required to identify causative factors and to consider the position of more detailed geographies.

## Key messages

- While encouraging major urban to rural migration is a shared ambition of many professions, diverse strategies may be required because of pre-existing differences in migration patterns.
- There is evidence of the impact of GP training strategies with increased early career migration into regional areas. However, migration to rural and remote areas for those in other professions is highest in the later career stages.
- Despite more than two decades of concerted policy efforts to influence GP migration patterns, overall rates of rural and regional migration are lower for this profession than for other professions.
- Theories about the drivers of migration at different career stages, including escalator migration, step migration and amenity migration, may provide insights into effective strategies to influence migration patterns.

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