Doctors in remote Queensland: they don't stay, do they?

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Introduction

Health Workforce Queensland (HWQ) is Qld's rural health workforce agency. Since 2001, HWQ has been involved in attracting, retaining, supporting and recording medical practitioners working with a General Practice component in remote, rural and regional Qld. As part of its funding agreement with the Australian Government, Department of Health, HWQ maintains a Minimum Data Set (MDS) which lists general practice commencements and separations in remote, rural and regional Qld. The MDS is populated through a yearly survey of medical practitioners as well as twice yearly telephone contact with practice managers. Other information comes in through internal communication from other HWQ teams (e.g. recruitment and rural/remote support program administration). Key stakeholders also provide information on an intermittent basis (i.e. Queensland Health; Qld regional training providers).

Attraction and retention of the health workforce in remote, rural and regional communities has been of concern to HWQ as well as health workforce planners within Australia and internationally. For example, the World Health Organization (WHO) undertook a review of the evidence and in 2010 released Global policy recommendations to increase access to health workers in rural/remote areas through improved retention[1] (WHO, 2010). In Australia, governments have introduced many policies and programs directly targeting attraction and retention of the health workforce in rural and remote communities. Many of these policies and programs have been designed to assist specifically with medical practitioners.

There has also been considerable Australian research interest around attraction and retention issues. For instance, Russell and colleagues[2] identified Australian differences in retention according to geographic location and also provided evidence to support a major association between geographic location and population size on retention of medical practitioners in NSW.[3] Some have provided strategies to increase attraction and retention and others have examined the relationship between rural background, placements in rural settings during training and the relationship to rural/remote practice.[4,5]

Over the years there have been several different classification system used to define remote, rural and regional Australia. The current remoteness classification tool used by HWQ is the Australian Standard Geographical Classification: Remoteness Areas (RA) system. Within this system, RA1 refers to major cities of Australia (the non-rural areas), and rural/remote is classified from RA2 (Inner Regional) to RA5 (Very Remote).

Data from the latest 2013 Qld Minimum Data Set Report[6] highlights the amount of practitioner churn through remote, rural and regional Qld in one year, and provides some indication of retention problems in Qld (see Figure 1). The total medical practitioner workforce at 30 November 2013, was almost 2,000. There were just over 400 new medical practitioners that were not included in the previous MDS (20.8 percent), and more than 700 practice commencements during the year. Some of these commencements reflect multiple positions taken by one practitioner.

To get a better idea of how this churn applies across RA areas, Table 1 displays the number of practitioner arrivals at RA2-5 health services in Qld during the year to 30 November, 2013. For inner and outer regional Qld, the number of practitioners that commenced at a practice during the year expressed as percentages of the medical workforce working within that RA classification were close to 30 percent. In contrast, for remote and very remote Qld, the percentages were approximately double that rate. Combining the figures for remote and very remote Qld, medical practitioners arriving at practices during the year represented 58 percent of the total number of practitioners working in remote and very remote Qld as at 30 November, 2013, very nearly three out of every five doctors in remote and very remote Qld.

Figure 1 Medical practitioner movements 2012-2013

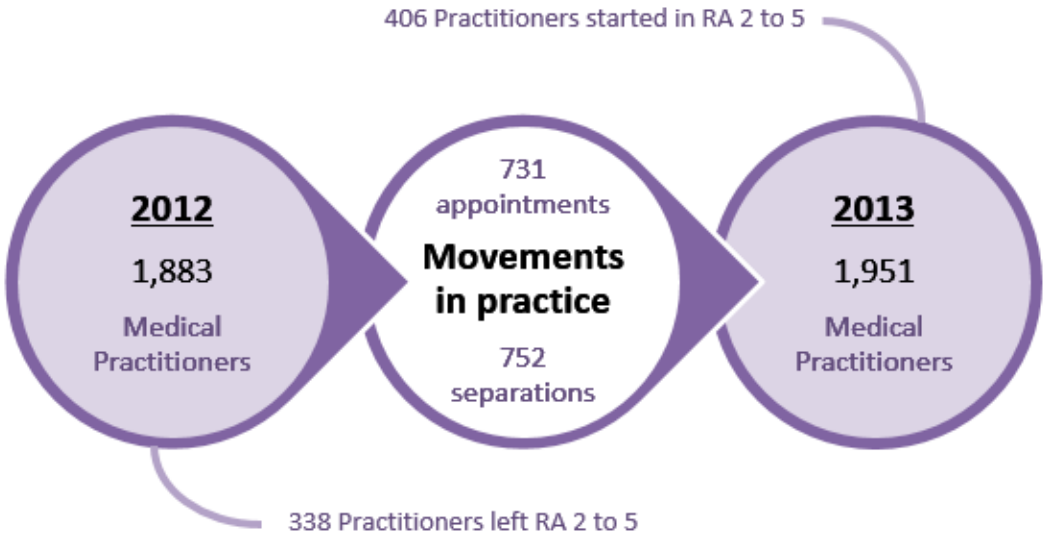


Table 1 Number of practitioner arrivals at health services, Dec 2012 to Nov 2013

Number of arrivals	Inner regional *n*	Outer regional *n*	Remote *n*	Very remote *n*	Total
Arrived at 1 practice	286	200	49	21	556
Arrived at 2 practices	38	20	4	1	63
Arrived at 3 practices	7	1	1	--	9
Arrived at 4 practices	1	1	--	1	3
Arrived at 5 practices	1	--	--	1	2
Practitioner commencements	333	222	54	24	633
% of total RA practitioners	*32%*	*29%*	*60%*	*55%*	*32%*

Source: Health Workforce Queensland (2014). *Medical practice in remote, rural and regional Queensland: Minimum data set report at 30 November 2013*. Brisbane: Health Workforce Queensland. p. 29.

Research questions

The information outlined previously indicates that in any one year in remote and very remote Qld locations there is likely to be considerable churn of doctors into and out of medical practices. However, what has not previously been looked at is where the doctors entering remote practice have come from and where they go to after a placement in remote and very remote Qld. Do they tend to move to other remote locations (RA4-5), do they tend to move to rural and regional locations (RA2-3), or do most move to urban centres (RA1)? If they don't return to urban centres, what are the typical career trajectories of practitioners who take a placement in a remote or very remote medical practice? The HWQ MDS database provided a unique opportunity to investigate these issues using retrospective longitudinal data.

Method

Retrospective longitudinal cohort analyses were undertaken of the HWQ Minimum Data Set (MDS). Records were extracted for every practitioner who had a practice commencement in a remote (RA4) or very remote (RA5) practice during 2003 and 2004. Four cohort groups were formed:

- Cohort 1: 2003 RA4 commencement
- Cohort 2: 2004 RA4 commencement
- Cohort 3: 2003 RA5 commencement
- Cohort 4: 2004 RA5 commencement.

The MDS database holds information about every remote, rural and regional medical practitioners' practice history including commencement and separation dates, and often holds information about where a doctor came from and, when a doctor leaves, where they have gone to. Other information includes demographics, registration category and country of basic medical education. MDS data for each cohort participant was examined from their first placement until 14 Sept, 2014. The Australian Health Practitioner Regulation Agency (AHPRA) register of practitioners was also sourced in January, 2015, to provide an indication of the most recent practice location of cohort participants.

While the MDS database holds an extensive amount of information, there are four important database limitations that should be noted. First, the MDS only commenced in 2001 and practitioner history prior to this is not complete. Second, the MDS does not follow practitioners when they leave rural and remote Qld practice and go to an urban, interstate or overseas location. Third, the MDS does not cover RA2-5 practitioners working in public and private hospitals in major regional centres including Townsville, Cairns, Toowoomba, Mt Isa and Nambour. Fourth, periods of extended leave are recorded as a practice separation and when a doctor returns it is recorded as a new practice commencement.

Results

Number or medical practitioners and commencements by cohort group

There were 97 medical practitioners captured in the four cohort groups. The number of medical practitioners, the number of practice commencements and the number of practitioners with more than one commencement during the cohort year are provided in Table 2 according to cohort group. Some medical practitioners were represented in more than one cohort group if they fitted entry criteria for more than one cohort group.

Table 2 Number of practitioners and practice commencements by cohort group

Cohort	Practitioner *n*	Commencements during cohort year *n*	Practitioners with multiple commencements *n*
Cohort 1 RA4 2003	18	19	1
Cohort 2 RA4 2004	27	33	5
Cohort 3 RA5 2003	21	22	1
Cohort 4 RA5 2004	31	38	6

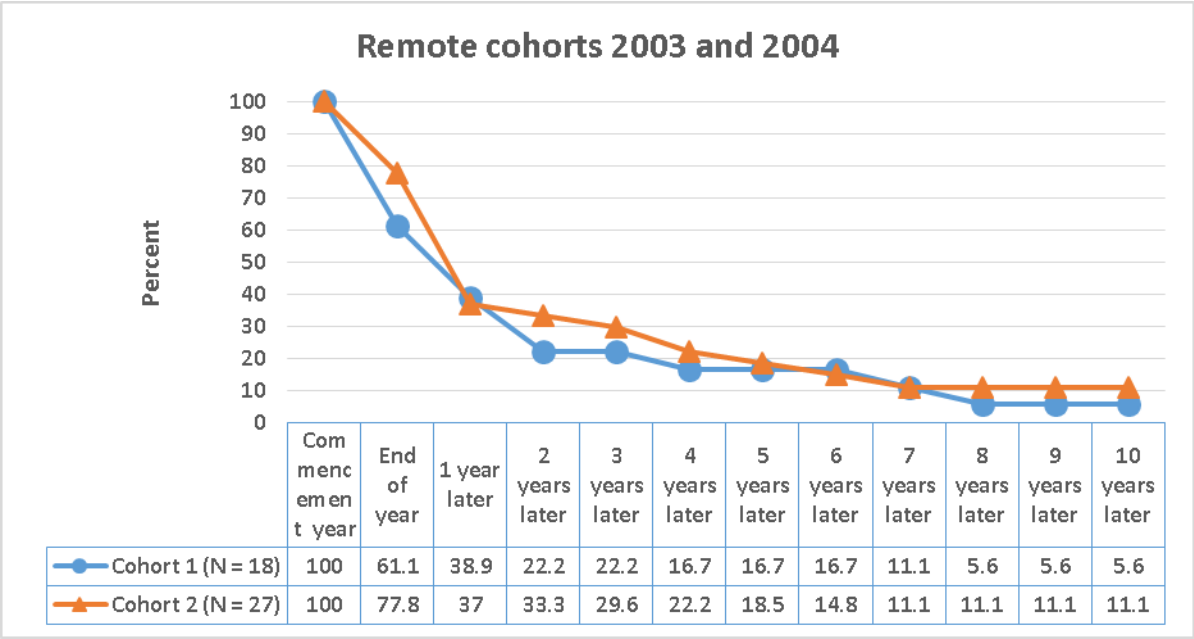
N = 97

It is of note that the number of practitioners and commencements in Cohorts 1 and 2 were lower than the RA5 Cohorts of the comparable year (Cohorts 3 and 4 respectively). This indicates that there were more practitioners commencing at more practices in very remote Qld than in remote Qld in both 2003 and 2004. This was surprising in light of the larger population and practice numbers in remote than in very remote Qld (2013: remote practice *n* = 70; very remote practice *n* = 40), and provides an indication of higher rates of practitioner churn in very remote Qld.

Length of stay at the commencing practice: Retention rates over 10 years

The number of medical practitioners commencing at a practice in each cohort group were followed over the next 11 years to provide 10-year retention rates. For both of the 2004 cohorts, the date used to mark the 10 years later date was September 2014. Results for the remote cohorts (Cohorts 1 and 2) are presented in Figure 2, and the very remote cohorts (Cohorts 3 and 4) are available in Figure 3.

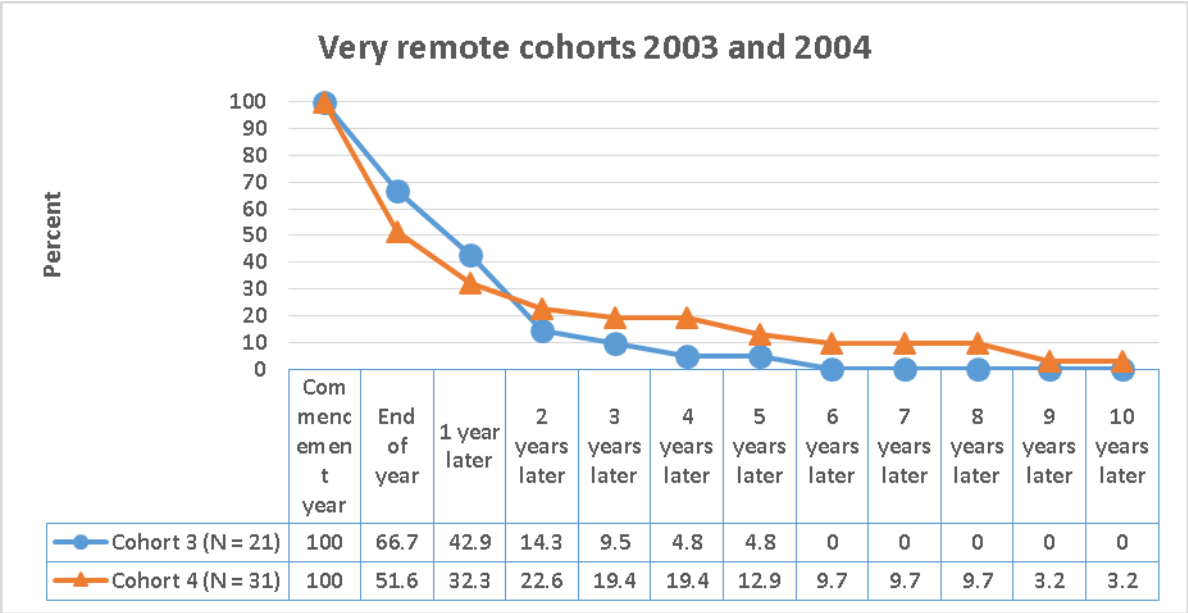
Figure 2 Remote (RA4) cohorts 10-year percentage retention rates



	Commencement year	End of year	1 year later	2 years later	3 years later	4 years later	5 years later	6 years later	7 years later	8 years later	9 years later	10 years later
Cohort 1 (N = 18)	100	61.1	38.9	22.2	22.2	16.7	16.7	16.7	11.1	5.6	5.6	5.6
Cohort 2 (N = 27)	100	77.8	37	33.3	29.6	22.2	18.5	14.8	11.1	11.1	11.1	11.1

By the end of the commencement year less than 80 percent of Cohort 1 practitioners remained at the commencing practice, with this figure being just over 60 percent for Cohort 2. The retention rate for both cohorts fell to less than 40 percent by the end of the following year (‘*1 year later*’). Cohort 1 continued to have another considerable reduction in retention by the ‘*2 years later’* date while the 2004 cohort managed to retain almost 10 percent more of the original commencements during the same period. From the ‘*2 years later’* period onwards the retention rates for both cohorts tended to decline at a much slower rate.

Figure 3 Very remote (RA5) cohorts 10-year percentage retention rates



	Commencement year	End of year	1 year later	2 years later	3 years later	4 years later	5 years later	6 years later	7 years later	8 years later	9 years later	10 years later
Cohort 3 (N = 21)	100	66.7	42.9	14.3	9.5	4.8	4.8	0	0	0	0	0
Cohort 4 (N = 31)	100	51.6	32.3	22.6	19.4	19.4	12.9	9.7	9.7	9.7	3.2	3.2

For commencing practitioners in very remote communities there were noticeable differences between cohort year groups in the decline by the end of the MDS commencement year (*End of year*). Slightly more than 66 percent of Cohort 3 commencements had been retained at the end of the commencement year (*End of year*), with this falling to approximately 43 percent at the *1 year later* period. In comparison, Cohort 4 had considerably lower retention rates, approximately 15 percent lower at the *End of year*, and more than 10 percent lower at the *1 year later* period. Over the course of

the following year the Cohort 3 retention rate continued to fall at approximately the same rate as earlier, while the rate for Cohort 4 tended to stabilise. By the *4 years later* period, the rate of retention for the Cohort 3 was just five percent of the commencing practitioners, approximately 15 percent lower than Cohort 4 at the same period. By the *6 years later* period, none of the 2003 cohort commencements were still active and only three of the 2004 cohort placements were active.

The main differences between the retention rates for the remote cohorts (see figure 2) and the very remote cohorts (see figure 3) were that the very remote cohorts had generally lower retention rates by the *1 year later* period, and also lower retention rates from the *5 year later* period right through to the *10 year later* period. Overall, these results provide evidence of the low retention rates within remote practice in Qld and also suggest that retention is more difficult in very remote communities.

Means were calculated for the length of stay for each cohort group. These are presented in Table 3. Both RA4 cohorts (Cohorts 1 and 2) had longer average length of stay that the RA5 cohorts (Cohorts 3 and 4), and the longest average length of stay was for Cohort 2, just over three years. When compared by year, both RA4 cohorts had an average length of stay of approximately one year more than the comparison RA5 year. These results provide further evidence of the difficulty retaining doctors in remote Qld.

Table 3 Mean length of stay by cohort group

Cohort	Commencement *n*	Years *M*	*SD*	*Range (years)*
Cohort 1 RA4 2003	19	2.30	3.11	0.04–11.27
Cohort 2 RA4 2004	33	3.10	3.71	0.16–10.54
Cohort 3 RA5 2003	22	1.30	1.38	0.09–5.91
Cohort 4 RA5 2004	38	2.02	2.80	0.03–10.54

Commencement *N* = 112

MDS career summary of cohort practitioners

The total number of MDS practice commencements for practitioners in each cohort are presented in Table 4.

Table 4 Number of practitioners with one or more rural and remote MDS practice commencements by cohort

	Practice commencements						
Cohort	1	2	3	4	5	6+	Total
Cohort 1 RA4 2003	7	4	1	2	1	3	18
Cohort 2 RA4 2004	6	7	4	5	1	4	27
Cohort 3 RA5 2003	7	7	1	2	3	1	21
Cohort 4 RA5 2004	9	5	7	3	2	5	31

N = 97

Practitioners with only one MDS practice commencement represent those for whom their cohort entry was the only MDS record to signify their presence in remote, rural and regional Qld. For the remote cohort groups, the seven practitioners for Cohort 1 with only one practice commencement represented over one-third (39 percent) of the practitioners in the cohort. In contrast, the six practitioners in Cohort 2 represented only 22 percent of practitioners. For the RA5 cohorts the results were more similar between cohorts, with 'one practice commencement' practitioners representing 33 percent of the Cohort 3 sample and 29 percent of Cohort 4. Overall, the number of practitioners with only one practice commencement represented approximately 30 percent of the practitioners. The remainder of the practitioners had at least two practice commencements with one practitioners from Cohort 2 having 13 practice commencements.

Where did practitioners come from and where did they go after remote/very remote practise?

All MDS practice commencements listed for each practitioner were used to provide a summary of their career path. Any year in which a practitioner spent at least some part of the year working in remote, rural and regional Qld was counted as representing another year in which the practitioner committed to providing care to remote, rural and regional communities. The first investigation was to examine evidence of where each practitioner came from before commencing at the remote or very remote practice. Some practitioners had more than one prior practice listed on the MDS and summary results are presented in Table 5.

There were very few commencements in which the practitioner was known to have come from an urban location or interstate, and approximately one-third of practitioners had an unknown previous location, either with Queensland Health or with another employer. From the remaining results, the locations most practitioners were working in prior to their cohort commencements were either in another rural location or from overseas. Interestingly, if results from known locations were combined (*n* = 72), the proportion of new commencements that had come from another remote, rural or regional location (*n* = 48) was two thirds (67 percent). This rose to 90 percent with inclusion of overseas practitioners.

These results indicated that few doctors moved from interstate or Brisbane to commence work in remote and very remote Qld practises during these years. Rather, most commencements tended to be practitioners who already had some previous experience in a remote, rural or regional community.

Table 5 Number of practitioners coming from urban, rural and other locations for the practice commencement by cohort

	From urban		From remote, rural and regional				Other locations		Unknown location	
Cohort	Urban	QH urban transfer	QH rural transfer	Another rural location	ACCHS (mainly rural & remote)	QH RA5 location	Overseas	Interstate	Unknown QH transfer	Unknown
Cohort 1 RA4 2003	1	1	-	4	1	3	4	-	3	1
Cohort 2 RA4 2004	1	-	6	11	1	2	4	2	6	4
Cohort 3 RA5 2003	-	-	4	1	-	3	3	1	6	3
Cohort 4 RA5 2004	-	1	6	2	-	4	6	-	11	4
Total	2	2	16	18	2	12	17	3	26	12

N = 110

To describe where practitioners went to after their cohort placement a similar analysis was undertaken. However, destinations were, where possible, classified by RA number. Results are presented in Table 6.

Table 6 Number of practitioners going to urban, rural and other locations after the practice commencement by cohort

	To urban	To remote, rural and regional Qld				Other locations		Unknown/other	
Cohort	Urban	RA2	RA3	RA4	RA5	Overseas	Interstate	Unknown	Retired or leave
Cohort 1 RA4 2003	1	7	10	11	1	-	1	8	-
Cohort 2 RA4 2004	1	8	21	14	2	-	-	8	2
Cohort 3 RA5 2003	-	3	4	2	5	2	2	9	1
Cohort 4 RA5 2004	4	5	21	3	9	-	2	10	1
Total	6	23	56	30	17	2	5	35	4

N = 178

There were very few known practitioner placements into urban locations, overseas or interstate for practitioners in the years after their 2003/2004 cohort placement. Interestingly, the majority of placements recorded were in remote, rural and regional Qld communities (71 percent). Practitioner records of unknown placements and practitioners taking retirement or extended leave constituted another 22 percent of placements. In terms of remote, rural and regional placements, the most common remoteness area for placements was RA3 (outer regional). However, the most noteworthy finding was that 47 future placements (26 percent of all placements) occurred in remote (RA4) and very remote (RA5) communities. In all cohorts there was a tendency for more practitioner placements to occur within the remote or very remote classification in which their cohort entry occurred.

The number of years of practice in rural and remote Qld were calculated for each practitioner as well as years of practice covered by MDS entries. For some practitioners the total years covered by the MDS included periods spent outside of remote, rural and regional Qld. Results are provided in Table 7 for Cohorts 1 and 2, and Table 8 for Cohorts 3 and 4.

Table 7 Number of placements, years spent in rural and remote practice and total MDS years covered for Cohort 1 and Cohort 2 (RA4)

Cohort 1	Placement *n*	Yrs rural	Yrs total	Cohort 2	Placement *n*	Yrs rural	Yrs total
RA4 2003	1	9	9	RA4 2004	1	1	1
	1	1	1		1	1	11
	1	1	1		1	1	1
	1	1	1		1	5	5
	1	8	8		1	1	1
	1	3	3		1	1	11
	1	1	1		2	6	7
	2	5	6		2	6	11
	2	13	13		2	11	11
	2	3	3		2	6	6
	2	2	12		2	2	2
	3	11	12		2	3	3
	4	8	12		2	3	3
	4	5	5		3	12	12
	5	20	20		3	11	14
	6	15	15		3	14	14
	6	5	7		3	3	3
	12	11	12		4	17	17
					4	5	5
					4	14	14
					4	13	13
					4	11	11
					5	7	9
					6	11	11
					8	8	11
					12	11	12
					13	11	11
Total years		122	141	Total years		195	230

The results for Cohorts 1 and 2 indicated that the 45 practitioners in RA4 locations were recorded as having spent a combined 371 years of practice, of which 317 years (85 percent) were spent in remote, rural and regional practice in Qld. For Cohort 1, the results indicated that, on average, each of the 18 practitioners spent almost 6.8 years practising in remote, rural and regional Qld. The 27 individual practitioners in Cohort 2 spent an average 7.2 years practising in remote, rural and regional Qld.

Table 8 Number of placements, years spent in rural remote practice and total MDS years covered for Cohort 3 and Cohort 4 (RA5)

Cohort 3	Placement *n*	Yrs rural	Yrs total	Cohort 4	Placement *n*	Yrs rural	Yrs total
RA5 2003	1	1	1	RA5 2004	1	1	1
	1	2	2		1	1	1
	1	6	6		1	5	5
	1	1	1		1	1	1
	1	3	3		1	1	1
	1	2	2		1	1	1
	1	1	1		1	1	1
	2	1	1		1	1	1
	2	6	6		1	9	9
	2	2	2		2	11	11
	2	1	1		2	1	1
	2	1	1		2	2	2
	2	11	12		2	7	10
	2	3	3		2	10	10
	3	4	4		3	2	11
	4	11	12		3	9	9
	4	13	13		3	19	20
	5	35	35		3	5	5
	5	9	10		3	11	11
	5	4	5		3	2	2
	6	7	12		3	2	2
					4	14	14
					4	8	14
					4	3	3
					5	9	11
					5	6	10
					6	13	13
					6	11	11
					6	11	11
					6	8	12
					8	7	9
Total years		124	133	Total years		202	223

For practitioners commencing in very remote locations (Cohorts 3 and 4), the results were very similar. On average, these practitioners had 356 years of practice of which 326 years (92 percent) were spent in remote, rural and regional practice. For Cohort 3, the 21 practitioners spent an average 5.9 years in rural/remote practice, while for Cohort 4 the practitioner average was 6.5 years within remote, rural and regional communities.

Taken together, the results for the years of practice covered in the MDS database and the number of years spent in remote, rural and regional practice suggest that for many practitioners, a practice

commencement in remote or very remote Qld may be just one part of a longer-term commitment to rural and remote communities that lasts for many years. To investigate this further, a check was done on the site of practitioners' current medical registration through the APHRA database. This information is available in Table 9.

Table 9 Site of practitioners' APHRA registration as at January 2015 by cohort

	No longer registered	Qld urban	Interstate urban	RA2	RA3	RA4	RA5	Interstate RA2-3	Interstate RA4-5
Cohort 1	5	3	1	-	4	2		1	2
Cohort 2	5	5	2	-	6	6	1	-	2
Cohort 3	5	6	2	1	2	-	3	2	1
Cohort 4	4	8	1	2	7	1	3	3	1
Total	19	22	6	3	19	9	7	6	6

Approximately one-fifth of the practitioners were no longer registered as a medical practitioner in Australia. The reasons for this can include practising in an overseas location, retirement, having registration cancelled, serious illness or death. For the remaining 78 practitioners, one-third were registered in an urban location either within Qld (n = 22) or interstate (n = 6), and the remaining two-thirds were working in remote, rural or regional locations either in Qld (RA2-5 n = 38) or interstate (RA2-5 n = 12). Those registered as working in remote and very remote Australia as at January 2015, comprised 28 percent of all practitioners with current medical registration.

Discussion

This retrospective longitudinal cohort analysis of HWQ's MDS database provided a snapshot of medical practitioners who commenced a placement in remote and very remote Qld communities during 2003 and 2004. The data supported previous research that indicates poor retention of medical practitioners in remote practices, especially over the first two years of practice, where less than 50 percent of commencements tend to be maintained. Interestingly, the results provided further evidence of high churn in very remote practices where it was found that there were more practice commencements in very remote Qld than in remote Qld even though the number of practitioners and practices overall was less in very remote Qld. This is troubling for very remote community members in terms of the development of trusting relationships with providers of medical services, particularly for Aboriginal and Torres Strait Islander community members who have considerably worse health outcomes and higher chronic disease rates compared to Australian averages.

This study provided a unique 10+year historical investigation of medical practitioner movements in Qld which indicated, encouragingly, that the majority of doctors who commenced a practice placement in a remote/very remote Qld community in 2003 and 2004, and were still registered practitioners in January 2015, tended to remain active in the provision of health services to remote, rural and regional communities over the next 10 or more years. It is also of note that very few of the doctors commencing at a remote or very remote practice came from an urban position into remote practice. Rather, most practitioners came from either a previous rural/remote setting or from overseas. These findings support other research that highlights the association between previous rural exposure and later rural medical practice.

This study also highlights some of the complexity involved in actively improving retention in rural/remote practice. It paints a picture whereby, although there is considerable churn of staff through remote and very remote communities, for many practitioners this churn represents one part of a career or career period devoted to rural/remote practice. Some practitioners actively return to remote/very remote practice after spending time in less remote practice. The reasons for leaving remote/very remote and returning at a later date are varied but, according to other research, key impetuses to leave tend to revolve around combinations of various professional and personal reasons. For instance, access to professional support and continuing education, schooling for children, employment opportunities for partners and other family members, and illness of family

members or practitioners. Some of these examples are time limited, such as children's education and professional education. One could argue that when the professional and/or personal requirements are finalised, there is opportunity to return to remote/very remote locations for practitioners seeking a remote lifestyle.

In the future, the current paper highlights several potential areas to investigate in order to improve retention of medical practitioners in remote and very remote communities. These include improved selection processes for practitioners to undertake short term contracts and improved support and career management for practitioners exhibiting an interest in working in remote communities. For instance, many of the health services in remote and very remote Qld are provided by Queensland Health who have access to a large pool of medical practitioners including specialists, general practitioners and doctors in training. It may be possible to adjust criterion for remote practice so that practitioners with a previous experience in rural remote communities, either during childhood or medical training, are actively encouraged to fill short term remote vacancies. The results also highlight the possibility of a tiered approach in which placements commence in rural settings for a period before moving to remote locations.

Recommendations

The results indicate that about one-third of the medical practitioners that commenced at remote/very remote Qld practices in 2003 and 2004 did not stay for long and were not recorded as working in rural/remote Qld again over the next 10 years. To reduce the size of this 'one-off' group of practitioners the following recommendations are made:

- **Recommendation 1:** Recruitment selection criteria for rural/remote positions (and GP training positions) should include weighting for measures associated with increased likelihood of further rural/remote practice. These include, but are not limited to: previous experience living in rural/remote settings; training placement experience(s) in rural/remote settings; known preference for, or intention to, rural/remote practice.

- **Recommendation 2:** Consideration of the need to further increase the number of rural and remote students given entry to medical schools.

Other results from this study indicate that very few practitioners came from urban centres to enter remote practice. The reasons for this are unknown but perhaps suggest a lack of knowledge of the practice variety, expanded skillset and lifestyle opportunities available in rural/remote medicine. To overcome this, more opportunities for medical students and prevocational junior doctors to undertake placements in rural/remote settings may provide increased awareness of the benefits. The following recommendations are made:

- **Recommendation 3:** Medical schools should be encouraged to provide more rural/remote placement opportunities for medical students in training. This would need to be supported with positive modelling and leadership on the unique benefits of rural/remote practice.

- **Recommendation 4:** The government should consider re-introducing short term prevocational training placements for Junior Medical Officer in rural/remote locations.

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Presenter

Chris Mitchell is CEO of Health Workforce Queensland (HWQ), a not-for-profit rural health workforce agency that creates sustainable health workforce solutions to meet the needs of remote, rural, regional and Aboriginal and Torres Strait Islander communities in Queensland. Chris leads HWQ in its work to understand the needs of Queensland communities, especially their health needs, so as to ensure optimal health workforce are available. Chris possesses a degree in Health Administration and a Masters of Business and has over 30 years of leadership experience in health workforce development. He has worked in a variety of communities including Griffith, Sydney, Dubbo, Brisbane and remote and rural Queensland. These roles have provided him with extensive experience in health service management and delivery across diverse geographic areas. Chris has a comprehensive understanding of health workforce development, industry trends and the impact and challenges of health workforce shortages in remote and rural communities. A particular interest is in collaborative solution creation activities with communities and stakeholders to optimise health service delivery and improve health outcomes. Chris has facilitated a number of action research projects in remote and rural Queensland that focused on health service redesign to ensure that communities had access to viable health services.