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MCCC

# GP Graduate Tracking Study: Phase 2 Report

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SCHOOL OF PUBLIC HEALTH

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# Abbreviations

ACRRM	Australian College of Rural and Remote Medicine
AGPT	Australian General Practice Training Program Australian Health Practitioners' Agency
AMG	Australian Medical Graduate
ASGS	Australian Standard Geographical System
AST	Advanced Skills Training
ATSI	Aboriginal and Torres Strait Islander
CI	Confidence Interval
EST	Extended Skills Training
FACRRM	Fellow of the Australian College of Rural and Remote Medicine
FARGP	Fellowship in Advanced Rural General Practice
FRACGP	Fellow of the Royal Australian College of General Practitioners
GP	General Practice
GPs	General Practitioners
GPTT	General Practice Training Tasmania
IMG	International Medical Graduate
MMM	Modified Monash Model
MCCC	Murray City Country Coast GP Training
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
PGPPP	Prevocational General Practice Placement Program
Qld	Queensland
RACGP	Royal Australian College of General Practitioners
SA	South Australia
Vic	Victoria
WA	Western Australia
WAGPET	Western Australian General Practice Education and Training Ltd





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## Executive summary

In 2014, Australia had 3.5 doctors per 1000 population<sup>1</sup> and has one of the highest number of medical graduates (15.3 graduates per 100,000) in the world, ranking third of 29 OECD countries.<sup>2</sup> This increase in graduates has arisen from a number of policies aimed at addressing workforce challenges. The major workforce issue in Australia for many years has been the uneven distribution of the workforce rather than absolute numbers.<sup>3</sup> This distribution is in terms of geography and speciality.

The most persistent challenge has been geographic maldistribution of the medical workforce, with shortages of doctors, mainly general practitioners (GPs), in rural and remote areas of Australia. Over the years, a number of strategies and programs have been implemented to address this problem. These have either focused on improving recruitment through education and training, financial incentives, regulatory such as the 10 year moratorium or support, such as locum support.

Research has shown that these strategies have been somewhat successful in influencing a rural practice location, but there is a dearth of evidence on the influence of strategies implemented during GP vocational training on subsequent practice location.

The aim of this study was to examine the effectiveness of the AGPT program in addressing geographic maldistribution by determining the current practice location of GPs who graduated from the Regional Training Providers/Organisations in the last six years (2010-2016).

1. To determine the current practice location of GPs who graduated from AGPT training programs in the last five years (2010-2016) including predictors and length of stay.
2. To identify the personal and professional retention factors associated with their current practice location.
3. To describe their use of rural procedural grants and involvement in teaching.

This report focuses on changes in practice location since graduation including time in rural/urban practices, influences on these moves and predictors of time in rural location, retention factors with current location and graduate involvement and interest in teaching, procedural training and alumni network.

Data for this phase was obtained through a survey of MCCC AGPT graduates. Phase 1 included 326 MCCC rural pathway AGPT graduates and these graduates were contacted to complete the survey. Of these graduates, 179 graduates participated in the survey, giving a response rate of 55%. A total of 103 of these respondents had sufficient data (Phase 1 and Phase 2) for this analysis.

The key findings from the study are outlined below:

### Retention factors

- > The most common reasons for working in their current practice were family (57%), lifestyle (49%) and the practice culture and team (43%).
- > The most important reason was practice culture/team (22%) and family reasons (21%).

### Procedural training

- > 34% of graduate respondents had undertaken procedural skills training with most gaining skills in obstetrics and gynaecology and anaesthetics.
- > 19 graduate respondents had accessed the Rural Procedural Grants Program or the GP Procedural Training Support Program, and most had accessed them during their AGPT training.

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## Involvement in teaching and alumni network

- > 61% of graduate respondents were involved in teaching, mainly medical students and GP training.
- > 41% of graduate respondents were interested in GP educator roles, mainly as an ECT visitor/DOV visitor (41%), Supervisor (41%) or Medical Educator (25%).
- > 40% of graduate respondents were not interested in GP educator roles, with the main reasons being too busy, other teaching involvement or family commitments.
- > Most respondents (59%) were interested in being part of an RTO alumni.

## Patterns of practice location

- > the mean number of practice moves was 1.3, with an average of 3.7 years spent in rural locations and 1.5 years in an urban location.
- > 86% of graduates had moved practices less than three times since graduating.

The individual factor that predicted more time practising in a rural location since graduation was:

- > Accessing rural procedural grants/training support: 2.8 times that of those graduates who did not.

## Conclusion

We have found several factors to be important predictors of time spent practising in a rural location after graduation. The study provides evidence that procedural skills training is important in influencing how long a GP graduate will remain in a rural location.

When selecting a practice to work in, the culture of the practice and teamwork and family were the most important considerations.

A large proportion of MCCC rural pathway graduates are already involved in teaching through their current practice and showed a willingness to take on additional teaching roles, providing a pipeline of future medical educators.

## Study limitations

The study had several limitations.

- > A response of 55% was achieved which is relatively high for GP surveys. However, the responses may have been biased towards more recent graduates, while older graduates may not have responded.
- > Reliant on recall of practice locations by graduates. For some graduates this may be up to five years since they completed their training and they may not recall all their practice locations.

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# Background

In 2014, Australia had 3.5 doctors per 1000 population<sup>1</sup> and has one of the highest number of medical graduates (15.3 graduates per 100,000) in the world, ranking third of 29 OECD countries.<sup>2</sup> This increase in graduates has arisen from a number of policies aimed at addressing workforce challenges. The major workforce issue in Australia for many years has been the uneven distribution of the workforce rather than absolute numbers.<sup>3</sup> This distribution is in terms of geography and speciality.

The most persistent challenge has been geographic maldistribution of the medical workforce, with shortages of doctors, mainly general practitioners (GPs) in rural and remote areas of Australia. Over the years, a number of strategies and programs have been implemented to address this problem. These have either focused on improving recruitment through education and training, financial incentives and the recruitment or retention of international medical graduates, through locum support, training, retention payments and ongoing professional development. For general practice, there have been a number of workforce strategies with the aim of increasing the number of GPs and/or influence their practice location. Many of these strategies have been implemented at undergraduate or graduate entry medical training, medical education and postgraduate training.<sup>3,4</sup>

At the medical school level these include:

- > The John Flynn Placement Program
- > Rural Australian Medical Undergraduate Scholarships (RAMUS)
- > Bonded Medical places (BMP)
- > 25% quota of rural background students
- > Mandatory rural rotations at medical school; and
- > Rural Clinical Schools

At the postgraduate level, those strategies that focussed on GP vocational training include:

- > an increase GP training places;
- > a rural pathway within the AGPT training program;
- > restriction on provider numbers for overseas trained doctors; and
- > incentive payments

Despite these and other strategies Australia still experience shortages of GPs in rural, remote and outer metropolitan areas and it is unclear which strategies have been effective or not.<sup>4</sup>

## Overall aim and objectives

The aim of this study was to examine the effectiveness of the AGPT program in addressing geographic maldistribution. The overall objectives are to:

1. To determine the current practice location of GPs who graduated from AGPT training programs in the last five years (2010-2016).
2. To describe their current scope of practice/services provided (eg procedural work, workload, practice size) and involvement in teaching.

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## Structure of the study

The study has two phases, each aligned to the project aims. Phase 1 focused on the current location of graduates (aim 1) and Phase 2 on their current scope of practice (aim 2) including involvement in teaching. Additionally, Phase 2 included an analysis of the practice locations of graduates since completing AGPT training and used linked data from Phase 1.

This report presents the methods and results for Phase 2 only.

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# Methods

Phase 2 of the GP graduate tracking study has two key components. The first component of the analysis involves the survey questions including information on rural origin, use of rural grants, interest in teaching and being part of an alumni organisation (Part A). The second component builds on the previous phase to obtain an understanding of the patterns of GP graduate practice locations and their movement between locations ie between urban and rural locations and within rural locations (Part B). The aim of Part B is to understand the patterns of practice location of graduates over time, what factors influence changes in practice location and what factors predict the time spent in a rural location.

## Graduate Survey

Data utilised from this phase of the study was sourced from Phase 1 and from a survey<sup>212</sup>) of AGPT graduates. The survey questionnaire was based on a survey undertaken by WAGPET and developed by the GP Graduate Tracking Advisory Group consisting of representatives from the four RTOs involved in this study – WAGPET, GGPT, GPEx and MCCC.

All graduates from the Phase 1 study were contacted by their RTO and asked to complete a survey. This followed an SMS alerting them to the forthcoming survey. The survey was administered by the RTO and the questionnaire could be completed by phone by the RTO or via an online version which was emailed to the graduate. Verbal consent to participate in the survey was gained if the graduate was contacted by phone and if they were sent the online questionnaire, consent was implied if the completed the questionnaire. A graduate was deemed uncontacted after three phone contact attempts.

Ethics approval for the study was obtained from the University of Adelaide Human Research Ethics Committee (H-2017-212).

The questionnaire covered six areas outlined below and summarised in Research has shown that rural origin is an important factor in influencing practice location<sup>7-9</sup>. However, this variable was not included in the Phase 1 analysis as the RTO did not collect this information from their registrars. To address this gap in the data, the survey in Phase 2 included questions on rural background and was used to determine rural origin. The definition for rural origin was based on that used for government programs<sup>10</sup>. Graduates were classified as rural origin they had lived in a category ASGS-RA 2-5 regional or remote area of Australia for a minimum of five or more consecutive years, or 10 cumulative years, prior to commencing university study.

### Table 1

- > Background
- > Work locations since completion of training
- > Reasons for selection current work location
- > Procedural skills training and use of grant
- > Involvement and interest in medical education
- > Interest in an RTO alumni

The survey was undertaken between January and February 2018.

### *Rural definition*

The same definition of a rural practice/location that was used in Phase 1 was applied in Phase 2. Location was defined as either urban or rural, based on Australian Standard Geographical Classification Remoteness Areas<sup>5</sup>. This classification system has five categories (RA1 to RA5) and for this study they were collapsed into two: RA1 (Major cities), defined as urban and RA2-RA5 (Inner regional, Outer regional, Remote and Very remote), defined as rural. This approach is commonly used for a broad definition of urban and rural areas in Australia. We also included in the analysis the Monash Modified Model (MM1 to MM7)<sup>3 6</sup> as this classification system is being increasingly used to define rurality for a number of workforce strategies.

### *Rural origin*

Research has shown that rural origin is an important factor in influencing practice location<sup>7-9</sup>. However, this variable was not included in the Phase 1 analysis as the RTO did not collect this information from their registrars. To address this gap in the data, the survey in Phase 2 included questions on rural background and was used to determine rural origin. The definition for rural origin was based on that used for government programs<sup>10</sup>. Graduates were classified as rural origin they had lived in a category ASGS-RA 2-5 regional or remote area of Australia for a minimum of five or more consecutive years, or 10 cumulative years, prior to commencing university study.

Table 1: Summary of survey questions

	<i>Variable</i>
Background	Did you complete you training at an overseas medical school?
	Have you ever lived in a rural area prior to commencing University?
	Where was the rural location your lived? Town and state Years in location
	What training pathway did you complete (AGPT training)?
	What was your main reason for choosing to train in the rural pathway?
Work locations since completion of training	For each practice location: Name of practice Town/suburb Country Start and end date AGPT training practice Full or part-time Working in area of special interest Special interest area
Current location	Primary reason/s for working in current practice
	Most important influence on decision to work at the practice
Procedural skills	Procedural skills training qualification completed
	Procedural skill
	Awareness of the Rural Procedural Grants Program and GP Procedural Training Support Program
	Accessed these Programs
	When accessed these Programs
	What skills you access the programs for
	Involvement in teaching and supervision



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Medical Education	Level of teaching
	Interest in RTO training
Alumni	Interest in being part of an RTO alumni

## Phase 1 data

Personal and training characteristics for graduates surveyed were obtained from the Phase 1 dataset and linked to the survey respondents using a unique identifier.

## Statistical analysis

To address the research questions for Phase 2 we undertook the following analysis. For the summary of survey results frequency tables were generated for all variables of interest (Part A). For Part B the following analysis was undertaken for each of the area of investigation.

### *Number of moves*

The number of moves during the study period was calculated for each GP (number of locations minus 1). The duration of the study period was calculated by adding the months spent in rural

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locations to the months spent in urban locations. The number of moves were then be divided by this duration in years to give average number of moves per year for the study population.

### *Changes in practice location*

A long format of the database was created which had origin variables for post code and associated location variables and destination variables for postcode and associated location variables. So each GP graduate had four rows of data: Location 1 versus 2, Location 2 versus 3, Location 3 versus 4 and Location 4 versus 5. If a GP did not move during a given period, the origin post code remained the same as the destination postcode. Cross tabulation was then be performed for origin Rurality (Rural/Urban) versus destination Rurality, origin ASGS classification versus destination ASGS classification and origin MMM classification versus destination MMM classification. These variables will be obtained from the Phase 1 and Phase 2 datasets. Patterns of movement were observed between urban and rural locations and within rural locations.

### *Influences on practice location and predictors of time sent in a rural location*

Using the same long format database, five categories of movers/stayers were created between Origin and Destination locations: no change: urban, urban to rural, rural to urban, no change: rural and moved within rural. The characteristics of these moving/staying GPs were then examined across the five groups, including age (3 categories), gender, rural origin, moratorium status, rural/urban training pathway, type of graduate (AMG/IMG), Rural Clinical School experience, rural bonded or not, ATSI or not, change in scope of practice, and specialised area or not, main reason for working at Origin location, number of moves, and length of stay at Origin location. Cross tabulations and Fisher's Exact Test P values were used for this analysis.

A Negative Binomial regression models was constructed with outcome being months spent in rural locations and offset being logarithm of months spent in rural and urban locations combined (total time). The predictors would be the GP characteristics mentioned above, one at a time in univariate models.

A final multivariable Negative binomial regression model was constructed. It included all covariates with  $P < 0.2$  on univariate regression in an initial multivariable model (Accessed Grants variable was excluded as  $N=34$ ). Using backwards elimination, the covariate with highest P value was removed one at a time until all covariates had  $P < 0.11$ . A less conservative cut-off could not be used as no covariates had lower P values than that. This may be because of low sample size and fact that all the GPs had rural training so the Pathway covariate could not be included.

### *Time spent in practice location*

The number of months in rural locations and number of months in urban locations was derived using a long format with only one set of location variables. The length of stay column was summed by rurality and by ID so that each GP had a duration in rural locations and a duration in urban locations. By looking at descriptive statistics, we can determine for those who were in the rural pathway, how long do they spent in rural locations and, how long did they stay in urban locations. Then for those in the general pathway, how long do they spent in urban locations and how long did they stay in rural location.

### **Missing data**

With the follow-up survey, it was not possible to obtain data on all the graduates from Phase 1. Response rates for Phase 2 varied between 62% and 70%. To address the potential of issue of bias (ie more recent graduates may be more likely to respond to Phase 2 survey), inverse probability weights were applied to any inferential statistics in the Part B analysis.

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The statistical software used was SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

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# Results

The results are presented in two parts – the first part presents the summary of responses to the survey questions, excluding results for work locations since graduation; the second part presents the results of the analysis of practice patterns and predictors of time spent in a rural location.

## Response rate

Phase 1 included 326 MCCC rural pathway AGPT graduates and these graduates were contacted to complete the survey. Of these graduates, 179 graduates participated in the survey, giving a response rate of 55%. A total of 103 of these respondents had sufficient data (Phase 1 and Phase 2) for this analysis.

## Part A: Summary of survey of responses

Of those MCCC rural pathway graduates who responded to the survey, just over half were trained in an overseas medical school (51%), had lived in a rural area prior to University (55%) and were not classified as rural origin (77%) (Table 2). All respondents had trained in the rural pathway and the main reasons for choosing this training pathway was because they were subject to the 10 year moratorium (61%) and because they wanted to work in a rural area after training (38%) (Table 2).

Table 2: Background characteristics MCCC rural pathway graduates (n=103)

<i>Characteristics</i>	<i>Values</i>	<i>Frequency</i>	<i>Percent</i>
Overseas medical school	Yes	50	49.0
	No	52	51.0
Lived in rural area prior to University	Yes	29	54.7
	No	24	45.3
Rural origin	Yes	24	23.3
	No	79	76.7
Training pathway	Rural	103	100.0
Reason for choosing rural pathway (n=11)	Subject to the moratorium	60	61.2
	Wanted to work in a rural location post training	37	37.8
	Increased chances of successful entry to GP training	1	1.0

When asked what their primary reason for working in their current practice, the most common reasons were family (57%), lifestyle (49%) and the practice culture and team (43%), (Table 3). The least common reasons given were because they were rurally bonded.

Table 3: Reasons for working in current practice MCCC rural pathway graduates (n=49)

<i>Variable</i>	<i>Values</i>	<i>Frequency</i>	<i>Percent*</i>
Primary reason for working in current practice (multiple responses)	Family	59	57.3
	Lifestyle	51	49.5
	Practice culture/team	44	42.7
	Rapport with patients	39	37.9
	Career	33	32.0
	Scope of practice (including on-call)	29	28.2
	Felt part of the community	26	25.2
	Children's schooling	22	21.4
	Moratorium	17	16.5
	Financial	16	15.5
	Rurally bonded	5	4.9
	Other	10	9.7
	Other reasons working in current practice (n=10)	Own practice	3
Federation clinic		1	10.0
No longer a GP		1	10.0
No longer in state		1	10.0
Location		1	10.0
Partner's training		1	10.0
Special interest area		1	10.0
Type of work		1	10.0

*\*percentage of all respondents*

The most important influence on the decision to work in their current practice given by the graduate respondents was practice culture/team (22%) followed by family (21%) and lifestyle (18%) (Table 4).

Table 4: Most important influence on decision to work in current practice for MCCC rural pathway graduates

Most important influence on decision to work at current practice (n=94)	Practice culture/team	21	22.3
	Family	20	21.3
	Lifestyle	17	18.1
	Career	7	7.5
	Scope of practice (including on-call)	7	7.5
	Financial	6	6.4
	Moratorium	6	6.4
	Children's schooling	4	4.3
	Rapport with patients	4	4.3
	Felt part of the community	2	2.1
	Other	3	3.2

Of the graduate respondents, 34% had completed a procedural skills qualification during or after completing their AGPT training (Table 5). Obstetrics and gynaecology (54%) and anaesthetics (15%) were the most commonly reported procedural qualification, with surgery being the least common training area (6%). More than

Most graduates were aware of the rural procedural grants and training support programs. Of these those graduate respondents, 56% had accessed them, with just over half accessing the grants after they had completed their AGPT training (Table 5). Anaesthetics and emergency medicine were the most common procedural skills area for which the grants were used.

Table 5: Procedural skills training and grants MCCC rural pathway graduates

	<i>Variable</i>	<i>Values</i>	<i>Frequency</i>	<i>Percent</i>
Qualification (n=98)	Completion of procedural skills training qualification (training or post AGPT training)	Yes	33	33.7
		No	65	66.3
Area of training qualification (n=33)	Obstetrics and gynaecology	Yes	18	54.5
	Emergency	Yes	8	7.8
	Anaesthetics	Yes	5	15.2
	Surgery	Yes	2	6.1
Training grants (n=33)	Awareness of Rural Procedural Grants Program and the GP Procedural Training Support Program	Yes	31	91.2
		No	3	8.8
	Accessed the grants	Yes	19	55.9
		No	15	44.1
	When accessed grants	As a registrar	10	52.6
		After Fellowship	9	47.4
Skills area (n=18)	Obstetrics		5	27.8
	Emergency Medicine		4	22.2
	O&G, Emergency Medicine		3	16.7
	Anaesthetics		2	11.1
	Anaesthetics and emergency		2	11.1
	Emergency skills		1	5.6
	Skin cancer surgery		1	5.6

The graduates were asked about their involvement and interest in teaching and 61% reported a role in in-practice teaching or clinical supervision (Table 6). The most common levels of teaching were at the GP training level and medical student level, although a small number of graduate respondents taught in other areas including hospital supervision, IMG and nursing teaching.

When asked about their interest in GP educator roles within the RTO, 40% were not interested in such a teaching role, but 41% were interested in the ECT/DOV role, 41% in being a supervisor and 25% being a medical educator. For those not interested in teaching, the main reasons given were that they were already involved in teaching, family commitments and being too busy (Table 6).

Table 6: Involvement and interest in teaching, MCCC rural pathway graduates (n=103)

	<i>Variable</i>	<i>Values</i>	<i>Frequency</i>	<i>Percent</i>
Teaching	Involved in practice teaching or clinical supervision	Yes	60	61.2
		No	38	38.8
Level of teaching (n=217)	GP training	Yes	45	43.7
	Undergraduate (medical students)	Yes	46	44.7
	Other	Yes	10	9.7
Other types of teaching (n=10)	IMG training		3	30.0
	ECT		1	10.0
	GP (alternate pathway) requiring supervision		1	10.0
	Intern (via M2M program)		1	10.0
	JFPP mentoring		1	10.0
	Remote Area Nurses		1	10.0
	Interns		1	10.0
	Nursing students		1	10.0
Interest in RTO teaching (multiple responses)	ECT visitor/DOV visitor	Yes	42	40.8
	Supervisor	Yes	42	40.8
	Workshop/interviewer	Yes	16	15.5
	Medical Educator	Yes	26	25.2
	Not interested in RTO teaching	Yes	41	39.8
Reason for not wanting to teach (n=41)	Already involved in teaching		13	31.7
	Family commitments		7	17.1
	Busy		5	12.2
	No longer in state/overseas		4	9.8
	Time		3	7.3
	Not interested		3	7.3
	Not a good teacher		2	4.9
	Current position not allow it		1	2.4
	Focus more on patient practice		1	2.4
No longer practising as GP		1	2.4	
Working as locum		1	2.4	

Nearly 60% of the graduate respondents were interested in being part of an RTO alumni (Table 7).

Table 7: Interest in being part of an RTO Alumni

<i>Variable</i>	<i>Values</i>	<i>Frequency</i>	<i>Percent</i>
Interest in Alumni	Yes	57	58.8
	No	40	41.2

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## Part B: Patterns of practice location

### *Number of moves and time in locations*

Most graduate respondents (86%) had made less than three changes in practice location since graduating, while 4% had made five or more changes in practice location (Table 8 **Error! Reference source not found.**).

Table 8: Number of moves since completion of training by MCCC rural pathway graduates (n=98)

<i>Number of moves</i>	<i>Frequency</i>	<i>Percent</i>
0	32	32.7
1	37	37.8
2	15	15.3
3	5	5.1
4	5	5.1
5	1	1.0
6	3	3.1

When comparing the duration spent in a practice location, one-fifth of graduate respondents have spent more than 3.5 years in a practice location (55%) and one-fifth of graduates spending less than 12 months in a practice (Table 9 **Error! Reference source not found.**).

Table 9: Duration in practice locations (n=98)

<i>Duration in location</i>	<i>Frequency</i>	<i>Percent</i>
<=12 months	21	20.4
>1 year to 2 years	3	2.9
>2 years to 3.5 years	10	9.7
>3.5 years	21	20.4

The average number of moves among MCCC graduate respondents was 1.3 moves since graduation, with the mean number of moves per year being 0.5 (Table 9). Across the graduates, the average time spent in a practice was 5.3 years (63 months), with an average of 3.7 years spent in a rural practice and 1.5 years in an urban practice.



Table 10: Number and duration of moves since completion of training by MCCC rural pathway graduates

Variable	Mean	Median	Std Dev	Minimum	Maximum	Lower Quartile	Upper Quartile	N
Number of moves	1.3	1	1.4	0	6	0	2	98
Time in rural locations (months)	44.7	36	44.4	0	166	0	82	103
Time in urban locations (months)	18.8	0	30.0	0	159	0	33	103
Total time in practice (months)	63.5	58	47.4	0	269	26	95	103
Number of moves per year	0.5	0.17	1.1	0	6	0	0.38	98

### Changes in practice location

The 103 MCCC graduate respondents had made a total of 219 practice moves from their first practice location after graduation (Table 11). When analysed by location based on first location and subsequent locations, 86 moves were urban to urban moves and 101 were rural to rural moves. There were 26 rural to urban moves and 6 urban to rural moves. There was a significant association between first location and subsequent destinations (Chi square test,  $p < 0.0001$ ).

Table 11: Number of practice moves by location (rural/urban)

		Subsequent destinations			P value*
		Urban	Rural	Total	
First location	Urban	86	6	92	<0.0001
		93.5	6.5	100.0	
	Rural	26	101	127	
		20.5	79.5	100.0	
Total		112	107	219	

\*Chi square P value

The moves/destinations from first location to subsequent locations using the Remote Area classification is shown in Table 12. This table shows patterns of movement of graduates within rural locations, with most graduates moves remaining within their first location area. Of the 6 moves to rural areas from a major city (RA1) location (Table 11), most of these were to inner regional areas (RA2). Those starting in an inner regional area, most moves were to a major city (RA1). Most of those who started in an outer regional area (RA3) moved were to an RA1 location, while those who

started in very remote locations (RA5) moved to less remote rural locations (RA3-4). Practice moves by MMM is in Appendix 1. There was a significant association between first location and subsequent moves (Fisher's Exact test,  $p < 0.0001$ ).

Table 12: Number of practice moves by location (ASGC)

		Subsequent moves/destinations					Total	P value*
		Major cities (RA1)	Inner regional (RA2)	Outer regional (RA3)	Remote (RA4)	Very remote (RA5)		
First location	Major cities (RA1)	86 (93.5%)	5 (5.5%)	1 (1.1%)	0 (0.0%)	0 (0.0%)	92	<0.0001
	Inner regional (RA2)	21 (22.1%)	70 (73.7%)	2 (2.1%)	0 (0.0%)	2 (2.1%)	95	
	Outer regional (RA3)	3 (13.6%)	1 (4.6%)	16 (72.7%)	1 (4.6%)	1 (4.6%)	22	
	Remove (RA4)	2 (50.0%)	0 (0.0%)	0 (0.0%)	1 (25.0%)	1 (25.0%)	4	
	Very remote (RA5)	0 (0.0%)	0 (0.0%)	1 (16.7%)	1 (16.7%)	4 (66.7%)	6	
Total		110	78	20	3	8	219	

\*Fisher's Exact test

A summary of the pattern of moves between origin and destination is provided in Table 13. Out of all the moves, the majority were no change urban (39%) followed by no change rural (31%). A small proportion of moves were within rural (16%).

Table 13: Summary of pattern of moves between origin and subsequent locations

Pattern of moves	Frequency	Percent
No change: urban	85	38.8
Urban to rural	6	2.7
Rural to urban	26	11.9
No change: rural	67	30.6
Moved within rural	35	16.0
Total	219	100.0

Patterns of moves by various demographic and training characteristics of the MCCC graduate respondents is shown in **Error! Reference source not found.** The distribution of graduates across the pattern of moves were similar for most characteristics, however there some differences worth noting **Error! Reference source not found.** A greater proportion of graduates whose moratorium had ceased had moved from rural to urban locations (27%) compared with no moratorium graduates

(3%) and graduates with the moratorium still applying (17%). Nearly half of AMG graduates had remained in rural location compared to IMGs, of whom 27% have moved from rural to urban locations. Nearly two-thirds of rural origin graduates remained rural compared to only 30% of non-rural origin graduates.

In analysis of patterns of move by various characteristics, there was statistically significant association between pattern of move (ie urban to rural, no change rural) and:

- > Rural origin (Fisher's Exact P value 0.0325)
- > Type of graduate (Fisher's Exact P value 0.0456).

Table 14: Location changes by demographic and training characteristics (n=103)

	Variables**	No change: urban	Urban to rural	Rural to urban	No change: rural	Moved within rural	Total	P value*
Age group	<35 years	3	0	3	9	4	19	0.8183
		15.8	0.0	15.8	47.4	21.1	100.0	
	35-39 years	12	1	5	15	7	40	
		30.0	2.5	12.5	37.5	17.5	100.0	
	40+ years	7	1	10	14	7	39	
		18.0	2.6	25.6	35.9	18.0	100.0	
Gender	Male	12	0	6	14	8	40	0.5035
		30.0	0.0	15.0	35.0	20.0	100.0	
	Female	10	2	12	24	10	58	
		17.2	3.5	20.7	41.4	17.2	100.0	
Rural origin	Yes	2	0	1	14	5	22	0.0325
		9.1	0.0	4.6	63.6	22.7	100.0	
	No	20	2	17	24	13	76	
		26.3	2.6	22.4	31.6	17.1	100.0	
Moratorium	No moratorium	5	0	1	19	7	32	0.0183
		15.6	0.0	3.1	59.4	21.9	100.0	
	Ceased moratorium	16	2	16	16	10	60	
		26.7	3.3	26.7	26.7	16.7	100.0	
	Continuing moratorium	1	0	1	3	1	6	
		16.7	0.0	16.7	50.0	16.7	100.0	
Training pathway	General	-	-	-	-	-	-	
	Rural	22	2	18	38	18	98	
		22.5	2.0	18.4	38.8	18.4	100.0	
Type of graduate	AMG	10	0	4	23	10	47	0.0456
		21.3	0.0	8.5	48.9	21.3	100.0	
	IMG	12	2	14	15	8	51	
		23.5	3.9	27.5	29.4	15.7	100.0	
Rural bonded	Yes	0	0	3	2	0	0	
		0	0	3	2	0	100.0	
	No	-	-	-	-	-	-	
ATSI	Yes	-	-	-	-	-	-	

Working in area of special interest	Yes	10	1	9	24	10	54	0.7066
		<i>18.5</i>	<i>1.9</i>	<i>16.7</i>	<i>44.4</i>	<i>18.5</i>	<i>100.0</i>	
	No	12	1	9	14	7	43	
		<i>27.9</i>	<i>2.3</i>	<i>20.9</i>	<i>32.6</i>	<i>16.3</i>	<i>100.0</i>	
Duration in location	<=12 months	8	0	2	11	9	30	0.0085
		<i>26.7</i>	<i>0.0</i>	<i>6.7</i>	<i>36.7</i>	<i>30.0</i>	<i>100.0</i>	
	> 1 year to 2 years	3	1	2	2	1	9	
		<i>33.3</i>	<i>11.1</i>	<i>22.2</i>	<i>22.2</i>	<i>11.1</i>	<i>100.0</i>	
	> 2 years to 3.5 years	5	1	4	2	0	12	
	<i>41.7</i>	<i>8.3</i>	<i>33.3</i>	<i>16.7</i>	<i>0.0</i>	<i>100.0</i>		
	>3.5 years	6	0	10	23	8	48	
		<i>12.8</i>	<i>0.0</i>	<i>21.3</i>	<i>48.9</i>	<i>17.0</i>	<i>100.0</i>	
Total		22	2	18	38	18	98	
		<i>22.4</i>	<i>2.0</i>	<i>18.4</i>	<i>38.8</i>	<i>18.4</i>	<i>100.0</i>	

\*Fisher's Exact Test

Note: Row percentages shown in italics

### *Predictors of time spent in a rural practice location*

Negative binomial generalised estimating models were performed for the outcome of number of rural months serviced by each GP graduate across location versus various predictors. These results of the models are shown in Table 15.

One factor was found to predict more time practising in a rural location since graduation:

- > Graduates who had accessed rural procedural and training support grants have a rate of time spent in rural areas 2.8 times that of graduates did not (IRR 2.83, 95% CI 1.1, 7.4).

Table 15: Predictors of time (months) spent in a rural practice since graduation (n=107)

<i>Predictor</i>	<i>Comparison value</i>	<i>Reference value</i>	<i>Incidence Rate Ratio (95% CI)</i>	<i>Comparison P value</i>	<i>Global P value</i>
Age groups	35-39 years	40+ years	0.89 (0.50, 1.57)	0.6778	0.8311
	35-39 years	<35 years	0.79 (0.36, 1.73)	0.563	
	40+ years	<35 years	0.90 (0.43, 1.89)	0.7733	
Gender	Male	Female	1.07 (0.63, 1.82)		0.7944
Country of birth	Australia	Not Australia	1.60 (0.91, 2.80)		0.1015
State of current practice	Other states	Victoria	0.59 (0.31, 1.12)		0.1065
Moratorium status	Ceased moratorium	Continuing moratorium	0.80 (0.19, 3.36)	0.7615	0.5416
	Ceased moratorium	No moratorium	0.74 (0.44, 1.26)	0.2722	
	Continuing moratorium	No moratorium	0.93 (0.22, 3.96)	0.9186	
Training pathway	Rural				
Type of graduate	AMG	IMG	1.33 (0.80, 2.22)		0.2742
PGPPP placement	Yes	No	0.89 (0.50, 1.57)	0.6778	0.8311
Duration in practice location	<=12 months	>1 year to 2 years	1.43 (0.24, 8.66)	0.6976	0.3667
	<=12 months	>2 years to 3.5 years	2.67 (0.89, 8.05)	0.08	
	<=12 months	>3.5 years	1.32 (0.63, 3.76)	0.4616	
	>1 year to 2 years	>2 years to 3.5 years	1.87 (0.29, 12.27)	0.5138	
	>1 year to 2 years	>3.5 years	0.92 (0.17, 5.02)	0.9264	
	>2 years to 3.5 years	>3.5 years	0.49 (0.20, 1.23)	0.13	
Rural origin	Has rural origins	No rural origins	0.63 (0.04, 11.01)		0.7531
Workload	Full time	Part time	1.43 (0.24, 8.66)	0.6976	0.3667
Work in area of interest	No	Yes	2.67 (0.89, 8.05)	0.0800	
Undertaken procedural skills training	Yes	No	1.32 (0.63, 3.76)	0.4616	
Procedural skills training – O&G	Yes	No	1.87 (0.29, 12.27)	0.5138	
Procedural skills training – Anaesthetics	Yes	No	0.92 (0.17, 5.02)	0.9264	
Procedural skills training – Surgery	Yes	No	0.49 (0.20, 1.23)	0.1300	
Procedural skills training – Emergency	Yes	No	1.55 (0.87, 2.78)		0.1371

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Aware of Rural Procedural grants/Support Program	Yes	No	Did not converge	
Accessed of Rural Procedural grants/Support Program	Yes	No	2.83 (1.08, 7.40)	0.0336
Teaching	Yes	No	1.45 (0.85, 2.46)	0.1693
Number of practice moves			0.91 (0.76, 1.08)	0.2901
Total number of FTE rural training weeks			1.04 (0.97, 1.12)	0.2749
Years since graduation			0.99 (0.90, 1.09)	0.813

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A multivariable negative binomial regression model was performed for the outcome of number of rural months serviced by each GP graduate across location versus various predictors. The results of the model are shown in Table 16 **Error! Reference source not found.**

Table 16: Results of multivariable negative binomial regression model for months spent in a rural location versus significant covariates, with offset: natural logarithm of total months of practice, MCCC rural pathway graduates (N=101)

<i>Covariate</i>	<i>Comparison value</i>	<i>Reference value</i>	<i>Incidence Rate Ratio (95% CI)</i>	<i>P value</i>
Country of birth	Born Australia	Not born in Australia	1.60 (0.91, 2.80)	0.1014
State	VIC	Other states	1.67 (0.90, 3.13)	0.1067

There was not a statistically significant association between months spent in rural practice versus born in Australia or not or between state where graduates are currently practising.

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## Discussion

This study has identified factors that predict the length time MCCC rural pathway graduates spend in a rural location after graduation as well how often graduates change practices and the patterns of location changes. It also identified what factors are important to these graduates when selecting a practice.

### Practice selection

When selecting a practice to work in, the culture of the practice and teamwork were reported as the most important consideration. There is little research on why GP graduates choose a particular practice. One of the few studies undertaken support these more recent findings. Laurence et al's<sup>11</sup> exploration of factors in choosing a rural practice by recent GP graduates in SA, also found that professional factors such as the practice culture, practice staff and they style of the practice as an important consideration along with being able to utilise their skills. This study also found that the decision on which practice to work in was influence by family needs, also found to be an important consideration in this study.

### Changes in practice location

Overall, the MCCC rural pathway graduate respondents are stable in their practice location, with the majority making less than three practice moves since their graduation. Most graduate respondents also work in practices in the same geographic location and only a small proportion move between rural and urban locations.

The pattern of moves for graduate respondents within rural areas tend to be see that most of the moves from their first rural location are to a less rural areas, no matter their rural starting location. For example, inner regional moves to urban, outer regional to inner regional/urban, remote to outer regional. The pattern of moving from more remote locations to less remote locations has also been observed in several other studies. A similar pattern was found by McGrail et al<sup>12</sup> in a study of 3906 GPs which showed that GPs in small towns and remote areas had higher rates of mobility than those in less remote areas. Other studies have shown that this mobility rate is also related to the characteristics of the GP but also professional and non-professional factors such as schooling for children and use of procedural skills. An analysis of NSW GPs over nine years showed that risk of moving from rural locations was highest in small, remote centres and for non-procedural GPs and overseas trained doctors<sup>13</sup>. McGrail et al<sup>14</sup> found that male GPs with children in secondary school were more likely to work in larger rural towns and regional centres than GPs with children in primary school. This suggests that education may be a key driver to changes in practice location for rural GPs and this is supported by the results from this study showing that family were one of the most important considerations when choosing a practice location.

### Involvement in teaching

More than half of the graduate respondents were involved in practice teaching or clinical supervision. This may result from GP graduates selecting their practices based on their experience with a practice during training and therefore become involved in training through this process. It is also known that teaching increases GP satisfaction and adds variety to their practice<sup>15 16</sup> and it may contributes to retaining a GP in that practice.

The sustainability of a teaching workforce is important and while some research has been undertaken it has focussed on the financial aspect of teaching<sup>15 17 18</sup> rather than the future supply of this workforce. This study provides some indication the exists an ongoing supply of medical educations, with a large proportion of MCCC rural pathway graduates already involved in teaching



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through their current practice. They also showed a willingness to take on additional teaching roles, providing a pipeline of future educators for general practice. This is particularly important when the requirement for teaching in a GP setting is growing with increased medical students and GP registrars<sup>19</sup>. This requires a supply pipeline of GP educators to replace those experienced GP supervisors who are retiring but also meet the increased demands. Moreover, this demand is likely to grow in rural areas with the establishment of the Murray-Darling Medical school network and the redistribution of medical places to areas of workforce need such as rural and regional areas<sup>20 21</sup>.

## Predictors of time in rural locations

Our previous report<sup>22</sup> determined what factors predicted working in a rural location after graduation while this analysis has then investigated, once in a rural practice, how long an AGPT graduate is likely to stay and what predicts the length of time they remain in a rural location. Determining the length of rural retention of AGPT graduates is a key measure of the success of any strategy to increase GPs working in rural and remote areas. To date determining a retention rate in terms of time has been difficult to calculate and this analysis goes some way in addressing this question.

Assessing procedural skills training was found to predict a greater time spent in a rural practice and this is unsurprising. Our finding aligns with Russell et al's<sup>23</sup> analysis of MABEL data that showed that rural GPs with procedural skills had been in their current position for 26% longer than GPs with no anaesthetic, obstetrics or surgical skills. Related to procedural skills, she also found that GPs doing hospital work increased the retention of GPs in rural and remote areas (18% longer). Both these findings support the investment in procedural skills training to improve retention of GP graduates working in rural areas.

## Limitations

The main limitations of this study relate to the survey and its response rate. A response of 55% was achieved which is relatively high for GP surveys and while the results are likely to be representative of the MCCC rural pathway graduates, there is still the possibility of bias. For example, the responses may have been biased towards more recent graduates or general pathway graduates. This possible bias was offset by using probability weights.

In asking graduates to recall all their practice locations since completing their AGPT training, we were reliant on the accuracy of their recall. For some of the graduates who had completed training more than five years ago, they may be less likely to recall all the details about their earlier practice. However, as 86% of respondents had moved less than three times, this problem is likely to be minimal.

This analysis only includes rural pathway graduates of MCCC and not general pathway graduates and so the results may not reflect all graduates of the RTO.

## Conclusion

We determined which factors are important predictors of time spent practising in a rural location after graduation. The study provides evidence that procedural skills training is important in influencing how long a GP graduate will remain in a rural location. We have also found that AGPT training provides an important pipeline of future GP educators.

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# Appendices



## Appendix 1: Number of practice moves by location (MMM)

		Subsequent moves/destinations								
		<i>Major cities (MM1)</i>	<i>Large regional (MM2)</i>	<i>Medium large regional (MM3)</i>	<i>Medium regional (MM4)</i>	<i>Small regional (MM5)</i>	<i>Remote (MM6)</i>	<i>Very remote (MM7)</i>	<i>Total</i>	<i>P value*</i>
First location	<i>Major cities (RA1)</i>	85 (93.5%)	4 (4.4%)	1 (1.1%)	1 (1.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	91	<0.0001
	<i>Large regional (MM2)</i>	4 (9.5%)	28 (66.7%)	4 (9.5%)	0 (0.0%)	4 (9.5%)	1 (2.4%)	1 (2.4%)	42	
	<i>Medium large regional (MM3)</i>	9 (27.3%)	2 (6.1%)	16 (48.5%)	1 (3.0%)	3 (9.1%)	0 (0.0%)	2 (6.1%)	33	
	<i>Medium regional (MM4)</i>	5 (22.7%)	1 (4.6%)	3 (13.6%)	11 (50.0%)	2 (9.1%)	0 (0.0%)	0 (0.0%)	22	
	<i>Small regional (MM5)</i>	6 (28.6%)	4 (19.1%)	2 (9.5%)	0 (0.0%)	9 (42.9%)	0 (0.0%)	0 (0.0%)	21	
	<i>Remote (MM6)</i>	2 (50.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (25.0%)	1 (25.0%)	4	
	<i>Very remote (MM7)</i>	0 (0.0%)	1	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (25.0%)	2 (50.0%)	4	
	<i>Total</i>	111	40	26	13	18	3	6	217	

\*Fisher's Exact test