

# Who wants to be a GP? An examination of the Medical Schools Outcomes Database

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## Abstract

**Background:** There is currently a shortage of general practitioners in Australia. For this study, the authors used the Medical Schools Outcomes Database to examine: 1) whether attributes previously identified as being associated with an interest in pursuing a career in general practice (GP) hold true at commencement and completion of a medical degree, and at completion of the first postgraduate year (PGY1); 2) whether the medical school that a student attended is associated with a preference for GP; and 3) the consistency, over time, of GP preferences.

**Methods:** Information regarding students'/interns' demographics and career preferences at three points in time (commencement, completion and PGY1) were obtained from the Medical Schools Outcomes Database & Longitudinal Tracking Project database.

**Results:** Many attributes, including the medical school attended, were associated with a GP preference. Preferences for general practice were not consistent over the three time periods examined.

**Conclusion:** Targeting potential medical students with attributes associated with a preference for general practice is unlikely to alleviate Australia's general practitioner shortage because preferences for general practice are not stable over time.

**Keywords:** career choices; age; gender; marital status; children; place of birth; language; rurality; medical school.

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**Introduction**

Australia is currently experiencing a general practitioner shortage (Brooks, Lapsley, & Butt, 2003; Health Workforce Australia, 2012; Thistlethwaite, Kidd, & Leeder, 2008; Thistlethwaite, Leeder, Kidd, & Shaw, 2008), and this is unlikely to be alleviated if a significant proportion of medical school graduates do not pursue a career in general practice (Joyce, McNeil, & Stoelwinder, 2006). Such concerns have also been reported in other countries, including New Zealand (Gladu, 2007; Lambert & Goldacre, 2002; Mariolis et al., 2007; Reid, 2006; Rosser, 2002).

Several studies found that the following attributes are associated with interests in pursuing a career in general practice: female (Lambert & Goldacre, 2011; Morrison & Murray, 1996; Poole, Bourke, & Shulruf, 2010), being married/in a de facto relationship (WAGPET, 2009; but see also Poole et al., 2010), older (Mariolis et al., 2007; but see also Lambert, Goldacre, Davidson, & Parkhouse, 2001), born in the country in which they studied (Poole et al., 2010) and had previously lived in a rural region (Poole et al., 2010; WAGPET, 2009). These findings suggest that the general practitioner shortage may be alleviated by targeting individuals with these attributes to study medicine. Once committed to pursuing a career in general practice, these medical graduates must secure a place in the general practice fellowship training program. Thus sufficient general practice fellowship training program places need to be provided to meet the demands of the number of individuals intending to pursue a career in general practice and the number of general practitioners needed within Australia. From 2007 to 2014, the number of general practice fellowship places have increased from 600 to 1200 (Health Workforce Australia, 2012). Despite this increase over the years the question remains as to whether this increase is sufficient to meet the demand of students interested in pursuing a career in general practice.

The present study had three aims. The first aim was to ascertain whether the attributes associated with a preference for general practice, identified by previous studies, still hold true amongst Australian medical students and interns. Our second aim was to examine whether the students' medical school is associated with a preference for general practice. The third aim was to examine medical students' preferences for general practice at three points in time: at commencement of their medical degree, at completion of their medical degree and at the end of their first internship year (PGY1). Specifically, we were interested in determining how many students who commenced their medical degree with a preference for general practice retained this preference at completion and the end of PGY1. In other words, how stable are preferences for general practice? Determining the stability of a preference for general practice is important if prospective students with attributes associated with a preference were to be specifically targeted.

**Method**

Ethics approval was obtained from the Human Research Ethics Committee at The University of Western Australia. We had access to the Medical Schools Outcomes Database & Longitudinal Tracking Project (MSOD), an initiative by the Medical

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Deans of Australia and New Zealand, which collects data from medical students studying within Australia (see <http://www.medicaldeans.org.au/msod>). The MSOD project started with a pilot study involving a subset of students commencing their medical studies in 2005 and was subsequently implemented nationally in 2006. In 2008 and 2009, the project was extended to completing medical students and PGY1 interns, respectively.

At the time of our analyses, we had access to data from students who commenced their medical degree in 2005 (subset of medical schools only) and between 2006 and 2012, inclusive ( $n=22,115$ ); students who completed their medical degree between 2008 and 2012, inclusive ( $n=8,499$ ) and interns at the completion of their PGY1 between 2009 and 2012, inclusive ( $n=4,566$ ). Commencing medical students completed the survey within the first few months of starting their degree. Completing medical students and PGY1 interns completed the survey at the end of their medical degree and at the end of PGY1, respectively. Information within the MSOD that was of interest to us included students' career preferences, gender, age (at the 1st of January in the commencing year; at the 31st of December in the completing year; at the 1st of January during PGY1), place of birth, language spoken at home, time spent residing in a rural location before commencing medicine (or during the first 18 years of their life for those  $\geq 18$  at commencement), marital status, presence of children, presence of dependents other than children, medical school attended and the year students commenced and completed a medical degree and were in PGY1. Information regarding students' country of birth, language spoken at home and time spent residing in a rural location before commencing medicine was only collected at commencement. All other information, including students'/interns' career intentions and marital status were collected at all three survey times (i.e. commencement, completion, PGY1).

### ***Data collection***

#### *GP preference*

Only students/interns who indicated a first-ranked career preference were included in our analyses. We assigned students/interns to one of two categories based on their first-ranked career preference: 1) GP preference or 2) non-GP preference (i.e., containing all career preferences other than general practice).

#### *Place of birth*

We divided students/interns into one of two categories based on the country of birth they specified at the time of commencement: 1) Australia or 2) a country other than Australia.

#### *Language spoken at home*

We divided students/interns into one of two categories based on whether they indicated speaking a language other than English at home: 1) no language other than English or 2) a language other than English.

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*Marital status*

Commencing students’ marital statuses were divided into the following categories: 1) single, 2) relationship but not living with a partner or 3) married/living with partner. Only a few commencing students reported a marital status other than these categories (e.g., divorced, widowed) and, thus, were excluded from analyses involving marital status. The same categories were retained for completing students and interns for consistency purposes.

*Medical school*

Medical schools were examined in two ways: 1) establishment date of medical school (pre 1970 versus post 1970 based on Geffen, 2014) (see Table 1a) and 2) a combination of their entry status (graduate entry [postgraduate] versus direct from school entry [undergraduate]) and whether they are GP focused (GP focused versus non-GP focused) (see Table 1b). Medical schools were classified as being GP focused or not based on: a) information on medical schools’ websites regarding their school’s intentions/ambitions in addressing the needs of the community and b) published sources containing information regarding medical schools, for example, the University of Wollongong designed their curriculum with a strong general practice focus with the intention of having 60–70% of its graduates choose general practice as their preferred career (Lawson, Chew, & Van Der Weyden, 2004). Using this classification system, students/interns were categorised as belonging to one of four types of medical schools: 1) GP focused, undergraduate entry; 2) GP focused, graduate entry; 3) non-GP focused, undergraduate entry; or 4) non-GP focused, graduate entry.

Table 1a  
*Establishment Date of Medical Schools*

Pre 1970	Post 1970
Monash University	Australian National University
University of Adelaide	Bond University
University of Melbourne	Deakin University
University of New South Wales	Flinders University
University of Queensland	Griffith University
University of Sydney	James Cook University
University of Tasmania	University of New England
University of Western Australia	University of Newcastle
	University of Notre Dame (Fremantle)
	University of Notre Dame (Sydney)
	University of Western Sydney
	University of Wollongong

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Table 1b  
*Entry Status and Focus of Medical Schools*

Undergraduate & GP focused	Postgraduate & GP focused	Undergraduate & Non-GP focused	Postgraduate & Non-GP focused
University of New England	Deakin University	Bond University	Australian National University
University of Newcastle	Flinders University	Monash University (Undergraduate)	Monash University (Graduate)
	Griffith University	University of Adelaide	University of Melbourne (Doctor of Medicine)
	James Cook University	University of Melbourne (Undergraduate)	University of Melbourne (Graduate)
	University of Notre Dame (Fremantle)	University of New South Wales	University of Queensland
	University of Notre Dame (Sydney)	University of Tasmania	University of Sydney
	University of Western Sydney	University of Western Australia (Undergraduate)	University of Western Australia (Graduate)
	University of Wollongong		

**Statistical analyses**

For all continuous variables (e.g., age), we conducted independent samples *t*-tests to determine if there is a difference between students/interns showing a preference for general practice compared to those who do not. Chi-square tests were conducted for analyses involving discrete variables (e.g., marital status). Obtained and expected frequencies were compared for all Chi-square tests to examine where the difference lies between groups and whether it is statistically significant. All *p*-values less than or equal to .05 were considered to be statistically significant. SPSS version 22 was used to conduct analyses.

**Results**

**Attributes**

We examined whether particular attributes are associated with a GP preference at commencement, completion and PGY1. Only students who indicated a first-ranked career preference were included in analyses for each time period. Furthermore, only commencing students aged <50 years were included in the analyses pertaining to commencement to ensure that students would not be close to or past retirement age at graduation. Based on these criteria, data was available for 15,631 commencing students (2005: *n*=581; 2006: *n*=1,425; 2007: *n*=1,760; 2008: *n*=2,356; 2009: *n*=2,304; 2010: *n*=2,130; 2011: *n*=2,571; 2012: *n*=2,504), 7,528 completing students (2008: *n*=243; 2009: *n*=772; 2010: *n*=1,760; 2011: *n*=2,234; 2012: *n*=2,519) and 4,475 interns at PGY1 (2009: *n*=291; 2010: *n*=851; 2011: *n*=1,513; 2012: *n*=1,820). Responses to all

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questions within each survey were not available for all students/interns. Furthermore, not all students/interns completed surveys at all three times (commencement, completion, PGY1) because: a) not all students have completed their studies and/or are at PGY1 and b) some students did not complete some MSOD surveys (e.g., some completing students did not complete the commencement survey).

Thirteen percent of students had a first-ranked career preference at commencement (GP:  $n=2,072$ ; non-GP:  $n=13,559$ ), 13% at completion (GP:  $n=1,002$ ; non-GP:  $n=6,526$ ) and 18% at the end of PGY1 (GP:  $n=804$ ; non-GP:  $n=3,671$ ). The percentage of commencing students interested in pursuing a career in general practice did not vary much across the cohorts and was in fact the same for the last two years (2005: 16.2%; 2006: 14.9%; 2007: 15.3%; 2008: 11.7%; 2009: 12.6%; 2010: 14.1%; 2011: 12.4%; 2012: 12.4%). Similarly, the percentage of completing students (2008: 10.7%; 2009: 14%; 2010: 12.3%; 2011: 12.6%; 2012: 14.7%) and PGY1 interns (2009: 17.5%; 2010: 18.2%; 2011: 17.3%; 2012: 18.5%) intending to pursue a career in general practice did not vary much across the cohorts.

Students had a mean age of 21.4 years ( $n=15,631$ ,  $SD=4.6$ , range 13–49) at commencement, 26.4 years ( $n=7,528$ ,  $SD=4.2$ , range 16–60) at completion and 27.6 years ( $n=4,475$ ,  $SD=4.4$ , range 22–75) at PGY1. Those with a GP preference were significantly older than those with a non-GP preference at commencement, completion and PGY1 (see Table 2).

Students with a GP preference spent significantly more time residing in a rural location before commencing the medical course than those with a non-GP preference at commencement and completion. The findings were in the same direction for PGY1, but they did not reach statistical significance (see Table 2).

Table 2  
*Mean Age in Years and Mean Number of Years Residing in a Rural Location Categorised by Students'/Interns' First-Ranked Career Preferences at Commencement, Completion and Postgraduate Year 1*

Characteristic	Commencement				Completion				Postgraduate year 1			
	General Practice M (SD) n	Non General Practice M (SD) n	t (df)	P	General Practice M (SD) n	Non General Practice M (SD) n	t (df)	P	General Practice M (SD) n	Non General Practice M (SD) n	t (df)	P
Age	23.1 (6.2) n = 2,072	21.1 (4.3) n = 13,559	18.49 (15,629)	≤.001	28.1 (6.0) n = 1,002	26.1 (3.7) n = 6,526	13.97 (7,526)	≤.001	29.3 (5.9) n = 804	27.3 (3.9) n = 3,671	11.97 (4,473)	≤.001
Rural location	5.6 (7.6) n = 1,310	3.6 (6.5) n = 8,850	10.36 (10,158)	≤.001	5.2 (7.3) n = 335	3.5 (6.4) n = 1,904	4.26 (2,237)	≤.001	4.4 (6.9) n = 152	3.6 (6.4) n = 571	1.26 (721)	.209

Note: All t-tests are two-tailed.

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Table 3  
*Students'/Interns' Characteristics by First-Ranked Career Preferences at Commencement, Completion and Postgraduate Year 1*

Characteristic	Commencement				Completion				Postgraduate year 1			
	General Practice	Non General Practice	$\chi^2$ (df)	p	General Practice	Non General Practice	$\chi^2$ (df)	p	General Practice	Non General Practice	$\chi^2$ (df)	p
Gender												
Female	1,246* (1126.4)	7,251 (7,370.6)	32.07	≤.001	656* (545.5)	2,941* (2,830.5)	58.11	≤.001	542* (456.0)	1,996 (2,082.0)	45.69	≤.001
Male	826* (845.6)	6,307 (6,187.4)	(1)		327* (437.5)	3,418 (3,528.5)	(1)		262* (348.0)	1,675* (1,589.0)	(1)	
Marital status												
Single	1,437* (1,641.5)	11,021 (10,816.5)	220.19	≤.001	402* (538.1)	3,778* (3,641.9)	129.36	≤.001	215* (329.2)	1,632* (1,517.8)	110.24	≤.001
Relationship but not living with partner	216 (195.5)	1,268 (1,288.5)	(2)		152 (153.2)	1,038 (1,036.8)	(2)		111 (125.5)	593 (578.5)	(2)	
Married / living with partner	391* (207.0)	1,180* (1,364.0)			378* (240.7)	1,492* (1,629.3)			464* (335.4)	1,418* (1,546.8)		
Children under 16 years of age												
No	1,865* (1,987.2)	13,111 (13,008.8)	197.70	≤.001	828* (907.6)	5,935 (5,855.4)	113.59	≤.001	669* (735.0)	3,422 (3,356.0)	84.21	≤.001
Yes	165* (62.8)	309* (411.2)	(1)		149* (69.4)	366* (447.6)	(1)		135* (69.0)	249* (315.0)	(1)	
Dependents other than children												
No	1,964 (2,008.3)	13,207 (13,162.7)	70.31	≤.001	887 (911.2)	5,929 (5,904.8)	14.05	≤.001	732 (753.2)	3,460 (3,438.8)	11.45	≤.001
Yes	77* (32.7)	170* (214.3)	(1)		75* (50.8)	305 (329.2)	(1)		72* (50.8)	211 (232.2)	(1)	
Place of birth												
Australia	1,432* (1,272.1)	8,161 (8,320.9)	60.29	≤.001	576 (531.8)	3,300 (3,344.2)	11.21	≤.001	496* (444.4)	1,886 (1,937.6)	21.46	≤.001
Country other than Australia	635* (794.9)	5,360* (5,200.1)	(1)		281* (325.2)	2,089 (2,044.8)	(1)		180* (231.6)	1,081 (1,009.4)	(1)	
Language other than English spoken at home												
No	1,573* (1,401.7)	9,009 (9,180.3)	75.04	≤.001	665* (598.0)	3,888 (3,755.0)	28.65	≤.001	547* (495.8)	2,111 (2,162.2)	24.21	≤.001
Yes	493* (664.3)	4,522* (4,350.7)	(1)		194* (261.0)	1,706 (1,639.0)	(1)		131* (182.2)	846 (794.8)	(1)	
Establishment date of medical school												
Pre 1970	1,061* (1,269.0)	8,512* (8,304.0)	101.38	≤.001	607* (669.2)	4,421 (4,358.8)	20.11	≤.001	444* (530.9)	2,511 (2,424.1)	51.06	≤.001
Post 1970	1011* (803.0)	5,047* (5,255)	(1)		395* (332.8)	2,105 (2,167.2)	(1)		360* (273.1)	1,160* (1,246.9)	(1)	
Entry status and focus of medical school												
Undergraduate GP focus	161* (123.3)	769 (806.7)	116.46	≤.001	47 (41.0)	261 (267.0)	48.21	≤.001	33 (24.4)	103 (111.6)	56.45	≤.001
Graduate GP focus	740* (570.7)	3,565* (3,734.3)	(3)		313* (240.1)	1,491 (1,563.9)	(3)		278* (207.7)	878* (948.3)	(3)	
Undergraduate non-GP focus	580* (744.6)	5,037* (4,872.4)			273* (354.6)	2,391 (2,309.4)			187* (257.5)	1,246* (1,175.5)		
Graduate non-GP focus	591 (633.5)	4,188 (4,145.5)			369 (366.3)	2,383 (2,385.7)			306 (314.4)	1,444 (1,435.6)		

\* Significant difference between observed and expected counts at the 5% level based on standardised residuals. Expected counts are stated in parentheses next to observed counts.

Chi-square tests revealed that students with the following attributes were significantly more likely to show a GP preference: female, married/living with a partner, have children ≤16 years of age, have dependents other than children, born in Australia, do not speak a language other than English at home, are enrolled at a GP-focused medical school and are enrolled at a medical school established after 1970 (see Table 3).

**Preferences over time**

We examined students'/interns' career preferences over time. This part of the data analysis was restricted to individuals aged <50 years at commencement, who indicated a career preference at all three survey times (commencement, completion and PGY1). Thus, only those who completed PGY1 between 2009 and 2012, inclusively, could be included (i.e.,  $n=2,118$ ). As can be seen in Figure 1, 4.9% had a preference for general practice at all three times, whereas 69.5% had a preference for a career other than general practice at all three times. The remaining participants alternated their career preferences over time. For example, 14.3% had a preference for general preference at PGY1 but a preference for a career other than general practice at commencement and/or completion. On the other hand, 11.3% had a preference for general practice at commencement and/or completion but had a preference for a career other than general practice at PGY1.

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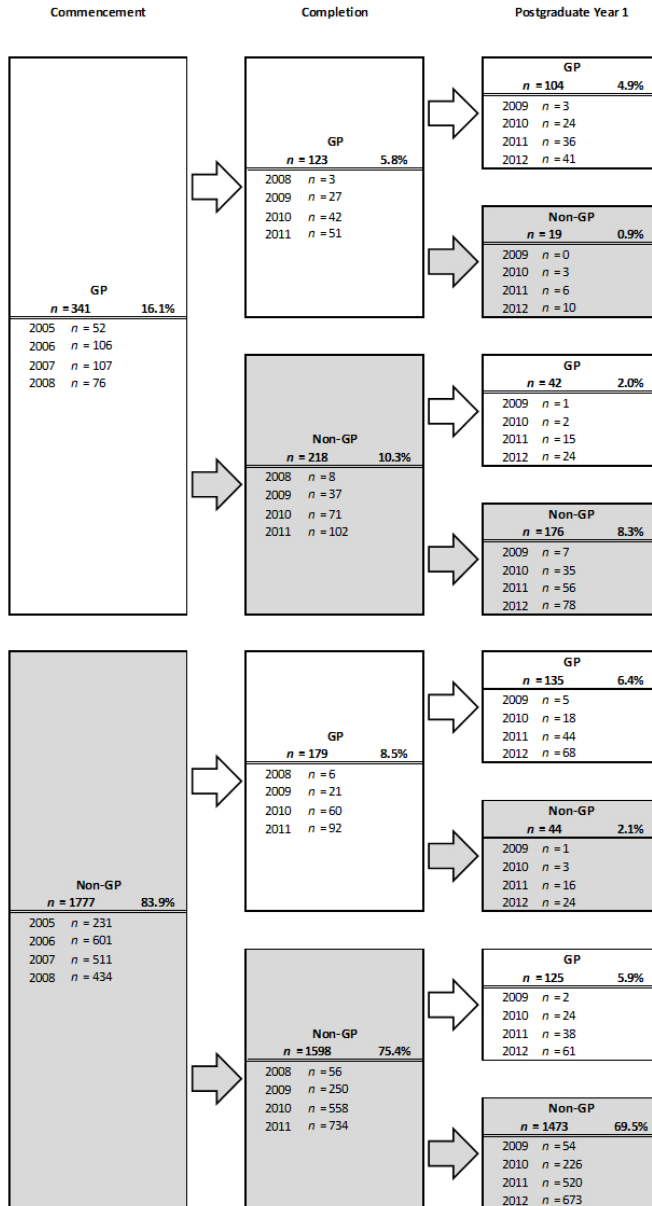


Figure 1. First-ranked career preferences for 2,118 students/interns who were aged <50 at commencement, at three points in time (commencement, completion and PGY1).

Each box shows the career preference (GP or non-GP), the total number and percentage of students/interns who expressed the career preference shown at that point in time and as a breakdown of the number of students/interns in each year who expressed the career preference shown. Note: the length of the medical degrees varies across institutions and thus not all students who commenced in a particular year (e.g., in 2005) completed after a period of four years of study (e.g., in 2008).



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**Discussion**

Medical students/interns indicating a GP preference were compared to those not showing a GP preference at three points in time (commencement, completion and PGY1). Those with a GP preference were more likely to possess the following attributes: older, female, married/living with a partner, dependent children, dependents other than children, born in Australia, spoke only English at home, raised in a rural location, enrolled at a GP-focused university and enrolled at a medical school established after 1970.

Our findings are consistent with international studies (e.g., Morrison & Murray, 1996; Scott et al., 2011). Preferences for general practice did not vary much across the cohorts at the three survey times. Viewed in isolation, our findings, together with those reported previously, could prematurely lead to the suggestion that prospective medical students with these attributes could be targeted to increase the number of students interested in general practice. However, our findings show that students who have a first-ranked preference for general practice at commencement do not necessarily retain this preference at completion and/or at the end of PGY1. Less than 5% of those surveyed had a preference for general practice at all three time points (i.e., commencement, completion and PGY1). Furthermore, the largest percentage of PGY1 interns who show a preference for general practice come from those who did not show a consistent preference for general practice over time. Interestingly, nearly 6% of PGY1 interns showing a preference for general practice did not express this preference at commencement and completion (i.e., a larger percentage than those who had a consistent preference for general practice at all three times). Thus, a first-ranked preference for general practice at commencement is not a reliable indicator of a preference for general practice later (i.e., closer to the time students make actual career choices). Perhaps those that expressed an interest in general practice in PGY1 but not earlier had an interest in general practice whilst completing their degree but this was not their first-ranked career preference at the time.

Attracting more graduates to pursue a career in GP, either by maintaining their initial interests in general practice at commencement or by establishing an interest in the field during their studies, is only part of the solution to solving Australia's general practitioner shortage. The general practitioner shortage cannot be resolved if the number of GP fellowship positions do not match the number of general practitioners required. In other words, a bottleneck will be created in regards to the number of graduates that can enter the fellowship program.

**Strengths and limitations**

The strengths of our study include that it is based on several cohorts of medical students representing all Australian medical schools who were surveyed at commencement, completion and PGY1. The MSOD website shows that 23,371 students commenced their medical degree at an Australian university between 2006 and 2012, inclusively (note: no data was available for 2005), and 11,537 students completed their degree between 2009 and 2012. For these time periods, the MSOD database contains information for 21,240 commencing and 8,237 completing students. Furthermore,

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15,050 of these commencing students and 7,285 of these completing students for these time periods met the criteria for our analyses (e.g., must have indicated a career preference). Thus, our study represents 64% and 63% of students who commenced between 2006 and 2012 and completed between 2009 and 2012, respectively. Response rates for PGY1 interns cannot be determined because the MSOD website does not state the total number of PGY1 interns in Australia between 2009 and 2012, inclusively. It is highly unlikely that there is a responder bias for general practice in our study given that the MSOD data collection takes place annually and is not designed to establish students' preferences for general practice.

A limitation of our study is that the MSOD does not contain information on graduates' actual career choices. Thus career preferences at PGY1 may not necessarily translate into these interns actually pursuing the career that they indicated. Longitudinal studies encompassing several cohorts of students and actual career choices are required to draw rigorous conclusions pertaining to factors associated with pursuing a career in general practice. Additionally, other factors—for example, GP placement durations and perceived quality of GP placements (Brooks et al., 2003)—that were not available on the MSOD, may also be associated with a GP preference and thus require exploration. Factors such as GP placement experiences may explain the changes in preferences for general practice that we found over time. For example, a student may not have had an initial interest in general practice at commencement, but a positive placement experience may have led the student to express an interest in general practice at completion and/or PGY1.

We only examined students'/interns' first-ranked career preference for GP. Some students/interns may rank GP as their second or third preference and actually end up pursuing this career. Thus, rankings beyond a first preference should ideally also be examined. Unfortunately, rankings other than a first preference were only obtained as part of the MSOD from 2008 onwards. Therefore, we could not explore whether PGY1 interns with an interest in general practice, but not during their medical studies, ranked general practice as their second or third choice at commencement and/or completion.

A limitation to note in regards to our examination and classification of medical schools is the changing nature of medical schools in terms of their intake (undergraduate entry/postgraduate entry) and change in focus over time. For example, the University of Western Australia's undergraduate program no longer exists. Thus, caution needs to be taken when drawing conclusions on GP preferences related to our categorisation based on medical schools being GP focused or not.

## Conclusion

Our study shows that certain attributes (e.g., being female and older at commencement) are associated with a preference for pursuing a career in general practice as shown by previous studies. Furthermore, the type of medical school (e.g., being GP focused and established after 1970) is also associated with a preference for general practice. An examination of preferences for general practice across three time periods (commencement,

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completion, and PGY1) amongst the same students/interns shows that preferences for pursuing a career in general practice are not stable. Only 5% of individuals had a consistent preference for general practice at commencement, completion and PGY1. Interestingly, nearly 6% of individuals had a preference for general practice at PGY1 but did not have this preference at commencement and completion. The idea of recruiting potential medical students with attributes associated with a preference for general practice is unlikely to assist in alleviating Australia's GP shortage because preferences for pursuing a career in general practice are not stable across time.

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