

Demographic changes in Australia's regulated health professions: 6-year trends

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ABSTRACT

Objective. Studies of Australian health workforce demographics tend to be limited to single professions, a set geographic area, or based on incomplete data. This study aims to comprehensively describe changes to the demographic characteristics of Australia's regulated health professions over 6 years. **Methods.** Data were sourced from the Australian Health Practitioner Regulation Agency (Ahpra) registration database, and a retrospective analysis of 15 of the 16 regulated health professions between 1 July 2015 and 30 June 2021 was conducted. Variables including profession, age, gender and state/territory locations for the practitioners' principal places of practice were analysed descriptively and via appropriate statistical tests. **Results.** Changes in age, gender representation, and place of practice varied significantly and in different ways across the 15 professions. The total number of registered health practitioners increased by 141 161 (22%) from 2016 to 2021. The number of registered health practitioners per 100 000 population increased by 14% from 2016, with considerable variation across the professions. In 2021, women accounted for 76.3% of health practitioners across the 15 health professions, a significant increase of 0.5% points since 2016. **Conclusions.** Changes to demographics, especially in ageing workforces and feminising professions, can have implications for workforce planning and sustainability. Future research could build on this demographic trend data by investigating causes or undertaking workforce supply or demand modelling.

Keywords: demographics, gender-sensitive planning, health workforce, National Registration and Accreditation Scheme, workforce supply, trend.

Introduction

In Australia, 16 health professions are regulated nationally under the National Registration and Accreditation Scheme (the Scheme). The Scheme is administered through the Australian Health Practitioner Regulation Agency (Ahpra) working in partnership with 15 National Boards. The National Scheme registers more than 800 000 health practitioners annually.¹ Ahpra's health practitioner registration database includes demographic information, providing a unique opportunity to study the changing demographics of Australia's regulated health practitioner workforce.

Health workforce demographics and distribution trends must be monitored to effectively plan for Australia's changing healthcare needs.² Australia's ageing population and increasing rates of chronic disease are leading to a greater demand for health services,³ while the health workforce is still impacted by the coronavirus disease 2019 (COVID-19) pandemic. Therefore, understanding the demography and distribution of health professionals has become more important than ever.

Demographic trends in the Australian health workforce parallel those in the broader population.^{4–6} Schofield *et al.* have shown that some health professions have aged

considerably since the mid-1980s,^{4,5} which is consistent with ageing observed in the general population.^{7,8} Shifts towards feminisation in parts of the health workforce^{9–11} also mirror changes observed across multiple sectors globally.^{10,12,13} This presents unique workforce planning issues, such as the retention of practitioners approaching retirement age or experiencing age-related disabilities,^{8,14} and the need to improve understanding of gender-sensitive, supportive working environments. Similarly, as metropolitan areas have experienced a greater share of population growth,¹⁵ urban zones have had better access to health care, with more practitioners relative to the population than in regional and remote areas.⁶ The inequitable distribution of health practitioners has implications for both access to and quality of care across the country.¹⁴

Research suggests that feminising professions could benefit from gender-sensitive planning to create an equitable and supportive work environment.^{11,16}

Although several studies have demonstrated changes in the demography of the Australian health workforce, they tend to focus on individual professions, prescribed geographic areas, or are based on data that are dated or incomplete.^{4,17–19} The aim of this study is to present a national picture of 15 regulated health professions in Australia across a 6-year period, examining demographic changes within and between professions and jurisdictions. This will allow for comparisons across Australia's regulated health professions, enabling a better understanding of the current health workforce and highlighting emerging areas of need.

Methods

Study design

A retrospective analysis of the demographics for 15 health professions between 1 July 2015 and 30 June 2021 was conducted. Paramedicine was not included in the analysis because paramedics were not regulated under the National Scheme until 2018. Variables analysed included profession, age, gender and state/territory location of practitioner principal place of practice.

Data source and management

For each financial year between 1 July 2015 and 30 June 2021, de-identified demographic data for practising health practitioners were obtained from Ahpra's administrative database and analysed using RStudio.²⁰ Practitioners holding non-practising registration or leave of absence were excluded. Due to the small sample size ($n = 31$), practitioners who did not identify as male or female were excluded from gender-related analyses. National population estimates were obtained from the Australian Bureau of Statistics.²¹

Data analysis

Analyses were conducted using R.²² Descriptive statistics are used to present demographic information and non-parametric data are presented as median, IQR and percentage. Mann–Whitney *U*-tests were conducted on non-normally distributed practitioner age data between 2016 and 2021. Chi-squared tests of homogeneity and independence were used to test the distribution of demographic information between 2016 and 2021 and to determine changes between populations. The Bonferroni procedure was applied to adjust for multiple comparisons and an adjusted *P*-value of <0.05 was considered significant.

Results

Number of registered health practitioners

The total number of registered health practitioners in Australia at 30 June 2021 was 784 421, an increase of 141 161 (22%) compared with 30 June 2016. After adjusting for Australia's population, the number of registered health practitioners per 100 000 population in 2021 increased by 14% from 2016, with considerable variation across the professions (Table 1). Chinese medicine was the only profession that showed a decrease in the number of registered health practitioners relative to the Australian population from 2016 to 2021 (19.74–18.89 per 100 000 population).

Age

The median age of health practitioners across all registered health professions in 2021 was 42 years (IQR: 32–55), a significant drop from 43 years (IQR: 33–55) in 2016 ($P < 0.001$). Post-hoc analysis shows a significant increase in practitioner age from 2016 to 2021 for Chinese medicine practitioners from 48 years (IQR: 39–57) to 51 years (IQR: 42–60); $P < 0.0001$), pharmacists from 35 years (IQR: 29–47) to 37 years (IQR: 31–47; $P < 0.0001$) and podiatrists from 36 years (IQR: 29–46) to 36 years (IQR: 30–47; $P = 0.002$; Table 1). Nursing was the only profession that showed a significant decrease in median age from 45 years (IQR: 34–56) in 2016 to 43 years (IQR: 33–56) in 2021 ($P < 0.0001$). Differences in the median age from 2016 to 2021 for all other professions did not vary significantly between 2016 and 2021.

Gender

In 2021, women accounted for 76.3% of health practitioners across the 15 health professions, a significant increase of 0.5% since 2016 ($\chi^2(1) = 37.90$, $P < 0.0001$). Within-profession post-hoc analyses shows that the representation of female practitioners increased significantly for chiropractors ($\chi^2(1) = 10.15$, $P = 0.022$), dental practitioners ($\chi^2(1) = 78.83$, $P < 0.0001$), medical practitioners ($\chi^2(1) = 195.03$,

Table 1. Practitioner population, gender and age demographics.

Profession	Population			Age (years)			Female		
	2016 n per 100 000	2021 n per 100 000	% change	2016 Median (IQR)	2021 Median (IQR)	P	2016 n (%)	2021 n (%)	P
Aboriginal and Torres Strait Islander health practitioner	2.42	3.19	32	47 (38–54)	45 (34–55)	0.31	451 (77.1)	634 (77.2)	14.99
Chinese medicine practitioner	18.80	17.75	–6	48 (39–57)	51 (42–60)	<0.0001	2461 (54.3)	2617 (57.3)	0.059
Chiropractor	20.21	21.68	7	40 (32–50)	41 (32–51)	0.36	1862 (38.2)	2303 (41.3)	0.021
Dental practitioner	87.84	93.74	7	41 (32–54)	41 (33–53)	1	10 453 (49.3)	12 909 (53.5)	<0.0001
Medical practitioner	433.22	489.15	13	44 (34–56)	43 (34–56)	1	43 430 (41.6)	55 958 (44.4)	<0.0001
Medical radiation practitioner	62.46	67.83	9	36 (29–48)	36 (29–47)	0.35	10 187 (67.6)	11 928 (68.3)	2.51
Midwife ^A	131.73	132.18	0	52 (40–59)	50 (36–60)	1	31 282 (98.4)	33 543 (98.6)	1.29
Nurse ^A	1534.43	1745.74	14	45 (34–56)	43 (33–56)	<0.0001	330 183 (89.2)	397 237 (88.4)	<0.0001
Occupational therapist	73.20	96.65	32	35 (28–44)	35 (28–44)	1	16 132 (91.3)	22 461 (90.3)	0.004
Optometrist	20.65	23.72	15	41 (31–52)	39 (30–52)	0.06	2571 (51.6)	3480 (57.0)	<0.0001
Osteopath	8.41	10.99	31	37 (30–45)	37 (30–45)	1	1097 (54.1)	1541 (54.5)	12.25
Pharmacist	118.88	132.78	12	35 (29–47)	37 (31–47)	<0.0001	17 611 (61.4)	21 544 (63.0)	<0.001
Physiotherapist	116.11	140.40	21	36 (29–47)	35 (29–46)	1	18 985 (67.8)	23 386 (64.7)	<0.0001
Podiatrist	18.87	21.91	16	36 (29–46)	36 (30–47)	0.002	2753 (60.5)	3323 (58.9)	1.82
Psychologist	133.66	155.56	16	43 (34–55)	43 (34–54)	1	25 551 (79.2)	32 215 (80.5)	0.001

^ADual nursing and midwifery registrants were counted in both categories.

$P < 0.0001$), optometrists ($\chi^2(1) = 32.01$, $P < 0.0001$), pharmacists ($\chi^2(1) = 17.73$, $P < 0.001$) and psychologists ($\chi^2(1) = 16.67$, $P = 0.007$), but decreased significantly for nurses ($\chi^2(1) = 124.41$, $P < 0.0001$), occupational therapists ($\chi^2(1) = 13.52$, $P < 0.0001$) and physiotherapists ($\chi^2(1) = 65.72$, $P < 0.0001$). The representation of women in all other health professions did not vary significantly over this time period.

Jurisdiction

Of the 784 421 practising registrants in 2021, 98% had a principal place of practice located in an Australian state or territory, up from 97.7% of practitioners in 2016. Within-profession variation across states and territories was significant for Aboriginal and Torres Strait Islander health practitioners ($\chi^2(7) = 28.58$, $P = 0.003$), medical practitioners ($\chi^2(7) = 49.35$, $P < 0.0001$), nurses ($\chi^2(7) = 209.51$, $P < 0.0001$), occupational therapists ($\chi^2(7) = 24.15$, $P = 0.016$), osteopaths ($\chi^2(7) = 31.52$, $P < 0.001$) and pharmacists ($\chi^2(7) = 24.53$, $P = 0.013$; Table 2). There were no changes in the distributions for all other regulated health professions between 2016 and 2021 (Supplementary Table S1). Post-hoc chi-squared tests of independence demonstrated significant increases in the number of health practitioners practising across most states and territories from 2016 to 2021 and a concomitant increase in the estimated number of practitioners relative to the population from 2016 to 2021.

Ethics approval

Exemption of this work from ethics review was granted by The Prince Charles Hospital, Metro North Hospital and Health Service, The Prince Charles Hospital Human Research Ethics Committee.

Discussion

This study shows that from 2016 to 2021, the number of registered health practitioners has grown faster than the Australian population. This is largely due to an increased supply of domestic and international students, with continued growth in students enrolled in approved programs of study or clinical training programs.^{1,23,24} Similarly, Department of Education statistics show an average yearly growth rate of 5.4% for health students from 2011 to 2020.²⁴ Domestic and international student growth has translated to increasingly higher annual applications for new health practitioner registration from 65 274 in 2016 to 81 581 in 2021 (excluding paramedicine).^{1,23,25–28}

Several professions remain reliant on the intake of overseas-qualified practitioners. Between 2016 and 2021, more than one-quarter of medical practitioners, dentists,

nurses and Chinese medicine practitioners registered with Ahpra were internationally qualified.^{29–31} In 2020 and 2021, COVID-19 international travel restrictions constrained the intake of internationally qualified health practitioners. However, the expected reduction in internationally qualified applicants was potentially partially offset by Ahpra's creation of a pandemic sub-register, which returned 26 595 practitioners to practising practicing status by 2021.¹

The growth rates of Aboriginal and Torres Strait Islander health practitioners, osteopaths and occupational therapists exceeded 30% of the number of regulated health practitioners per 100 000 population observed in 2016. The remaining professions also had growth, with the exception of Chinese medicine, which had a slight reduction of practitioners, and midwifery, which had no population-adjusted growth.

Age profile changes were observed for several health professions. The overall median age dropped from 43 years (IQR: 33–55) to 42 years (IQR: 32–55) over the 6-year period, which was largely driven by the change in the nursing age profile. Nursing was the only profession for which the median age reduced significantly, with the proportion of nurses aged less than 35 years increasing from 29.5% in 2017 to 33.0% in 2021.³² This is consistent with Department of Health figures showing that the supply of young nursing graduates has increased at fivefold the rate of population growth between 2016 and 2019.^{29–31} Chinese medical practitioner median age increased significantly, with the proportion of Chinese medical practitioners aged 50 years or more increased from 32.6% to 39.0%.³¹ Although research examining the complementary and alternative medicine workforce is scarce, one 2018 study reported that the majority of those practising in Australia obtained their qualification 10 or more years ago,³³ suggesting a potential lack of new graduates and/or internationally qualified graduates. The reliance on a pandemic-obstructed international training pipeline and a registration replacement rate below 1 are possible causes of the low growth and rise in median age for Chinese medicine practitioners. Pharmacists and podiatrists remained among the youngest regulated professions, despite the significant increase in median age. The proportion of podiatrists aged 35 years or less decreased from 47.4% to 46.4% between 2016 and 2020, and the proportion of pharmacists aged 35 years or less decreased from 48.8% to 39.0% over the same period.³¹ These changes could be attributable to many causes, however, for pharmacists, attention has been drawn to a potential increase in early career attrition ascribed to burnout, stress and structural factors.^{34,35}

More than three-quarters of all registered health practitioners are female. Women predominantly work in professions traditionally viewed as feminine, such as nursing and midwifery, while men are overrepresented in professions such as medicine and dentistry.³⁶ Historically, the nursing workforce has accounted for more than half of all registered

Table 2. Registered practitioners by jurisdiction.

Profession	Jurisdiction	2016 <i>n</i> (<i>n</i> per 100 000)	2021 <i>n</i> (<i>n</i> per 100 000)	<i>P</i>	<i>P</i>
Aboriginal and Torres Strait Islander health practitioner	ACT	<10 (0.99)	<10 (0.23)	0.003	21.6
	NSW	106 (1.37)	176 (2.15)		0.004
	NT	209 (85.07)	204 (82.81)		96.72
	Qld	103 (2.13)	152 (2.91)		0.258
	SA	52 (3.04)	87 (4.91)		0.359
	TAS	<10 (0.58)	<10 (0.37)		78.6
	Vic.	11 (0.18)	35 (0.53)		0.048
	WA	97 (3.8)	164 (6.12)		0.004
Medical practitioner	ACT	2010 (498.63)	2405 (556.37)	0.000	0
	NSW	32 578 (421.29)	38 079 (464.99)		0
	NT	1173 (477.45)	1470 (596.74)		0
	Qld	20 674 (426.69)	25 829 (494.7)		0
	SA	7731 (451.35)	8925 (503.32)		0
	TAS	2183 (421.82)	2772 (511.93)		0
	Vic.	25 574 (414.28)	31 402 (472.27)		0
	WA	10 551 (412.8)	12 913 (481.53)		0
Nurse	ACT	5857 (1452.97)	7589 (1755.63)	0.000	0
	NSW	101 626 (1314.21)	120 635 (1473.09)		0
	NT	4263 (1735.2)	5223 (2120.26)		0
	Qld	72 832 (1503.19)	92 922 (1779.72)		0
	SA	32 383 (1890.6)	37 272 (2101.91)		0
	TAS	8721 (1685.17)	10 961 (2024.27)		0
	Vic.	97 813 (1584.49)	119 601 (1798.74)		0
	WA	37 156 (1453.69)	44 162 (1646.83)		0
Occupational therapist	ACT	330 (81.86)	407 (94.15)	0.016	0.547
	NSW	5035 (65.11)	6851 (83.66)		0
	NT	173 (70.42)	202 (82)		16.08
	Qld	3418 (70.54)	5026 (96.26)		0
	SA	1362 (79.52)	1944 (109.63)		0
	TAS	272 (52.56)	358 (66.12)		0.073
	Vic.	4395 (71.2)	6475 (97.38)		0
	WA	2520 (98.59)	3361 (125.33)		0
Osteopath	ACT	34 (8.43)	47 (10.87)	0.001	20.88
	NSW	572 (7.4)	632 (7.72)		13.68
	NT	<10 (1.22)	<10 (2.44)		57.6
	Qld	190 (3.92)	271 (5.19)		0.024
	SA	37 (2.16)	45 (2.54)		37.32
	TAS	42 (8.12)	53 (9.79)		42.12
	Vic.	1109 (17.96)	1779 (26.76)		0

(Continued on next page)

Table 2. (Continued)

Profession	Jurisdiction	2016 <i>n</i> (<i>n</i> per 100 000)	2021 <i>n</i> (<i>n</i> per 100 000)	<i>P</i>	<i>P</i>
Pharmacist	WA	62 (2.43)	66 (2.46)	0.014	94.56
	ACT	501 (124.29)	704 (162.86)		0
	NSW	8916 (115.3)	10 255 (125.22)		0
	NT	215 (87.51)	282 (114.48)		0.318
	Qld	5727 (118.2)	6899 (132.14)		0
	SA	2094 (122.25)	2435 (137.32)		0
	TAS	693 (133.91)	881 (162.7)		0
	Vic.	7070 (114.53)	8799 (132.33)		0
	WA	3109 (121.64)	3717 (138.61)		0

Note: Excludes 14 597 practitioners in 2016 and 15 970 practitioners in 2021 without a registered principal place of practice. Cell sizes less than 10 have not been reported.

health practitioners in Australia. This study demonstrated significantly increased feminisation in the chiropractic, dentistry and medicine professions between 2016 and 2021. Further, the (unpublished) student register suggests that just over half of all dentistry students are women, which is expected to contribute to the continued feminisation of the dental workforce.²³ Research suggests that female practitioners are more likely to take time away from work, work flexibly, see fewer patients and work fewer hours than their male counterparts,^{37,38} therefore feminising professions could benefit from planning and gender-sensitive design to create an equitable and supportive work environment.^{11,16}

Nursing, occupational therapy and physiotherapy showed slight but significant masculinisation. Male nurses have remained a minority despite a sizeable body of research highlighting barriers, motivations and strategies for change.^{39,40} Male nurses continue to identify strong barriers to entering the profession, including problematic stereotypes and perceptions.^{41,42} In occupational therapy, a profession with one of the lowest proportions of male practitioners recorded in 2021, a gender bias has been visible for decades.⁴³ Early research suggested that male occupational therapists were significantly dissatisfied with their work and were more likely to exit the profession,⁴⁴ however, recent studies show that male occupational therapists are just as satisfied as their female counterparts.^{45,46} Physiotherapy experienced one of the larger increases in the proportion of male practitioners, however, it is also a more gender-balanced profession.

Health practitioner distribution across Australia varied over the study period. The number of Aboriginal and Torres Strait Islander health practitioners, medical practitioners, nurses, occupational therapists, osteopaths and pharmacists showed significant growth across most states and territories. Distributional change for the remaining professions did not meet statistical significance. Queensland and Victoria had the greatest growth across all health professions. The Northern

Territory had the lowest growth relative to population size and the size of other jurisdictions. Population data analysis showed that the low growth in practitioner numbers in the Northern Territory was consistent with low overall population growth.⁴⁷ The increase in the number of practitioners relative to the population in Queensland and Victoria did not mirror growth trends during the timeframe of this study, with the highest resident population growth visible in the Australian Capital Territory and Tasmania.

These results support findings that demonstrate that where there is an inequitable distribution of the health workforce,⁴⁸ the number of practitioners relative to the population does not match need or demand, and this has health implications for the communities. In the Northern Territory and rural and remote settings generally, studies find low stability and high staff turnover in clinical settings, contributing to low practitioner retention and issues with quality and continuity of care.⁴⁹ These are enduring challenges; health workforce distribution is a policy priority of both Commonwealth and state and territory governments,⁵⁰ and supportive initiatives have been active in communities Australia-wide.^{51–53} However, more work is needed to address distribution issues comprehensively and sustainably.⁵⁴

The demographic changes identified suggest the need for strategies to bolster replacement rates in ageing professions, particularly Chinese medicine. Concurrently, ageing professions could benefit from continued flexible working arrangements seen during the COVID-19 pandemic to support the retention of older practitioners considering retirement. Proactive planning is needed to address in-profession demographic changes, such as targeted anti-attrition strategies, and work to understand the impacts of the changes to the feminisation and masculinisation of professions. Finally, incentives and supportive work environments to attract practitioners to rural and remote areas should remain a priority for equitable service delivery.⁴⁹

Limitations

While Ahpra's administrative database provides the most reliable source of data about the 15 registered health professions, data quality issues relating to missing principal place of practice locations and non-collection of employment type (i.e. full-time, part-time and casual work) could limit the strength of some of the conclusions drawn. Furthermore, state/territory level findings from this study do not capture changes occurring in rural or regional areas. For example, in 2017 the number of midwives per 100 000 population was found to be much lower in remote areas of Australia.⁵⁵

It is also important that health practitioner numbers are not interpreted as the supply of health practitioners. Supply is better estimated by the count of registered health practitioners together with their full-time equivalent (FTE).⁷ The Australian Institute of Health and Welfare has estimated an overall increase in FTE rates for all health professions between 2013 and 2018.⁷ Given the new domestic graduate and new internationally qualified graduate growth over the years,^{1,23,25–28} the increased supply of health professionals in Australia is likely to continue.

Conclusion

Over the 6-year study period, the median age of health practitioners in six professions remained the same, in six professions it decreased and in three professions it increased. The regulated health practitioner workforce increased by 22%, outpacing Australian population growth. This was driven by new graduates replacing retiring or non-renewing practitioners. While many professions showed increased numbers of practitioners relative to the population, the number of Aboriginal and Torres Strait Islander health practitioners, osteopaths and occupational therapists had growth rates exceeding 30% of estimates observed in 2016. The sample overall was feminising, including in several traditionally masculine fields, although three professions recorded small but significant increases in the number of male practitioners. These changes have implications for workforce planning and healthcare service delivery.

This study reports demographic data without making causal inferences or undertaking workforce supply or demand modelling. There would be benefits in further work in these areas for the professions with changes in practitioner number, gender distribution, an increase in age or a reduction in demographic distribution.

Supplementary material

Supplementary material is available [online](#).

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