

# **The effects of medical graduate expansion in Australia**

*(Work-in progress – please do not quote)*

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## **Summary**

The aim of this paper is to examine the effects of the recent rapid increase in medical graduates in Australia. Both short and long term effects are discussed, and preliminary data are presented on the short term effects on senior and junior doctors using data from the Medicine in Australia: Balancing Employment and Life (MABEL) survey. Intern places seem to be keeping up with the growth of graduates, but the number of specialists and GPs involved in supervision is not quite keeping pace with the growth in interns. Interns and pre-vocational trainees are seeing fewer patients and spending less time in direct patient care. These findings need confirmation through more rigorous analysis. The longer term effects on costs, quality of care and distribution across specialties and geographic areas need to be monitored.

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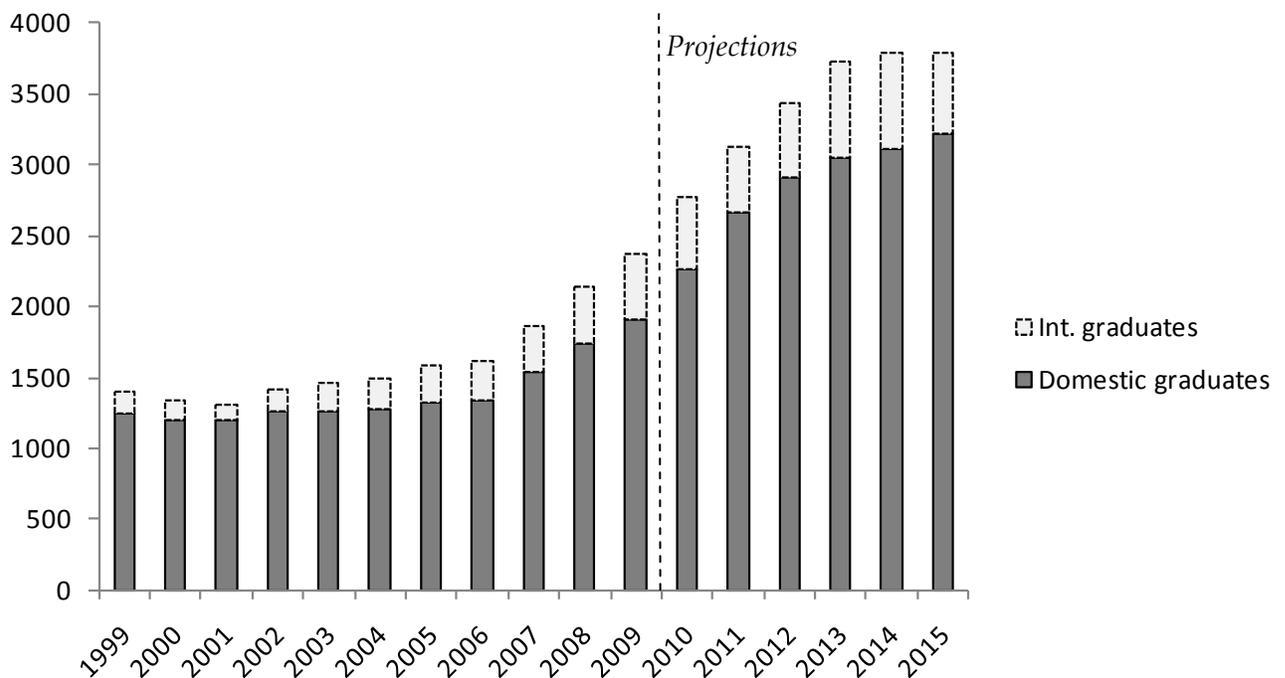
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## Background

Medical graduate expansion in Australia began with the establishment of 10 new medical schools since 2000. There are now 18 universities accredited to produce medical graduates and 15 of these had produced graduates by the end of 2009 (1). The three others produced their first graduates in 2010 and 2011. The number of new medical graduates started to increase in 2007, though before that the number of international graduates had already started to rise (Figure 1). In 2009, 80% of medical graduates were domestic students. Figure 1 shows that the number of medical graduates has increased by 70% between 1999 and 2009. Domestic graduates have increased by 52% and international graduates increased by 223% over the period. Projections show that by 2015, the number of graduates will have increased by a factor of almost 1.7 since 1999. The types of medical degree have also changed in Australia with a move to many graduate entry and shorter medical degrees. In 2010, 33.8% of 15,397 medical students were undertaking a six year undergraduate course, 28.2% were undertaking a 5-year graduate entry course, and 37.9% were undertaking a 4-year graduate entry course (1).

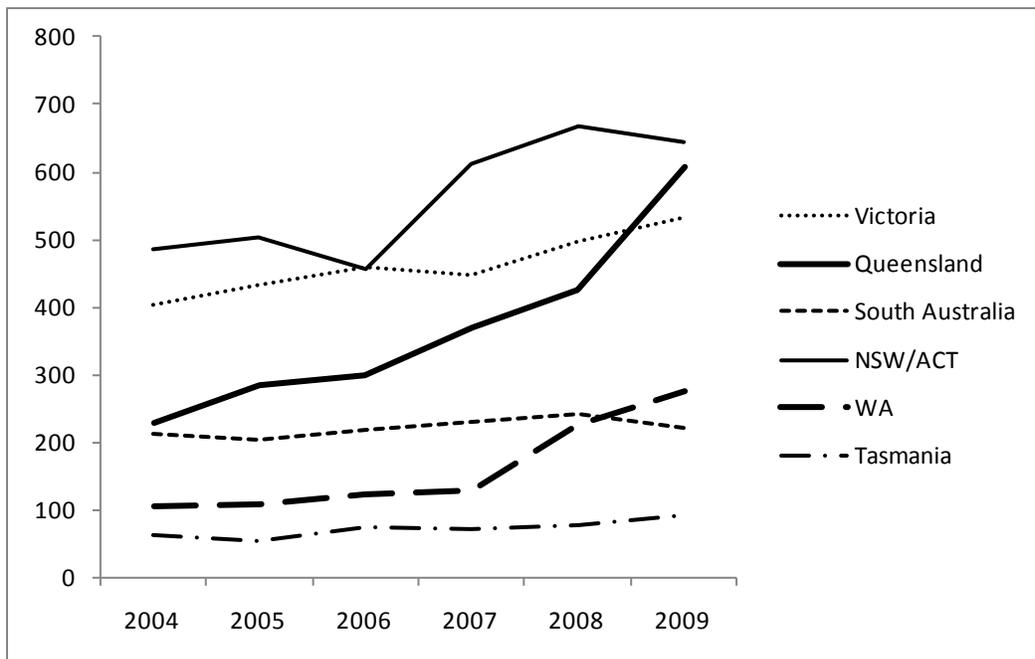
**Figure 1. Number of medical graduates: Australia, 1999 to 2015 (Projections from 2010)**



Source: Australian Government (2011)

Figure 2 shows how the expansion of medical graduates is distributed by State. This reflects largely the location of new medical schools, including one in Western Australia (WA) that started to produce graduates in 2008, and three new medical schools in Queensland that started to produce graduates in 2005, 2008 and 2009. There are also three new medical schools in New South Wales (NSW) and one in Victoria and their first graduates completing their degrees in 2010 and 2011. The number of medical graduates in Queensland almost tripled (an increase of 165%) between 2004 and 2009, followed by a similar increase of 159% in WA.

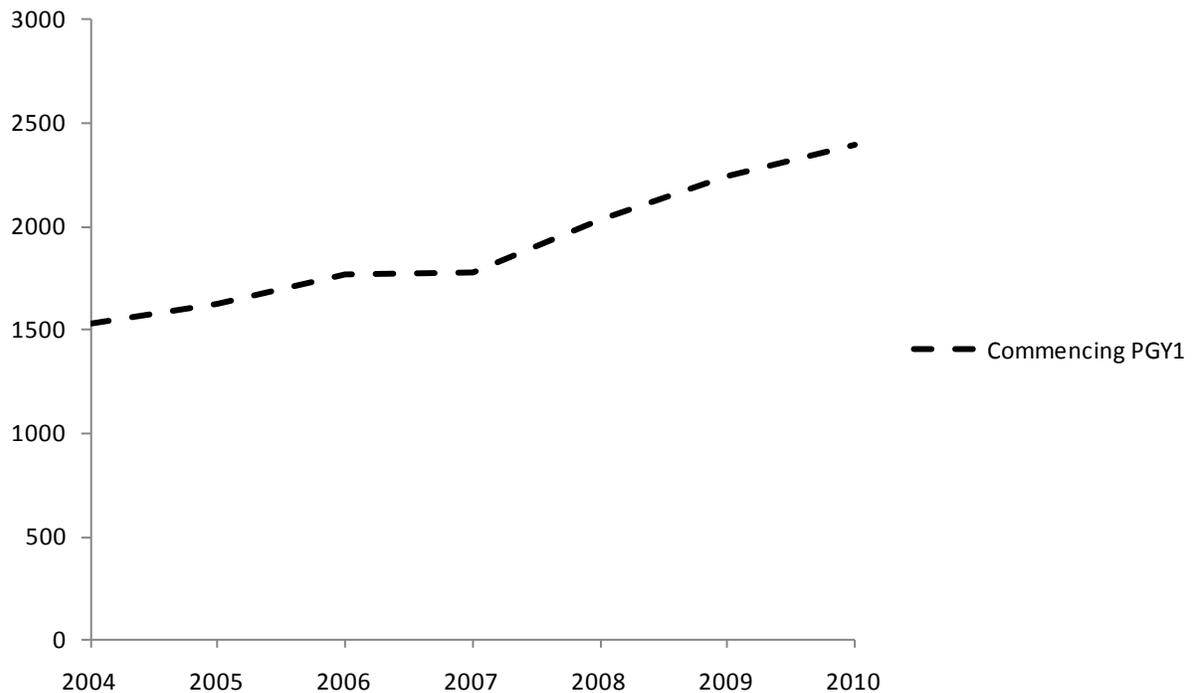
**Figure 2. Medical graduate expansion by State, 2004 to 2009**



Source: Australian Government (2011)

In Australia, doctors need to complete a pre-registration year (PGY1/intern) before full medical registration, and then two or three other pre-vocational training years before they begin vocational (specialty) training. The numbers of PGY1 doctors began to increase in 2008 (Figure 3). Between 2007 and 2010, the number of PGY1 doctors increased by 56.4% (863).

**Figure 3. Numbers of PGY1 doctors (interns), 2004 to 2010**



Source: Australian Government (2011).

### **Policies to address medical graduate expansion**

The main response from the Federal government to the increased numbers of medical graduates has been to provide additional funding to support the increased number of training places required (2). The States have also committed to provide and fund more intern (PGY1 places). A focus of the additional funding is for extra training places that are located outside of the usual public teaching hospitals.

The funding of undergraduate and postgraduate clinical training is shared between the State and Territory governments and the Federal government, and accreditation and management of places and the actual training also involves the medical training colleges and State-based postgraduate training councils. This co-funding will continue, but from 2010 Health Workforce Australia now provides additional funds for undergraduate clinical training across 22 health professions, including medicine, rather than the funding being provided solely through different health and education budgets. This is through the Clinical Training Funding Program (CTF), with the first

training funds being delivered in 2010. The intention is that the additional funding (and the existing funding from States and territories) is to provide opportunities to train in a wider range of settings. The additional funding represents a 30% increase over estimated clinical training costs per student (3). It includes a 50% clinical training subsidy for undergraduates of \$496m between 2009-10 and 2012-13 administered by HWA, a postgraduate clinical training subsidy for GPs and the private sector of \$86.2m between 2011-12 and 2012-13 administered by the Federal government, in addition to extra funding for increased supervisory capacity, and funding for capital infrastructure of \$175m over four years. This includes:

- \$45m to States and territories to support simulated learning environments to improve access to training and increase productivity/efficiency in the training system. Through this program a national simulator educator and technician training initiatives is also being delivered.
- \$90m to support innovative teaching and training initiatives, and
- \$40m to support training in major regional hospitals as part of the rural clinical schools program.

HWA is also establishing Integrated Regional Clinical Training Networks – to establish broad membership networks across the public, private and non-government health sectors as well education and training sectors to provide coordinated approaches to the management and delivery of clinical training across Australia.

In addition, there is a new program of funding to support vocational specialist training in the private sector (hospitals and practices), and outside of public teaching hospitals including regional, rural and ambulatory settings. Introduced in January 2010 and administered by the Federal government, the Specialist Training Program (STP) it consolidates a number of existing programs. The aims and objectives to:

- increase the capacity of the health workforce to train specialists;
- better train specialists with education that matches the nature of demand and reflects the way health services are delivered;
- develop networked specialist training arrangements, which are:

- integrated series of accredited training sites focusing on providing health care, through which trainees may rotate in the pursuit of specialist qualification;
- based on health service delivery requirements of a region with the education potential of training sites being matched to the health service delivery potential inherent in increased availability of a specialist trainee workforce.

In 2011, there were 518 training posts funded under the STP, with these set to expand to 600 in 2012. The level of funding available for training posts is a salary contribution of \$100,000 (ex GST) per FTE. Posts in rural locations may also be provided with rural loadings, of up to \$20,000 (ex GST) per FTE. In addition to establishing specialist training posts, the program also provides funds for clinical supervision of up to \$30,000 (ex GST) per annum and training infrastructure of up to \$10,000 (ex GST) every three years for all private sector STP training.

### **The effects of medical graduate expansion**

There are number of short and long term effects of medical graduate expansion. This includes effects on health care costs, quality of care and population health, working patterns and the geographical and sectoral distribution of doctors. A key issue is the capacity of the system to train these additional doctors. Each of these issues are discussed below and illustrated with evidence from Australia or examples of how Australian policy makers are responding.

#### ***Effects on health care costs.***

There are no national data on the costs of training a doctor in Australia, nor on the lifetime costs to the health care system of an additional doctor. The complex pattern of education and training subsidies make it difficult to estimate the value of the resources involved in training a doctor.

The opportunity costs of medical training can be estimated on the basis of the market price for a full-fee paying medical degree. For example, this is currently \$250,000 for a five year graduate degree from Bond University. The public sector currently bears the costs of undergraduate, pre-vocational and vocational training. Scheffler (2008) estimates that the cost of training a doctor in the US (including vocational training) is around US\$1m per year (4).

In the longer term, basic economics would predict that an increased supply of doctors would reduce average earnings. More competition would be expected to keep prices down. However, the possibility of supplier-induced demand may mean that the effect of competition on prices and earnings of doctors is not as theory predicts though there is little evidence on this (5).

***Effects on quality of care and population health.***

It is not necessarily the case that more doctors will improve quality of care and population health. Iatrogenic illness is common and largely preventable (6-9). In the short term, a fixed rate of medical errors and adverse events means that the number of these events will increase as the number of doctors rise. The rate of adverse events could also increase where the number of junior doctors grows faster than the ability and capacity of the system to safely train these new doctors. The pool of senior doctors to train additional junior doctors is relatively fixed in the short term, so one could expect that junior doctors receive less training and supervision, with this leading to a higher rate of medical errors and adverse events in both the short and longer term. In the same vein, a large percentage of medical practice has no evidence behind it or is ineffective, yet is still being provided (9, 10). And much effective care is being underprovided. More doctors would therefore increase the number of ineffective treatments being provided. If the uptake of evidence does not change and ineffective treatments continue to be provided, then more doctors are likely to lead to increases in costs with largely unknown effects on quality of care and population health. The issue is that more doctors do not automatically lead to improvements in productivity or better health for the population.

There have been several empirical studies examining the effects of increased GP supply on health status. Evidence from the UK found that a higher number of GPs led to improvements in individuals' self-reported health status and EQ5D scores, whilst controlling for the endogeneity of primary care physician supply (11). This is in contrast to a study using an arguably stronger study design. Aakvik and Holmås, using 16 years of data from Norway, use a dynamic panel data model that accounts for endogeneity and time persistence, and finds no statistically significant effect of the number of the GPs in an area on a range of mortality rates (12).

Other short term effects on quality are concerned with the throughput of hospitals. Depending on how hospitals are funded, more junior doctors may mean a higher throughput of patients, shorter lengths of stay, and shorter public hospital waiting times.

*Effects on the distribution of doctors.*

Though one might expect a more even distribution of doctors, both across geographical areas and specialties, this is not guaranteed. Doctors tend to locate in metropolitan areas, close to hospitals and private schools, and in areas of lower need for health care. Geographical diffusion may take many years, and other policies are required to encourage doctors to practice in underserved geographical areas. ‘Flooding the market’ is an expensive and a likely ineffective way to address geographical inequalities in the distribution of doctors.

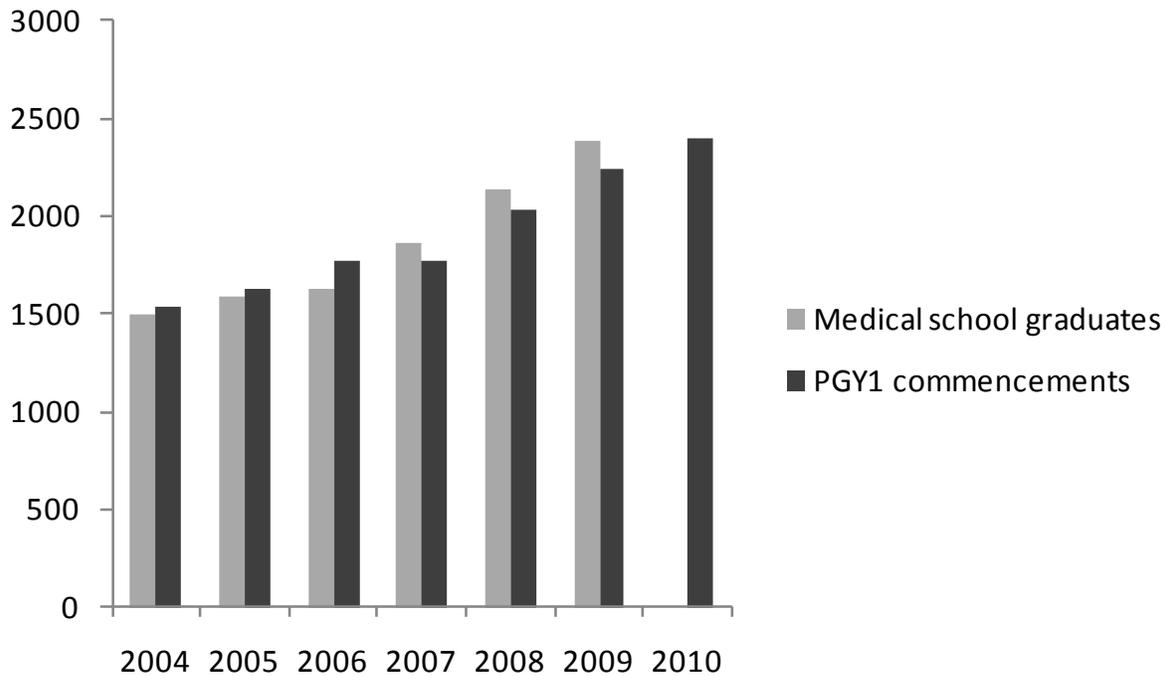
*Effects on doctors’ working patterns.*

There are also short term effects largely due to changes in the flow of doctors through the training system, including bottlenecks at key stages that influence doctors working patterns and the length of time it takes to complete specialist training. This is likely to occur if there is a delay between the growth in junior doctors and the capacity and ability of the system to train these doctors to the same standard as previously.

If the number of training places does not grow sufficiently in the short term, then interns may have difficulty finding an internship. There is anecdotal evidence that competition for intern places has increased, and an explicit policy that internship places can be guaranteed only for medical graduates who are Australian citizens or residents (3). Preference is being given to domestic graduates rather than international graduates, a policy congruent with the stated objective of self-sufficiency (13). However, this may not be efficient compared to a system based on merit alone, where only the ‘best’ doctors are offered intern places, rather than this being based on their country of birth. There is a possibility that some graduates may not secure an intern place. This may not be such a bad thing if it increases competition and provides an incentive for medical students to work harder. Most other labour markets do not guarantee a job after an undergraduate degree, and so are more competitive with the possibility of unemployment acting as a strong incentive to study and work hard.

Figure 4 combines data from Figures 1 and 3, and shows the growth of intern places is largely keeping pace with the numbers of graduates, given the one-year lag in the data between graduating and commencing as an intern. For example, in 2009 there were 2,380 medical graduates and 2,394 PGY1 commencements in 2010. Similarly, if the number of vocational training places is also fixed, then competition for these places may increase. Only the best doctors would then secure vocational training places. A shortage of places will result in more doctors who work as non-specialists, medical officers, in clinical research for a longer period of time.

**Figure 4. Medical graduate numbers and PGY1 commencements, 2004 to 2010**



As large numbers of pre-vocational trainees begin to flow through the system and with a fixed number of senior doctors to supervise and train, the ability and capacity of senior doctors to train these additional junior doctors depends on a number of factors. First, senior doctors may be unaffected if the additional supervisory responsibilities are delegated to registrars, or training takes place in a larger number of locations (ie not only teaching hospitals) and by a larger pool of

senior doctors. Assuming that senior doctors are better trainers than registrars, then any delegation of training has implications for the quality of training being provided. Alternatively, senior doctors may increase their total hours worked to accommodate the additional training workload. If they do not, then they may ‘give up’ other activities to train these extra junior doctors. Senior doctors may also undertake less work in the private sector assuming they are rewarded for their additional public sector teaching workload. This raises the issue of what incentives are being used to persuade senior doctors to undertake more supervision.

The working patterns of junior doctors may also be affected. If patient throughput does not increase in public hospitals because of budget or volume caps, then junior doctors may work fewer hours, be more satisfied with their job, and work fewer ‘unsafe’ hours, therefore having a positive effect on medical errors and adverse events. However, working fewer hours may also mean they have less accumulated experience, and this could also adversely influence quality of care.

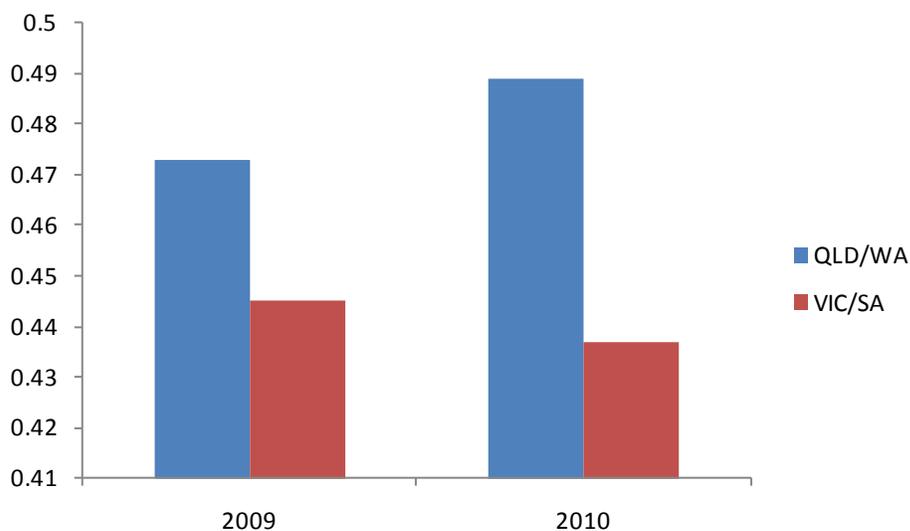
Some preliminary evidence on the short term effects on working patterns is provided in the Figures below. These use data from the first three waves of the Medicine in Australia: Balancing Employment and Life (MABEL) longitudinal survey of doctors. Details of methods are provided elsewhere (14). We compare groups of doctors from those States that have experienced the largest increase in graduates between 2007 and 2009, with a comparison group of States during the same period that experienced the lowest increases in graduates. During this period, new medical schools in Queensland and Western Australia began to produce the largest numbers of graduates. We therefore compare these States with doctors in Victoria and South Australia (Figure 2). One would expect to see differences between the working patterns of doctors in these groups. *Note the data below have not controlled for differences across the groups in age, gender and other factors that affect working patterns, nor have we conducted tests of statistical significance, and so the results are preliminary and could change.*

The survey included a question for specialists and GPs in Waves 2 (2009) and Wave 3 (2010) asking whether they were involved in training/supervising interns and vocational trainees. The data are weighted so they are nationally representative (14). Figure 5 shows that just under half of specialists in Australia are involved in training interns and pre-vocational trainees. The

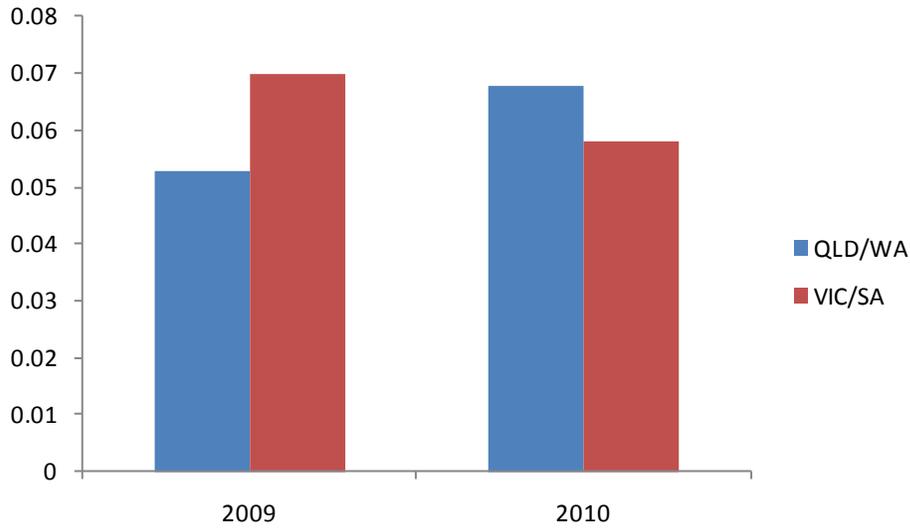
proportion of specialists involved in training interns is higher in QLD/WA than in VIC/SA, though these differences are and not statistically significant. The data also show a small increase of 1.6 percentage points in the proportion of specialists involved in training junior doctors between 2009 and 2010, but again this difference is not statistically significant. Figure 6 shows the same data for GPs. Though the proportion of GPs involved in training junior doctors has increased by 1.5 percentage points between 2009 and 2010, this increase is not statistically significant.

These proportions can be used to estimate the changes in the total number of specialists involved in training junior doctors across the two groups (Figure 7). The proportions are applied to the MABEL sampling frame (the AMPCo Medical Directory) of all specialists in clinical practice in 2009 and 2010. In QLD/WA there has been an estimated increase of 216 specialists who are involved in training interns and pre-vocational trainees, compared to an increase of 45 specialists in VIC/SA.

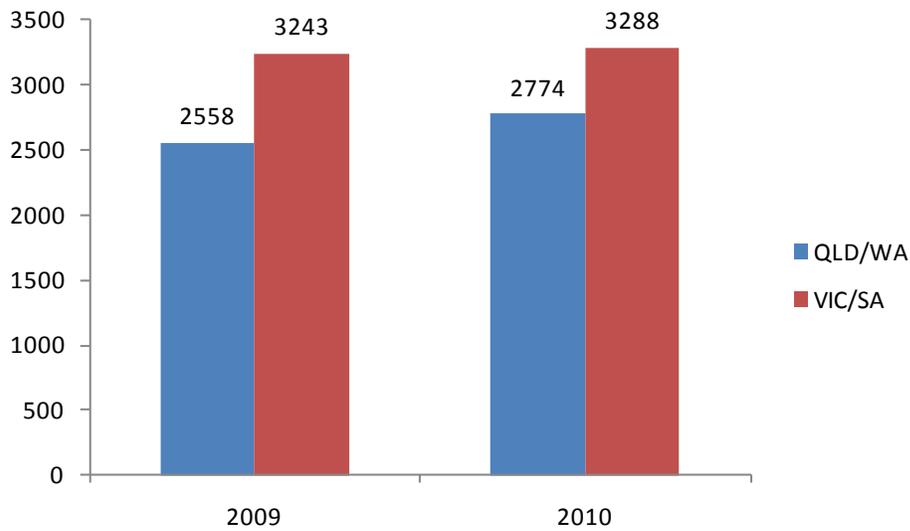
**Figure 5. Proportion of specialists involved in training interns and pre-vocational trainees**



**Figure 6. Proportion of GPs involved in training interns and pre-vocational trainees**



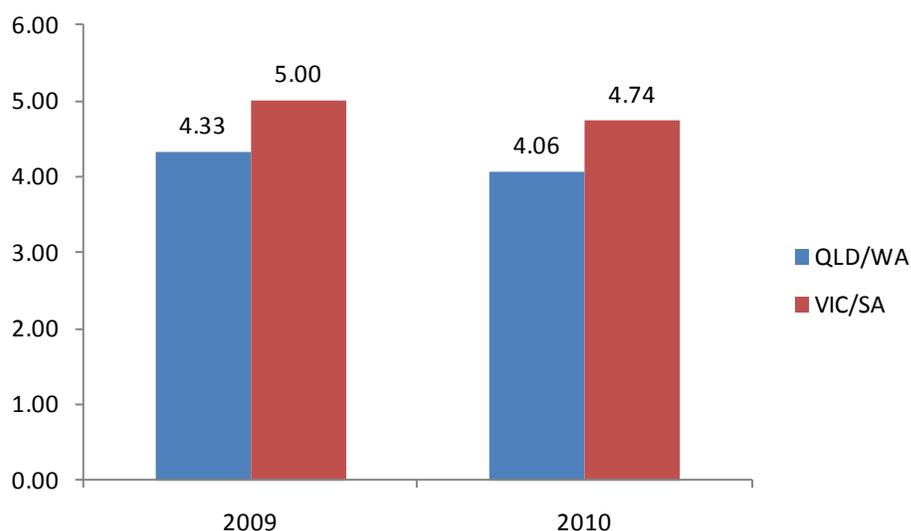
**Figure 7. Estimated total number of specialists involved in training interns and pre-vocational trainees**



We can also combine these data with the data on PGY1 commencements to show the number of specialist supervisors per PGY1 commencement. This gives an idea of whether the increase in the number of supervisors is keeping pace with the number of PGY1 commencements. The figures below combine data for specialists and GPs who are supervising or training interns and

pre-vocational trainees. The ratio of supervisors to PGY1 has fallen in both groups of states, though there is a slightly higher percentage fall in QLD/WA (6.2%) than in VIC/SA (5.3%). This suggests that there are fewer supervisors per PGY1 doctor in 2010 compared to 2009 and that the increase in the number of supervisors is not keeping pace with the expansion in graduates.

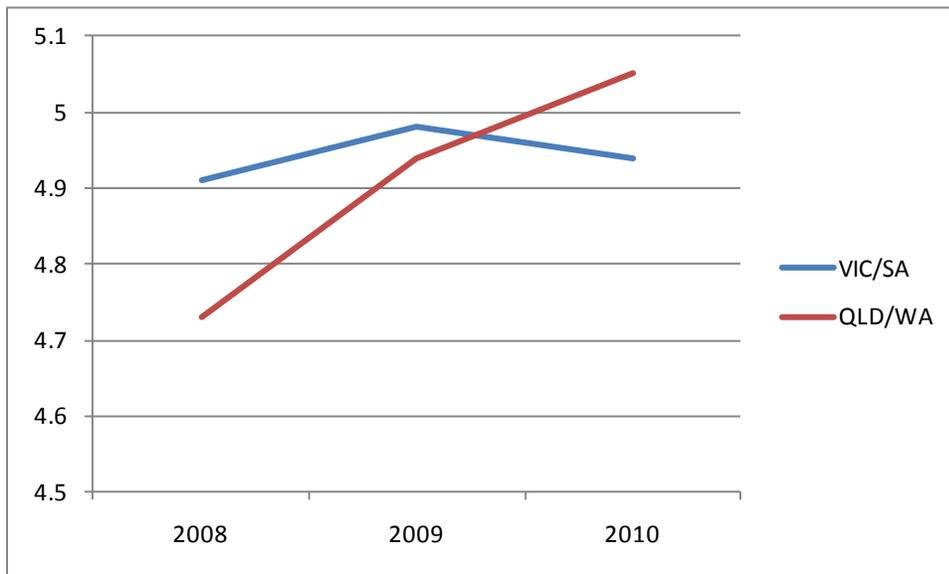
**Figure 8. The number of specialists involved in training per PGY1 commencement**



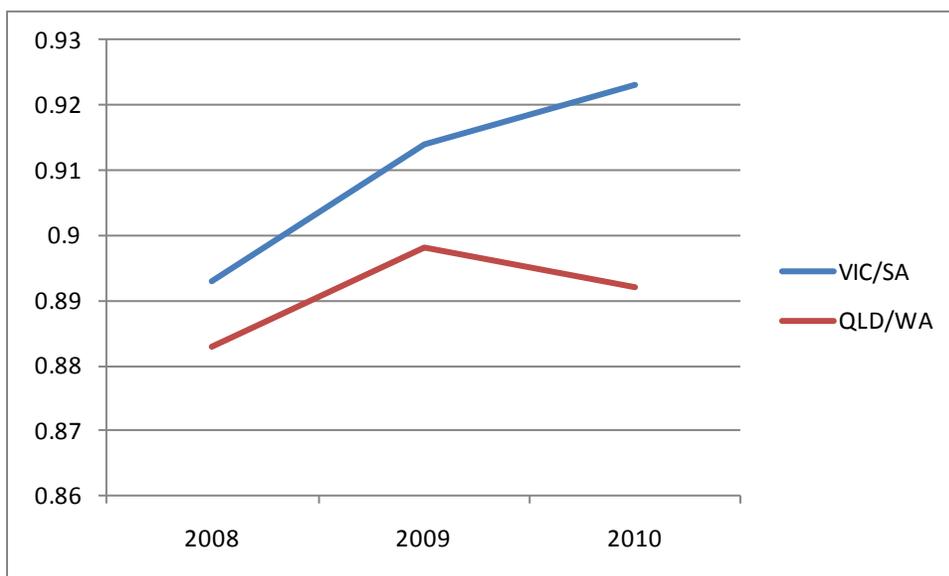
Data on working patterns are summarised below. The first set of figures are for senior doctors (specialists) who indicated in the survey that they are teaching or supervising interns or pre-vocational trainees. These are doctors who completed all of the first 3 waves of MABEL, and so show changes over time for each doctor. Depending on the question there are up to 1,300 senior doctors who responded to the survey in VIC/SA and up to 833 senior doctors in QLD/WA. There seem to be few effects on senior doctors involved in training pre-vocational trainees. The trends in the two geographical groups are generally similar. Trends in total hours worked and the number of patients seen are similar, suggesting that senior doctors may have absorbed the additional supervisory activity, delegated it to registrars, or that there are more senior doctors undertaking training. There has been an increase in the number of weeks holiday taken (Figure 9) for those in QLD/WA compared to those in VIC/SA. Trends in perceptions of work-life balance are similar. The proportion of senior doctors being moderately or very satisfied with

their job has increased in both groups, though the size of the increase has been lower for doctors in QLD/WA (Figure 10).

**Figure 9. The number of weeks holiday taken; senior doctors involved in training interns and pre-vocational trainees**



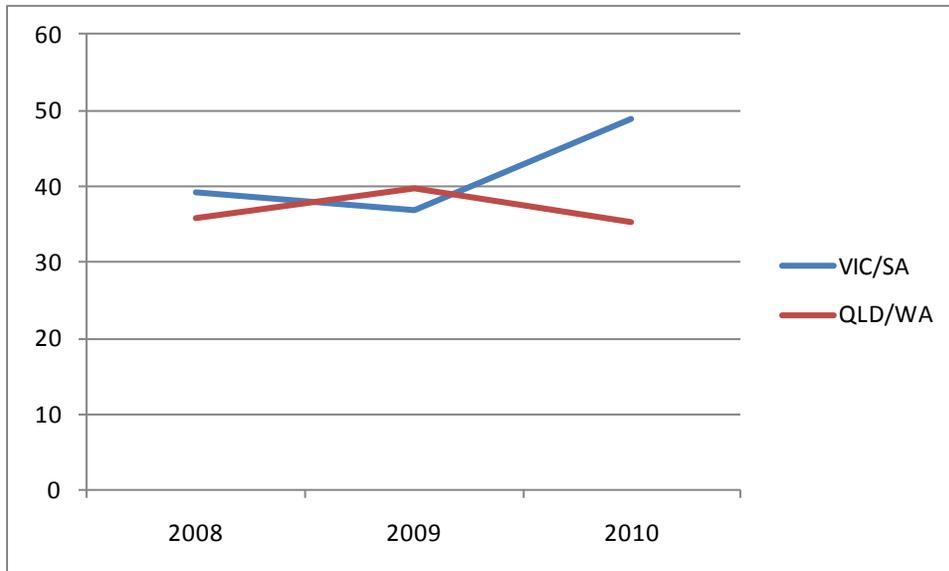
**Figure 10. Proportion of senior doctors moderately or very satisfied with their jobs overall**



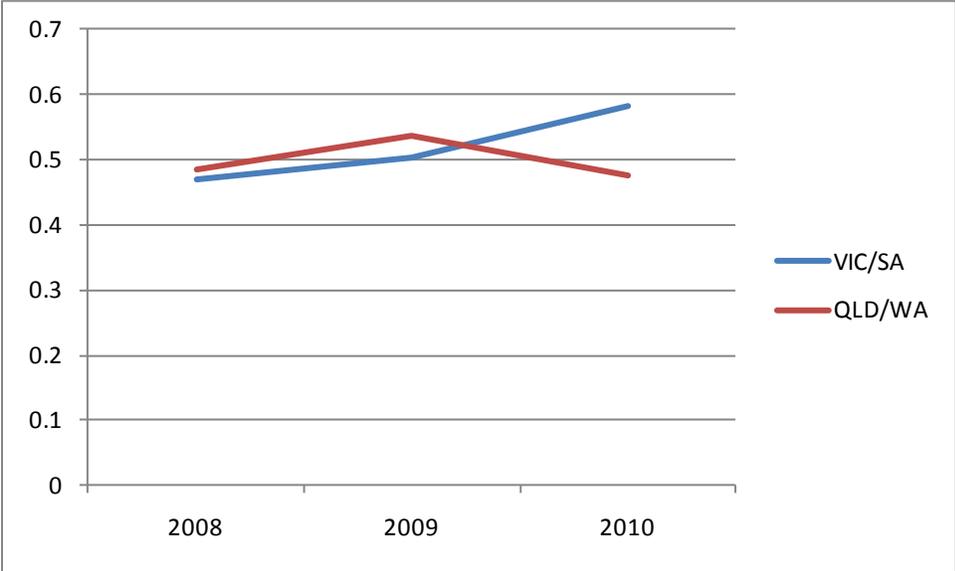
We also examined the working patterns of junior doctors in 2008, 2009 and 2010. These are doctors who identified themselves as interns, or hospital medical officers year 1 and hospital medical officer year 2. In QLD/WA and across the three years, there are up to 579 doctors included in the analyses, and in VIC/SA there are up to 561 doctors, depending on the question answered.

There was little evidence of an effect on total working hours for junior doctors. There was evidence that those in QLD/WA were seeing fewer patients per week (Figure 11), and also spending a lower percentage of their time in direct patient care (Figure 12) compared to those in VIC/SA where medical graduate expansion did not take place. Junior doctors are also more likely to agree that the balance between their personal and professional commitments is about right (Figure 13) compared to junior doctors in VIC/SA.

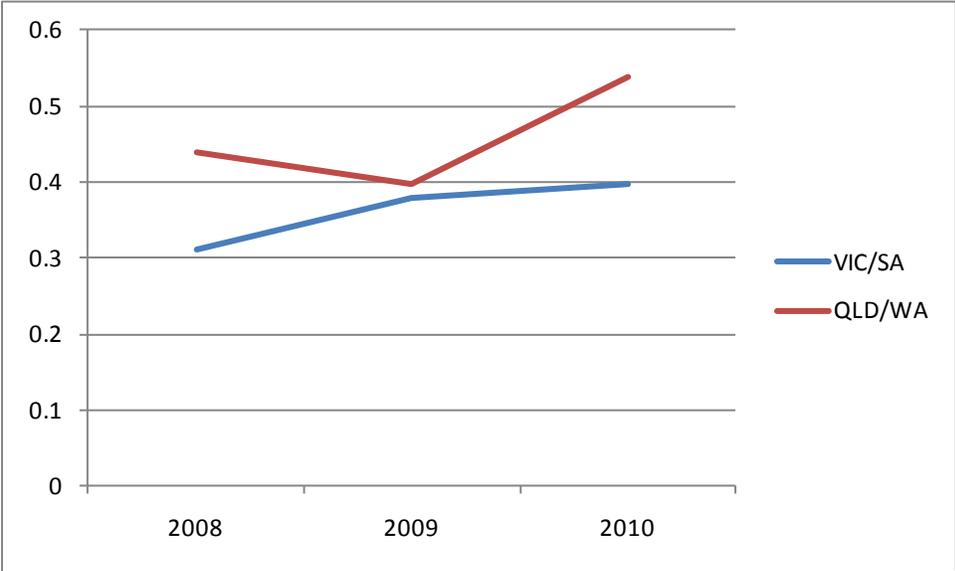
**Figure 11. Number of patients seen in last usual week; junior doctors**



**Figure 12. Proportion of hours spent in direct patient care; junior doctors**

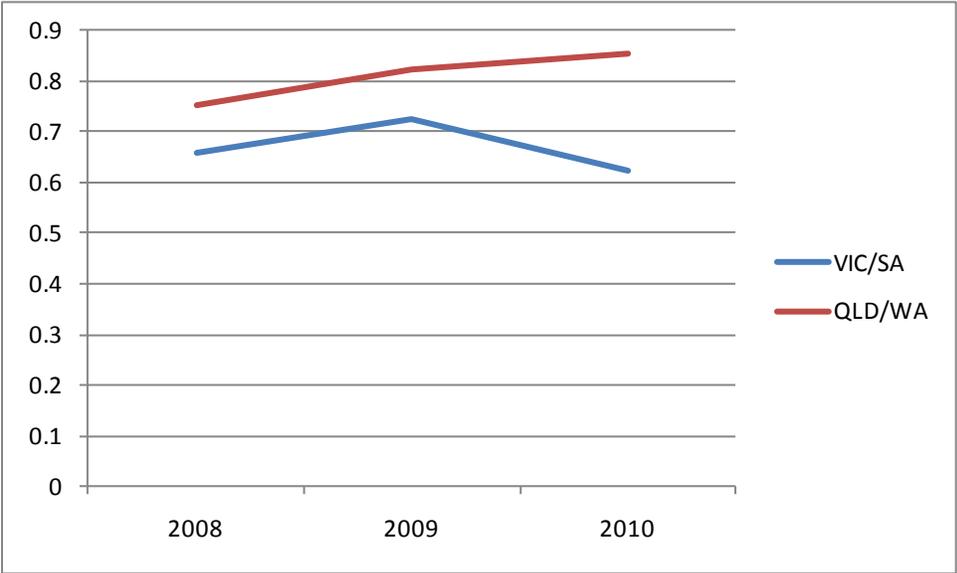


**Figure 13. Proportion of junior doctors agreeing with the statement ‘The balance between my personal professional commitments is about right’**

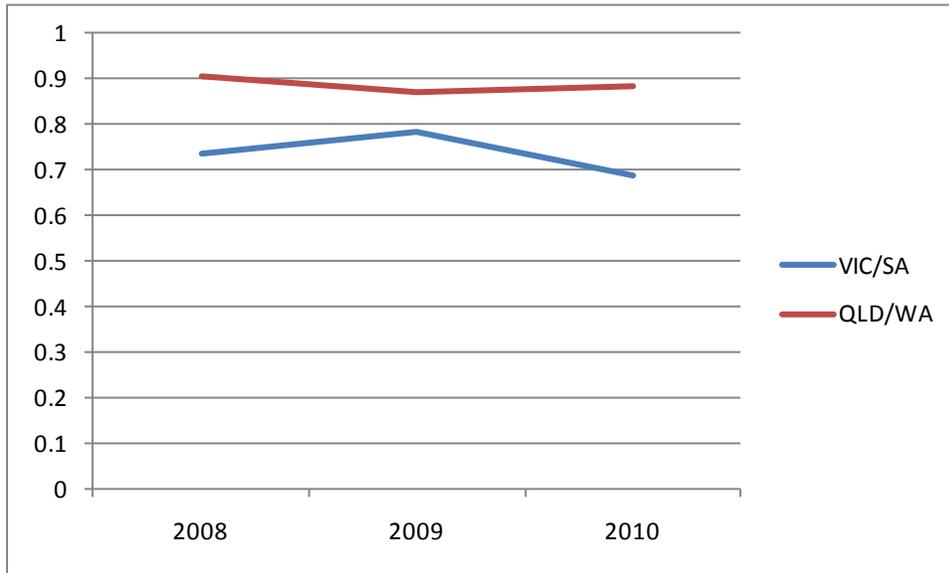


Junior doctors in QLD/WA also report an increase in whether they agree with the statement, ‘I receive good support and supervision from qualified specialists’ (Figure 14). The proportion agreeing with this statement in VIC/SA has fallen. This may be a consequence of a lower patient workload, rather than any changes in the amount and quality of supervision they are receiving. Job satisfaction has also remained relatively high, whilst in VIC/SA it is falling (Figure 15). Junior doctors in QLD/WA are also more likely to be satisfied with the amount of responsibility they are given, whereas this is falling in VIC/SA (Figure 16).

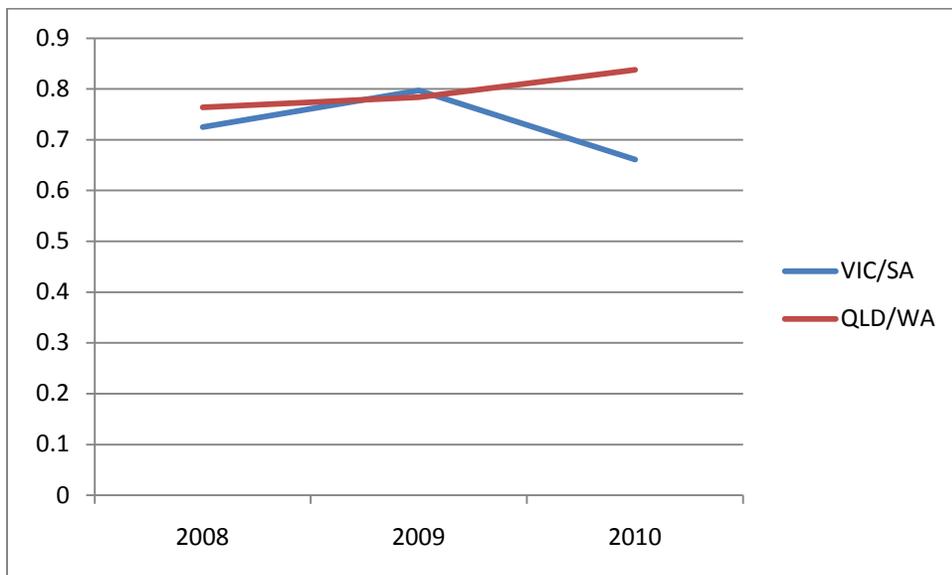
**Figure 14. Proportion of junior doctors agreeing with the statement, ‘I receive good supervision and support from qualified specialists’.**



**Figure 15. Proportion of junior doctors moderately or very satisfied with their job overall**



**Figure 16. Proportion of junior doctors moderately or very satisfied with the amount of responsibility they are given.**



## **Conclusion**

Australia is currently experiencing a relatively rapid increase in medical graduates, and has recently instigated a number of policies to increase the number and locations of clinical training places. Early data show that the number of intern places is just keeping up with the numbers of graduates, though it is too early to tell whether the number of vocational training places can keep pace with demand for these places. There is also evidence that the increase in the number of supervisors is not growing as fast as the number of interns. Preliminary data on changes in short term working patterns show few effects on senior doctors who are supervising interns and prevocational trainees. There is some evidence that junior doctors are seeing fewer patients and spending a lower proportion of their total hours worked in direct patient care. These doctors also seem more satisfied with their jobs and happier with their work-life balance, compared to doctors in States which have not witnessed rapid graduate growth. These data are preliminary and subject to change. If junior doctors are seeing fewer patients, this suggests that the effect of more doctors has not been to increase throughput, reduce lengths of stay, or reduce waiting times, though analysis of hospital activity data are required to confirm this hypothesis. This may also mean that junior doctors may be getting less 'experience' in terms of patient volume. The effect on patient safety and adverse events is difficult to predict.

The longer term impact of graduate expansion depends on how doctors flow through the system. The additional graduates have yet to apply for vocational training and choose their specialty. This will be the next potential bottleneck that policy makers will need to address. The opportunity to introduce policies to manage this flow is important if the existing maldistribution of doctors across geographic areas and specialities is to change in the future.

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## Appendix

<b>Professions covered by HWA's Clinical Training Funding Program</b>
Medicine
Nursing
Audiology
Dentistry
Dietetics
Exercise Physiology
Medical Laboratory Science
Midwifery
Occupational Therapy
Oral Health
Orthoptics
Orthotics and Prosthetics
Paramedicine
Pharmacy
Physiotherapy
Podiatry
Psychology
Radiation Science
Social Work
Sonography
Speech Pathology
Aboriginal and Torres Strait Islander Health Worker