Riding the wave: current and emerging trends in graduates from Australian university medical schools

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ABSTRACT

- The number of domestic graduates from Australian medical schools is set to increase by 81% in 7 years, from 1348 in 2005 to 2442 by 2012.
- Including international students, medical school graduates will total almost 3000 by 2012.
- Planning must begin now to ensure that the significant flow-on effects of these increases are managed effectively.
- Most urgently, postgraduate medical training will require a substantial injection of resources to expand opportunities for clinical training, without compromising quality.
- Patterns of career choice by medical graduates and workforce supply levels must be monitored to ensure responsiveness to the effects of substantially larger, and more diverse, graduate cohorts.

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Australia is currently in the midst of an expansionist phase in medical workforce supply, driven by a range of policies designed to encourage growth in the medical workforce, including significant increases to medical school intakes. Already there are expressions of concern about the flow-on effect of these increases through medical education pathways.[1] Here, we place current policies in their historical context, quantify the immediate outcomes with respect to the number of graduates over the next decade, and consider the broader implications of larger graduate cohorts.

Trends in medical workforce supply

Historically, the long-term picture indicates evident cycles in Australian medical workforce supply policy, with periodic shifts between phases of containment and growth. In 1973, increases to medical school intakes were recommended in response to perceived workforce shortages.[2] Intakes were expanded, and graduations from medical schools rose steadily during the 1970s, from 851 in 1970 to 1278 in 1980. By then, the medical workforce was believed to be in oversupply, and reductions to medical school intakes were recommended and subsequently implemented.[3] Effects of this on graduate numbers were seen from the mid 1980s, with 1030 graduates in 1990. The medical workforce was considered to be in surplus throughout the 1980s and into the 1990s, and medical school intakes remained static.[4,5] In the late 1990s, opinion began to swing back to a view of medical workforce shortage, and after a 20-year period of no change, intakes to medical schools were once again rigorously augmented. Five new medical schools have opened since the year 2000, with a further seven programs planned by 2008 (see Box 1), doubling the number of medical schools since 2000. Combined with increases to intake numbers in existing medical schools, this represents a square wave shift that is in stark contrast to the static pattern of graduate numbers over the previous two decades.

The profile of Australian university medical school graduates is also changing, with increasing numbers of international students. The effect of this increase is amplified by changes in policy which, since 2003, have enabled international graduates to remain in Australia and obtain access to general medical registration here. Adding to this increase is a new student group: domestic full-fee-paying students. Since 2004, medical schools may enrol domestic full-fee-paying students in addition to their Commonwealth-funded domestic places; more than half of Australia's medical schools have taken up this option (Box 1). This allowance was originally limited to the equivalent of 10% of domestic places provided, but has increased to 25% from 2007.

The proportion of medical students completing graduate-entry medical programs (GMPs) has increased steadily since these programs were introduced in the 1990s, and will continue to increase. Intakes to all medical schools are now close to being evenly split between males and females.

There are long lead times before impacts of medical school intake policies are seen on medical workforce supply. However, many flow-on effects of recent policies are already foreseeable and, indeed, inevitable. The potential for pressure further along the medical education pathway is the most immediate of these, but certainly not the only one.

Projected graduations from 2006 to 2016

We projected graduate numbers using data from Medical Deans Australia and New Zealand (formerly the Committee of Deans of Australian Medical Schools) for Australian university medical schools from 2001 to 2005.[6] This dataset provides the number of students by year of course, university, sex, and student type (domestic or international). This dataset was supplemented by information on stated government and university plans for new programs or expansions, obtained from media releases, websites and other sources.[7]

Projected numbers of graduates for 2006–2016 were calculated from actual commencements or expected future commencements and training program durations. It was assumed that commencements in 2006–2012 would be the same as in 2005 unless there were specific indications otherwise. The projected proportion of females among future intakes was estimated based on the proportion in 2004 and 2005 intakes for each medical school. Schools that had less than two intakes by 2005 were assumed to have a 54.2% female intake — the average for all enrolled students in existing GMPs up to 2005. (Note: all new schools except the University of Western Sydney are GMPs, and for this university the average proportion of females for all enrolled students in existing undergraduate programs up to 2005 [56.0%] was used.)

These simple extrapolations of expected numbers were adjusted to account for non-completion of degrees. We used the "apparent completion rate" method presented by Parkhouse, in which intake to medical schools in the United Kingdom was compared with output 5 years later.[8] We used an apparent completion rate of

1 Basic medical training programs in Australia, 2006*

University	Duration (years)	Year of first intake†	Full-fee-paying domestic students
Flinders University (GMP)	4		
Monash University‡	5		✓
University of Adelaide	6		✓
University of Newcastle§	5		✓
University of New South Wales	6		✓
University of Queensland (GMP)	4		✓
University of Sydney (GMP)	4		✓
University of Tasmania¶	5		
University of Western Australia	6		
James Cook University	6	2000	
University of Melbourne			✓
Undergraduate program	6		
Graduate-entry program (one-third of intake) (GMP)	4.5	2000	
Australian National University (GMP)	4	2004	
Bond University§	5	2005	✓
Griffith University (GMP)	4	2005	✓
University of Notre Dame (Fremantle) (GMP)	4	2005	✓
Future programs			
University of Western Sydney§	5	2007	
University of Wollongong (GMP)	4	2007	
Victorian Extended Rural Cohort (Monash University & University of Melbourne)	As above	2007	
University of New England (Joint program with University of Newcastle)	5	2008	✓
University of Notre Dame (Sydney) (GMP)	4	2008	✓
Deakin University (GMP)	4	2008	
Monash University (Gippsland) (GMP)	4	2008	

GMP = graduate-entry medical program.
* Sources: university websites and faculty offices. † If introduced since 1999. ‡ Monash University's 5-year program commenced 2001; previously 6 years' duration. § University accepts applications from both school-leavers and graduates. ¶ University of Tasmania's 5-year program commenced 2006; previously 6 years' duration. ◆

93.1%, based on previous analysis of actual commencements and completions in Australian university medical schools from 1994 to 2003.[9]

The projected number of graduates is shown in Box 2, with actual graduate numbers of domestic students from 1970 and international students from 1989 to 2005 for comparison. There is a clear jump in 2008, when the first graduates from Griffith University and the University of Notre Dame (Fremantle) will join those from the Australian National University (2007). All of the planned changes will have flowed through to the medical workforce by 2012, when graduate numbers are projected to stabilise once again. Overall, the number of domestic graduates is projected to increase by 81%, from 1348 in 2005 to 2442 in 2012.

The number of international graduates is also projected to grow. Having increased from about 10% of all graduates in 2000 to around 20% by 2006, international students will continue to comprise a similar proportion throughout the projection period. Numbers of international graduates are projected to increase from 260 in 2005 to almost 500 by 2012.

Western Australia, Queensland, New South Wales and Tasmania are projected to have the largest percentage changes in total (domestic and international) graduates from 2005 to 2012, and South Australia the smallest (Box 3).

GMP graduates are projected to comprise 45% of all graduates by 2012, from a baseline of none in 1998. The proportion of female graduates, which hit the 50% mark in the early 2000s, will continue to hover around 55%.

Projection assumptions

Our estimated projections are conservative, due to the assumptions of a 93.1% completion rate and no increases in international or domestic full-fee-paying students. The Medical Specialist Training Steering Committee projected about 2500 Commonwealth-funded graduates by 2012,[10] and the Australian Medical Association has projected 3023 domestic graduates,[11] compared with our projection of 2442 total domestic students, including full-fee-paying.

The differences between these projections arise from differing sets of assumptions about attrition rates and numbers of domestic full-fee-paying students, and precision of calculation methods. If all universities that are currently enrolling domestic full-fee-paying students took full advantage of the 25% cap from 2007, there would be about 237 more graduates in 2012. It seems likely that universities will continue to increase the number of full-fee-paying students they enrol (both domestic and international), so total numbers of graduates after 2012 are likely to continue to increase accordingly.

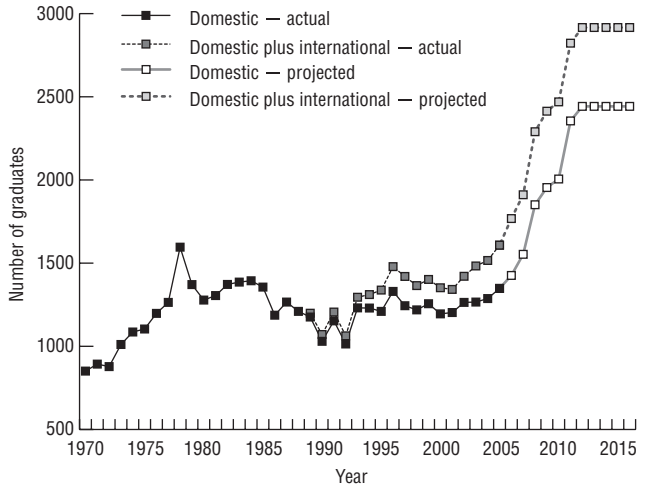
Implications

These figures paint a clear picture: the wave of students flowing into the Australian medical workforce represents substantial growth, and we must plan carefully — now — if we are to ride the wave, rather than being swamped by it. There are significant implications for medical training pathways, patterns of career choice, and workforce supply levels.

One of the most immediate concerns is the number of places and the resources available at the prevocational training stage. This is looming as a potential bottleneck in the system as more students than ever compete for junior medical officer positions. Although the states and territories have agreed, as part of the Council of Australian Governments (COAG) Health Workforce initiative, to provide sufficient intern-level positions, this does not address the need for similar increases in resources for the subsequent post-graduate training years (PGY2 and PGY3). Urgent attention is required to ensure that availability of clinical teachers, teaching time, access to patients, and necessary infrastructure is sufficient for the increased trainee numbers throughout this critical period of training.[12]

A number of strategies have been proposed to address this, including using simulation and a wider range of clinical teaching

2 Australian university medical school graduates: actual and projected, 1970–2016



Sources: Karmel;[2] Doherty;[4] Medical Deans Australia and New Zealand;[6] Department of Science, Education and Training, University Statistics Section, higher education data (customised dataset RFI 03/312). ◆

settings, such as community-based health services and the private health sector.[12] A commitment to use private clinical settings for specialist training was made at the July 2006 COAG meeting;[10] a similar approach is likely to be needed for the prevocational stage. The now well established rural clinical schools network provides another option for expanding clinical training beyond the traditional urban hospital setting. Innovations in clinical training, such as private sector settings or simulation, will need to be accompanied by mechanisms to safeguard quality and broad equivalence of training experiences.

Increased numbers of overseas-trained doctors are also entering the Australian medical workforce by the Australian Medical Council pathway, up from around 200 per year in the 1990s to over 500 in 2004.[13] This will add to the demands for clinical supervision and postgraduate training.

Changes in the student body may influence patterns of career choice within medicine (specialty distribution). Women's career choices have been found to be different to men's,[14,15] and it is also possible that GMP graduates will have different patterns of career choice than those from undergraduate programs. Although research in the UK indicates only slight differences,[16] medical schools have been shown to vary in patterns of graduate career choices.[17] The increasingly diverse "character" of Australia's medical schools suggests that changes to patterns of career choice are likely, and should be monitored closely. There are currently few data available to explore this issue, but it is possible that specialties experiencing difficulties in recruitment may benefit from a different graduate cohort profile. Many new regional medical schools specifically aim to produce graduates interested in rural and general practice.[7] It is also possible that generational shifts in work participation patterns and preferences may overshadow sex-based differences in the future. The Medical Schools' Outcomes Database project being overseen by Medical Deans Australia and New Zealand may provide further insight, by providing national data on the career intentions and demographics of medical students (commencing from 2006) and tracking their progress over time.

3 Australian university medical school graduates (domestic and international) by state/territory: actual (2005) and projected (2012)

State/territory	Total graduates 2005	2012	Per cent change
Australian Capital Territory	0	93	
New South Wales	504	965	91.5%
Queensland	284	575	102.5%
South Australia	209	224	7.2%
Tasmania	57	107	87.7%
Victoria	441	714	61.9%
Western Australia	113	237	109.7%
Total	**1608**	**2916**	**81.3%**

Balancing the interests of medical school graduates with the health care needs of the Australian community will become an increasingly important task. In the past, planning for individual specialist training programs was done separately, but this will need to be more integrated in the future to ensure an appropriate balance. Incentives may be needed to ensure that specialties perceived by graduates as less attractive have a sufficient workforce, similar to existing rural and remote workforce incentives. Greater flexibility in training pathways may also be required, both to accommodate interrupted and part-time training and to increase the flexibility of the medical workforce to move between specialties.[18,19] Younger cohorts of professionals are increasingly mobile, not just between jobs and locations, but also between occupations.[20] Medical career structures must be adapted to avoid losing too many from the medical profession altogether.

The effect of increases in numbers of graduates on the availability of clinical service providers is likely to be offset by a number of factors exerting downward pressure on workforce supply. Continual increases in the proportion of women in the medical workforce (32% of the total Australian medical workforce in 2004)[21] is the first of these, as women have lower levels of workforce participation across their career compared with men.[21,22] Average working hours are decreasing, influenced both by cohort effects in preferences for shorter working hours, and campaigns for "safe working hours". Finally, increased non-clinical activity by doctors reduces the time available to provide clinical services.[23]

While declines in medical workforce participation levels may counteract increases in real numbers of workforce entrants, they also have implications for the number of places in, and the quality of, specialist training. Moves towards competency-based models of training, rather than time-defined programs, may assist in ensuring quality of training is maintained.[24] In the future, postgraduate medical education may involve greater centralisation of governance, as has occurred in the UK.[25] There may also be increased university involvement. Ideally, this should build on existing precedents for cooperative arrangements with the medical specialist colleges, for example in fields such as psychiatry, occupational medicine and palliative care. The limiting factor in expanding postgraduate medical training is the availability of clinical environments and supervisors. There are, therefore, no benefits in competition between universities and colleges as providers of that training. There are clearly significant challenges ahead for colleges and other parties involved in specialist training.

For policymakers, the current growth phase in medical training necessitates careful monitoring. The lessons of history tell us that, to some extent, a boom–bust cycle in workforce supply is inevitable. But we must avoid an overcorrection like that of the early 1980s, the effects of which are felt now as workforce shortages. There are often unintended or unforeseen consequences of major policy changes. For example, the limits placed on entry to the Australian medical workforce in the early 1980s contributed to a massive rise in the number of overseas-trained doctors entering Australia on temporary resident visas during the 1990s.[26] Policymakers will need to be watching for the emergence of any similar unintended effects of current policies.

The increased number of Australian medical school graduates is a positive — and some would say long overdue — development in national medical workforce policy. But we need to be planning now to ensure that the impacts on medical education and health service delivery systems are managed as effectively and smoothly as possible.

Competing interests

None identified.

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