Department of Health

Australia's Future Health Workforce – Anaesthesia

April 2016

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Executive Summary

The Australia's Future Health Workforce – Doctors (AFHW - Doctors) report published in December 2014 indicated that Australia's health workforce is under pressure and must undergo significant transformation to meet future demands for healthcare.

Despite the projected overall position of oversupply, imbalances within the medical specialty workforces currently exist and are projected to continue.

The development of the AFHW – Doctors report was guided by the expert input of the National Medical Training Advisory Network (NMTAN) that has representation from all the key stakeholder groups in medical education, training and employment.

The report makes recommendations for future work including:

- updates to the workforce modelling results to determine requirements for future adjustments every two years; and
- prioritisation of future policy work to gain a better understanding of the prevocational years and overall capacity for and distribution of vocational medical training.

The NMTAN currently has three subcommittees that explore different aspects of medical training to inform workforce planning:

- changing work with the increase in burden of chronic disease;
- employment patterns and intentions of prevocational doctors and development of fact sheets on supply and demand in each of the medical specialties; and
- the capacity for and distribution of medical training, including the geographic distribution of medical training and community needs.

The anaesthesia report is part of the first segment of analysis under the capacity and distribution work. This report involves updating the supply and demand projections previously completed by the former Health Workforce Australia (HWA) and published in Health Workforce 2025 - Medical Specialists Volume 3 (HW 2025 Vol 3).

Key considerations

It is important to note the following regarding demand and supply modelling for all specialties:

- Supply only includes the hours worked by specialists in the specific speciality being modelled
    - For anaesthesia this means only the hours worked by specialist anaesthetists in anaesthesia contribute toward the supply FTE. In particular there are 360 specialist anaesthetists who work in anaesthesia AND another speciality – 44 percent of their FTE was spent working in anaesthesia while 56 percent of their FTE was spent working in their other specialty. Only the hours worked in anaesthesia contribute toward the supply FTE for anaesthesia.
- Demand only includes the services provided by specialists in the specialist area

- For anaesthesia this means only anaesthetic services performed by specialist anaesthetists are used in the calculation of demand.

- Projections for the 'Clinical hours scenario' (Table 12) will be produced for every specialty. This scenario is NOT recommended by the Australian Government Department of Health (DoH).
  - This scenario is presented for comparison purposes only as it uses the same methodology as previous modelling.

Key findings

Supply and demand projections

Results of the projections reveal a workforce that is in balance, with the potential to shift into oversupply if trainee numbers are increased or if there is not a decrease in International Medical Graduates (IMGS).

Should a scenario of increased demand for anaesthetists arise, the workforce is in a position to implement various tactics to meet the community needs:

- The decrease in hours over the years, and in particular the decrease in hours in the 45 to 50 year age group, suggests the current workforce may be underutilised. An additional reserve of 52.5 FTE could be mobilised if specialist anaesthetists aged 45 to 50 years worked one extra session per week.

- There are currently 360 registered and employed specialist anaesthetists who work hours in anaesthesia and another specialty. This group spend 56 percent of their FTE in a specialty other than anaesthesia. This equates to a supply of approximately 200 FTE that has the potential to be redirected to the anaesthetic workforce should the need arise.

Training program

The number of prevocational medical practitioners who have indicated their intentions to train in anaesthesia (421) is quite large relative to the current annual intake into the training program (just over 200). The Australian and New Zealand College of Anaesthetists (ANZCA) envisage that "trainee intake numbers could go up due to pressure to find vocational training jobs for the large number of medical graduates currently coming through the system".

The purpose of the AFHW series, however, is to provide evidence to assist in informing the broader training strategies for all medical colleges. In particular, the results of this report indicate that intake into the anaesthesia training program should not be driven by pressure or demand from medical graduates, rather intake should be attenuated with the aim of achieving a delicate balance between business fiscal interests, medical students vocational aspirations and evolving community requirements.

Whilst IMGS are not in the training program, they do complete relevant components of training. The bottleneck of partially comparable IMGS who have not been able to obtain fellowship under the current regulations reveal a potential opportunity to fine-tune the assessment of IMGS. In particular, there may need to be an additional or more meticulous assessment of the candidate's capability to complete the required examinations and obtain fellowship before deeming a candidate as partially comparable.

Capacity and distribution for vocational training

Training bottlenecks were previously problematic, especially in particular rotations such as neurology, paediatrics, cardiac and complex obstetrics. The current training pipeline suggests that this has eased as a result of the ANZCA curriculum change.

The distribution of training shows that trainees are generally located in the capital cities or regional centres. ANZCA has expressed concern that decentralisation of training solely to regional centres would pose a challenge to the completion of specialty training due to the lack of casemix, volume and complexity of cases in these area

Recommendations:

- The supply and demand projection be closely monitored by NMTAN and updated every two years.
- The College and the NMTAN continue to monitor the training numbers and transition rates
- The NMTAN monitor the numbers of partially comparable IMGS obtaining fellowship and the assessment process to ensure that those can't complete the pathway to fellowship are deemed not comparable.

Overview

The Australia's Future Health Workforce – Doctors (AFHW – Doctors) report published in December 2014 indicated that Australia's health workforce is under pressure and must undergo significant transformation to meet future demands for healthcare.

Despite the projected overall position of oversupply, imbalances within the medical specialty workforces currently exist and are projected to continue.

The medical workforce is a national resource; a resource that is valuable to the community both in terms of the cost of training, which is substantially borne by the taxpayer, and in terms of the benefit derived by the community from a well-trained health workforce.

In the past, uncoordinated decision making in the absence of an active workforce planning mechanism has seen a "boom and bust" cycle in medical training and resulting doctor numbers. This has been a cost to the community.

The AFHW - Doctors report shows there are three key factors that underpin the importance of national workforce planning for doctors. First, there is an immediate need to deal with the significant increase in domestic medical students that has occurred over the last ten years. This presents an opportunity to influence further training for medical students, to encourage doctors to move into the locations and specialties that will be needed in the future.

Second, due to the age demographic of the medical workforce, a number of doctors will retire from 2025. The length of time it takes to train a doctor means that short term changes in training levels are not an effective response to short term imbalances between supply and demand. This re-enforces the need to plan over a medium term time horizon and to minimise short term movements in medical intakes, which could be better dealt with using temporary migration.

Third, the report states there is a lack of coordination across the medical training pipeline. Between governments, universities, medical colleges and the various employers of doctors, there are hundreds of individuals making decisions on how many doctors and what type of doctors are trained in Australia. Ensuring these individual decisions are aligned to what Australia needs from doctors in the future is essential.

The development of the AFHW – Doctors report was guided by the expert input of the National Medical Training Advisory Network (NMTAN) that has representation from all the key stakeholder groups in medical education, training and employment.

The report makes recommendations for future work including:

- updates to the workforce modelling results to determine requirements for future adjustments every two years; and
- prioritisation of future policy work to gain a better understanding of the prevocational years and overall capacity for and distribution of vocational medical training.

Background

The establishment of the NMTAN was approved on 10 August 2012 by the then Standing Council on Health (SCOH) as a mechanism to enable a nationally coordinated medical training system in Australia. The NMTAN was established under the auspices of the former Health Workforce Australia (HWA) and held its first meeting in February 2014. Since August 2014, support to the NMTAN has been provided by the Australian Government Department of Health (DoH).

The NMTAN provides guidance in the development of a series of medical training reports to inform government, health and education sectors. In addition, the NMTAN provides policy advice about the planning and coordination of medical training in Australia, in collaboration with other networks involved in the medical training space.

The NMTAN currently has three subcommittees that explore different aspects of medical training to inform future workforce planning:

- the 'changing work with the increase in burden of chronic disease' subcommittee examines the implications of the increasing incidence of chronic disease and increased delivery of chronic disease management in the primary care setting. Modelling of the medical workforce will be undertaken based on a number of models of care. It is expected this work will be completed in 2016;
- the 'employment patterns and intentions of prevocational doctors' subcommittee aims to improve the modelling undertaken for the prevocational years in medicine and use this improved modelling to better inform career planning for junior doctors. The subcommittee has developed an internal report that provides a snapshot of the existing prevocational doctor workforce in Australia. This information will be used to develop a series of fact sheets on each of the medical specialties, to be made available on the Australian Government Department of Health (DoH) website. It is expected the factsheets will become available from June 2016; and
- the 'capacity for and distribution of medical training' subcommittee makes recommendations to the NMTAN Executive Committee on changes to policy and practices that could improve geographic distribution of medical training to produce the number and proportion of medical specialists needed to provide specialist healthcare to Australians. Members have identified a priority list of specialties to be modelled, with the focus initially on a small number of specialties seen to be at risk of workforce shortage or oversupply, and where there is capacity to address these issues with training.

In addition to the policy-focussed subcommittee, a fourth subcommittee – the data subcommittee – is responsible to support the production of an annual report of medical education and training, including undergraduate, postgraduate and vocational training projects. The functions of this subcommittee were transferred from the Medical Training Review Panel to the NMTAN in 2015.

This anaesthesia report is part of the first segment of analysis under the capacity and distribution subcommittee work. It involves updating the supply and demand projections previously completed by the former HWA and published in HW 2025 – Medical Specialists Volume 3.

This work has been guided by the input of the NMTAN and has been completed in two stages:

- Stage 1: review and analysis of supply and demand through the modelling of the anaesthesia workforce with projections to 2030 and analysis of current training capacity and identification of pipeline issues. This resulted in the development of an interim report for targeted consultation with NMTAN and relevant stakeholders/experts.
- Stage 2: consolidation of the feedback on the interim report to identify issues to develop training target ranges (including capacity in aggregation and by location) and policy recommendations for anaesthesia.

Determining the Future Capacity for Training Needs

Australia's medical training system is delivered through a complex interconnection of funding and organisation channels that span Commonwealth and state and territory governments, as well as private and non-government agencies. The cross-sectional nature of delivering and funding medical training in Australia makes workforce planning difficult for any particular agency or sector to deliver in isolation. There is also a risk there will be an ongoing mismatch between the medical workforce that is trained and that is required to deliver necessary services.

The pathway to independent practice as a vocationally recognised specialist is long and there are multiple layers of investment in the training from university entrance to the completion of specialist vocational training. At the same time, there are numerous players involved in the training pathway, from universities to public and private hospitals and private medical practices.

The recent growth in the medical workforce is important in the calculated supply and demand for health services over the time period covered by the workforce modelling.

This increase in the number of medical students and graduates demonstrates a large increase in the inflows into the medical workforce over a short space of time. This has implications for clinical training capacity, initially at the university level but extending into the prevocational and vocational training years. This pressure has already been seen in the availability of intern training places, which to date has largely kept pace with the increasing number of graduates.

This pressure is now beginning to move into the next stages of the training pipeline. There has been an increase of over 30 percent in vocational training positions with 15,478 in 2011 moving to 20,069 by 2015 with unclear links to future workforce requirements. Previous workforce modelling demonstrates an emerging mismatch between the number of trainees seeking a vocational training place and the availability of places based on community need. This mismatch emerges from around 2017 in the most recent modelling presented in the AFHW – Doctors report and extends to approximately 1,000 places by 2030.

Introduction

Anaesthetists are a specialist medical workforce that practice across a range of clinical environments from isolated rural environments to large metropolitan teaching hospitals in both public and private practice. Anaesthetists apply their knowledge and skills to caring for patients in a variety of clinical contexts, providing anaesthesia and sedation for surgery and other procedures, providing pain management and perioperative care, working in resuscitation, trauma and retrieval teams and working with specialists in intensive care medicine. There are subspecialised areas of practice based around patient groups such as paediatric anaesthesia and obstetric anaesthesia or surgical sub-specialties such as anaesthesia for cardiac or neurosurgery.

Anaesthesia was selected as a medical specialty to be considered in the first segment of analysis by the NMTAN largely due to concerns identified in HW 2025 Volume 3. The anaesthesia chapter indicated that the workforce was perceived to have no current shortage while the comparison scenario projected the workforce would be in oversupply by 130 anaesthetists by 2025. Stakeholder views agreed that:

- There were sufficient anaesthesia trainees to meet service demands.
- The distribution of the anaesthesia workforce was the primary concern; particularly recruiting specialists to regional areas, with these regional areas often reliant on non-specialist anaesthesia providers (GP anaesthetists) or Specialist International Medical Graduates (SIMGS).
- The revised training curriculum, which commenced in 2013, may increase the duration of training time (although not expected to significantly increase the time) and may extend the time it takes pre-vocational doctors to enter the training program, by limiting the first part examination to those on ‘accredited’ training places.

The last point above reflected stakeholder views at the time that HW 2025 Volume 3 was released. ANZCA has indicated that they do not believe the timing of the primary exam extends the time it takes prevocational doctors to enter the training program. Currently candidates enter introductory training then sit the primary exam. This should not slow down the time it takes prevocational doctors to enter the program.

A summary of the approved modelling inputs can be found in Appendix 1.

Current workforce status

In 2014, there were 4,482 accredited specialist anaesthetists with current registration in Australia of which 4,135 (92 percent) were employed in the medical workforce. While the majority (4,101) worked in anaesthesia, 34 did not work in anaesthesia: of these 28 were clinicians, with 24 indicating they were working in specialty fields other than anaesthesia (the remaining 4 did not answer the question to indicate which specialty fields, if any, they were working in). The other specialty fields were: intensive care/paediatric intensive care, pain medicine, palliative medicine, general medicine and infectious diseases.

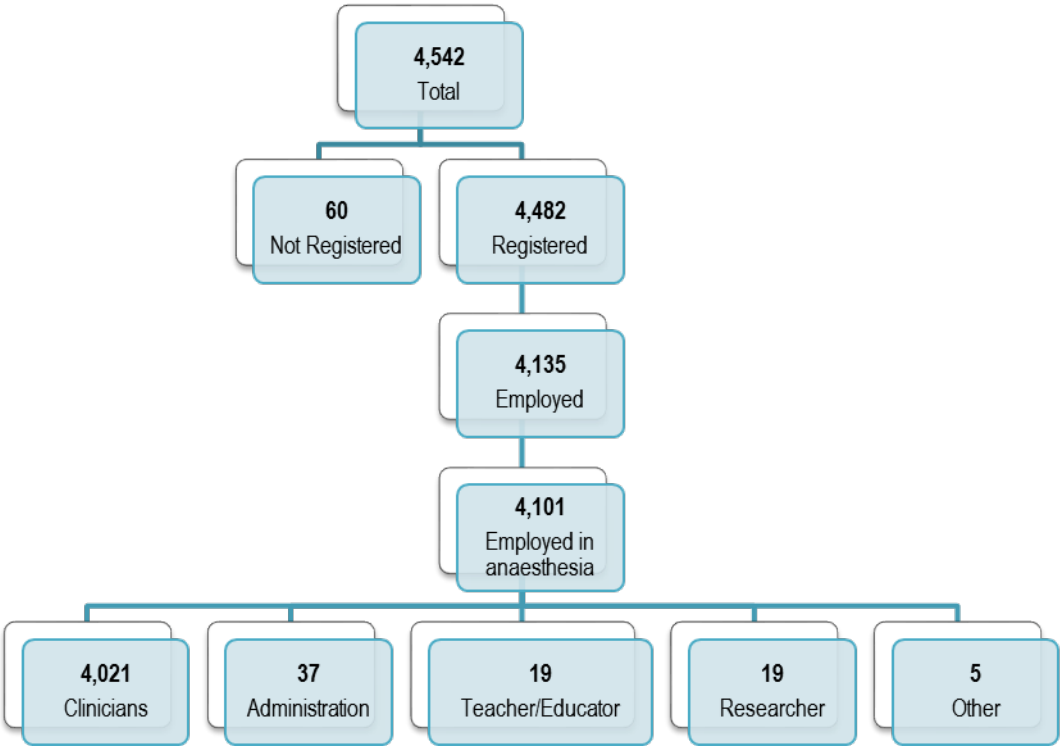
Those who did work in anaesthesia were mostly clinicians (90 percent) with the remainder working as administrators, teachers/educators and researchers (Figure 1).

Nine percent (360) of clinical anaesthetists also worked in a specialty other than anaesthesia. The most common second specialties were: intensive care medicine (195), pain medicine (128) and general practice (19).

The Medical Board publishes quarterly statistics on Medical Practitioner Registrant Data[1]. In the September 2014 edition there were 4,545 registrants with a specialty of anaesthesia; 63 more than reported in Figure 1 using the National Health Workforce Data Set (NHWDS). This is because the NHWDS is a snapshot at a point in time (as at the date of data extraction) and the figures reported here include only medical practitioners with a current registration. The Medical Board/AHPRA statistics report an annual figure and include medical practitioners who held a registration at some point in the year but may not have a current registration.

In the NHWDS there were 60 anaesthetists who did not have current medical registration; a difference of only 3 between the NHWDS and the Medical Board statistics.

Figure 1. Anaesthetist workforce by job role, 2014



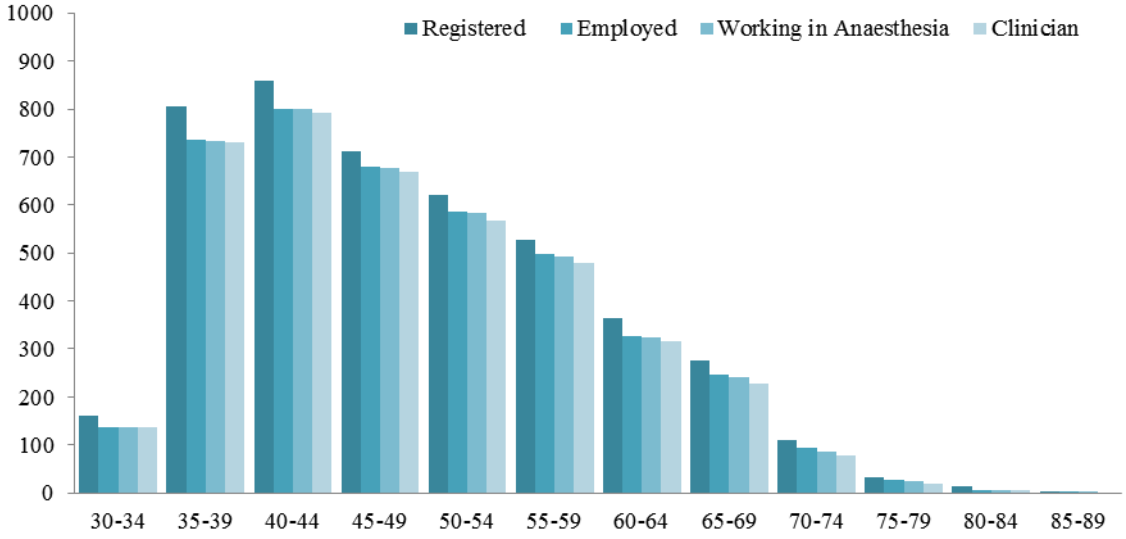
Source: NHWDS, Medical Practitioner 2014

Aged and Gender

The age distribution of anaesthetists in Australia (Figure 2) show the majority are in the 35-59 year age groups for registered, employed, clinicians and those working in the anaesthesia field. The proportion of the registered, employed, clinicians and those working in the anaesthesia field were similar within each of these age groups. The largest single age group for anaesthetists is 40-44 years with the numbers in the workforce reducing significantly beyond 59 years of age.

[1] http://www.medicalboard.gov.au/News/Statistics.aspx

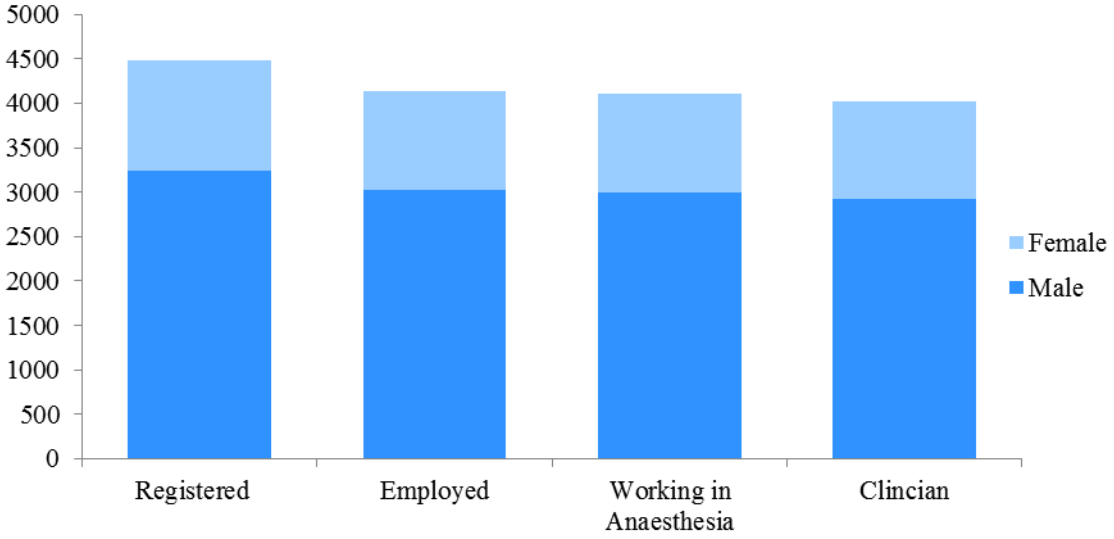
Figure 2. Comparison of anaesthetists that are registered, employed, working in anaesthesia, clinicians (headcount) by age group



Source: NHWDS, Medical Practitioner 2014

The gender distribution of anaesthetists (Figure 3) shows that the majority, about two thirds, are male across all groups of anaesthetists: registered, employed, clinicians and those working in the field.

Figure 3. Gender distribution of anaesthetist workforce, 2014

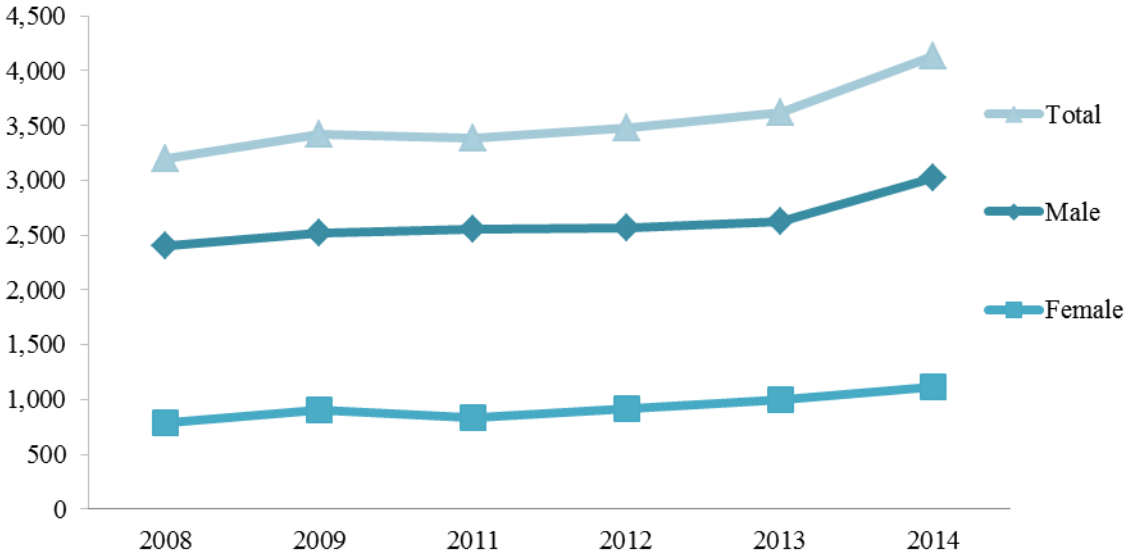


Source: NHWDS, Medical Practitioner 2014

Growth

Figure 4 shows that the number of employed anaesthetists has grown over the years (average annual growth of 4.4 percent), with female anaesthetists experiencing the largest growth over the last five years – at an average annual rate of 5.8 percent, while males have only grown at 3.9 percent (average annual growth). However, the proportion of females has remained fairly constant – on average 26 percent between 2008 and 2014.

Figure 4. Employed anaesthetists by gender, 2008 to 2014

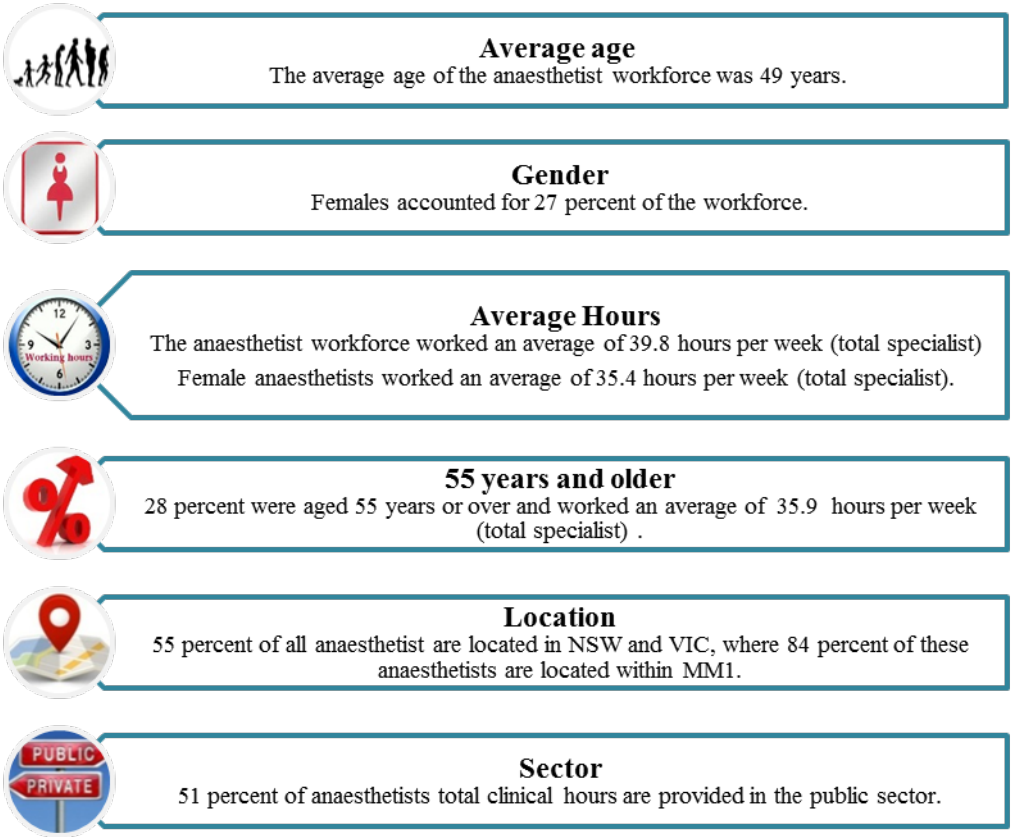


Data for 2010 has been omitted as it excludes Queensland and Western Australia due to their registration closing after the national registration deadline of 30 September 2010.

Sources: AIHW medical workforce surveys 2008 and 2009; NHWDS: medical practitioners 2011 to 2014

According to the 2014 NHWDS, there were 4,021 anaesthetists who indicated they were employed and working as clinicians (anaesthetist workforce) with the following characteristics:

Figure 5. Demographics of the anaesthetist workforce, 2014



Source: NHWDS, Medical Practitioner 2014

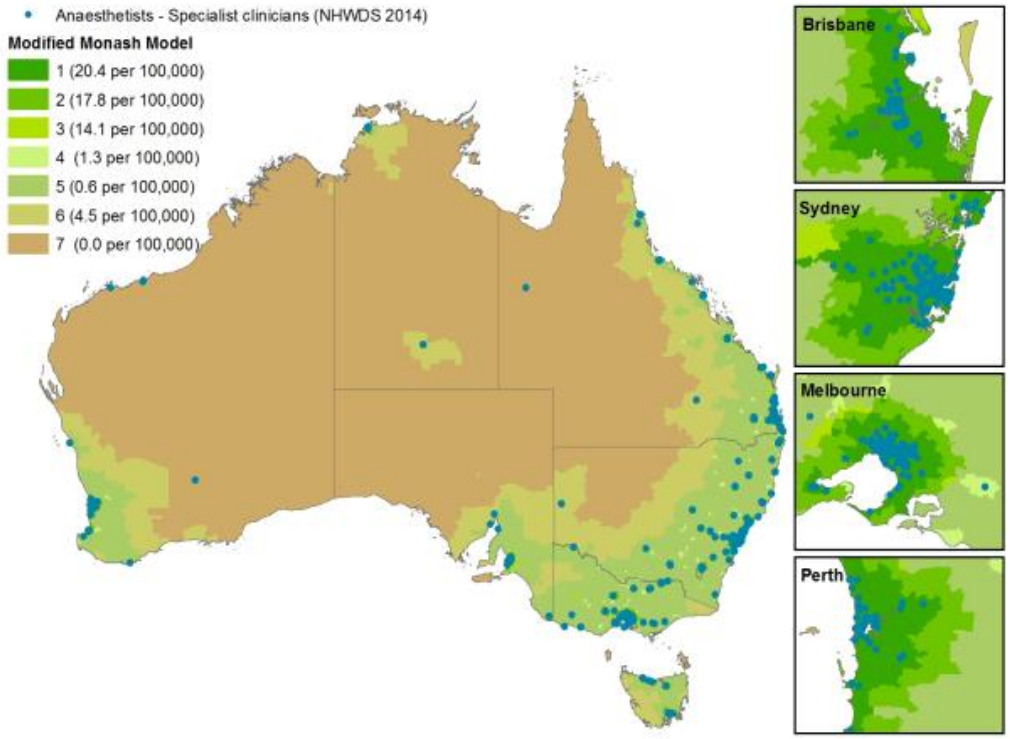
Distribution

Figure 6 illustrates the Modified Monash Model and density of the anaesthetist workforce within these areas. The Modified Monash (MM) Model is a new classification system that better categorises metropolitan, regional, rural and remote areas according to both geographical remoteness and town size.

The system was developed to recognise the challenges in attracting health professionals to more remote and smaller communities. MM 1 indicates major cities and progresses to MM 7, which indicates very remote Australia;
Table 1 below defines each of these MM categories. As can be seen in the map, the anaesthetist workforce is located throughout Australia, but mainly concentrated in major cities.

However, it is important to note that due to the collaborative nature of the anaesthetic field, the distribution or maldistribution of anaesthetists is inextricably tied to the distribution of other medical specialists.

Figure 6. Anaesthetist workforce (clinicians) by Modified Monash Model, 2014



Source: NHWDS, Medical Practitioner 2014

The old classification system was based on the Australian Standard Geographical Classification – Remoteness Area (ASGC-RA) system. The Australian Bureau of Statistics (ABS) has now replaced to ASGC with the Australian Statistical Geography Standard (ASGS). The ASGS uses the latest residential population data to determine the five base categories. The MM Model will overlay the ASGS for the purposes of administering some health workforce programmes.

Table 1. Definitions of the Modified Monash Model Categories

Modified Monash Category	Definition
1	All areas categorised ASGS-RA1.
2	Areas categorised ASGS-RA 2 and ASGS-RA 3 that are in, or within 20km road distance, of a town with population >50,000.
3	Areas categorised ASGS-RA 2 and ASGS-RA 3 that are not in MM 2 and are in, or within 15km road distance, of a town with population between 15,000 and 50,000.
4	Areas categorised ASGS-RA 2 and ASGS-RA 3 that are not in MM 2 or MM 3, and are in, or within 10km road distance, of a town with population between 5,000 and 15,000.
5	All other areas in ASGS-RA 2 and 3.
6	All areas categorised ASGS-RA 4 that are not on a populated island that is separated from the mainland in the ABS geography and is more than 5km offshore.
7	All other areas – that being ASGS-RA 5 and areas on a populated island that is separated from the mainland in the ABS geography and is more than 5km offshore.

Source: www.doctorconnect.gov.au

Hours worked

The Medical Practitioner workforce survey (Appendix 5) captures the hours worked at three levels as shown in Figure 7 below. The first row (A) is where a practitioner identifies the total hours they worked in the previous week. They are asked to split their total hours into (B) time spent in clinical roles and non-clinical roles. Non-clinical is defined as "including teacher, researcher, administrator and other". They are then asked to split their clinical hours into (C) time spent in up to two specialities (clinical hours in specialty 1 and clinical hours in specialty 2).

For example, 9 percent (360) of Anaesthetists worked hours in a specialty other than anaesthesia (most commonly intensive care medicine and pain medicine). For this group of dual specialists, 44 percent of their FTE was spent in anaesthesia, while 56 percent was spent in their other specialty.

They grey 'unknown' area in row (C) can occur when the hours reported in specialty 1 and specialty 2 do not add up to the clinical hours (B). The unknown clinical hours may be due to an error when completing the survey form (the medical practitioner miscalculates their hours) or it may represent time worked as a non-vocationally registered GP (VRGP) or in a third specialty. The unknown hours were not used in the modelling inputs. Furthermore, as can been seen in the grey 'not asked in survey' area in row (C), the non-clinical hours worked in each specialty are not captured in the survey.

Figure 7 shows how the use of clinical hours (highlighted in row B) is flawed for the purposes of modelling individual medical specialties. The clinical hours (highlighted in row B) can be much higher than the individual specialist clinical hours (C) as clinical hours comprises unknown clinical hours and/or hours worked in another speciality (other than the one being modelled). When clinical hours are used for modelling, the FTE is overestimated by including hours worked in a specialty other than the one being modelled as well as unknown/unattributed clinical hours. It also underestimates supply

by excluding the time spent in clinical support (non-clinical hours) for a specialty. The results of projections using clinical hours are presented in the 'clinical hours scenario' Table 12. This scenario is NOT recommended by DoH and is presented to enable comparisons with previous modelling.

Figure 7. Hours worked as captured in the workforce survey.

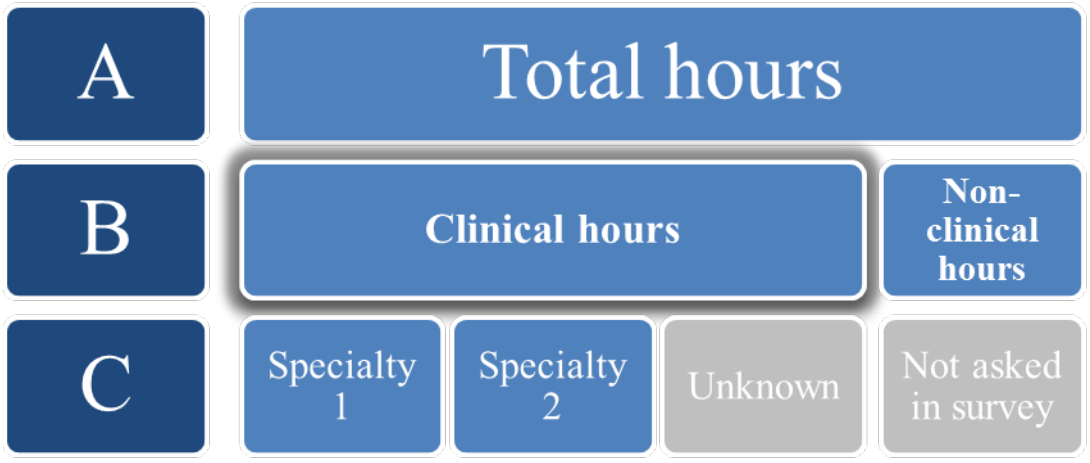


Figure **8** below shows how the hours for individual specialties have been estimated for modelling purposes in this report. In order to calculate (D), the total hours worked in the anaesthesia speciality (clinical and non-clinical), the proportion of the clinical hours for each of the specialities were used to attribute non-clinical hours to the specialties to give an indication of the total specialist hours (clinical and non-clinical) a practitioner is working in a given speciality.

Figure 8. Estimating total specialty hours

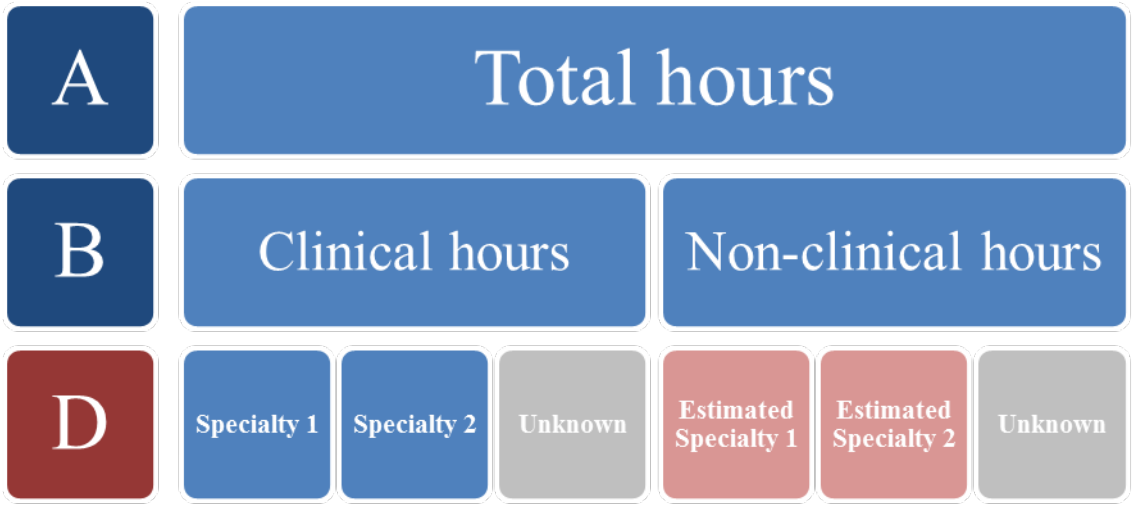


Figure 9 below shows which hours contribute to supply in the projections utilising total specialist hours ('Total specialist hours scenario Table 13, and 'College scenario reduction to migration' Table **14**).

In this example, if a practitioner indicated in specialty field 1 they worked in anaesthesia and in specialty field 2 they worked in intensive care medicine, then the

clinical specialty 1 hours plus the non-clinical estimated specialty 1 hours (highlighted in black) are used in the modelling for anaesthesia.

Figure 9. Total specialty hours used in modelling - example

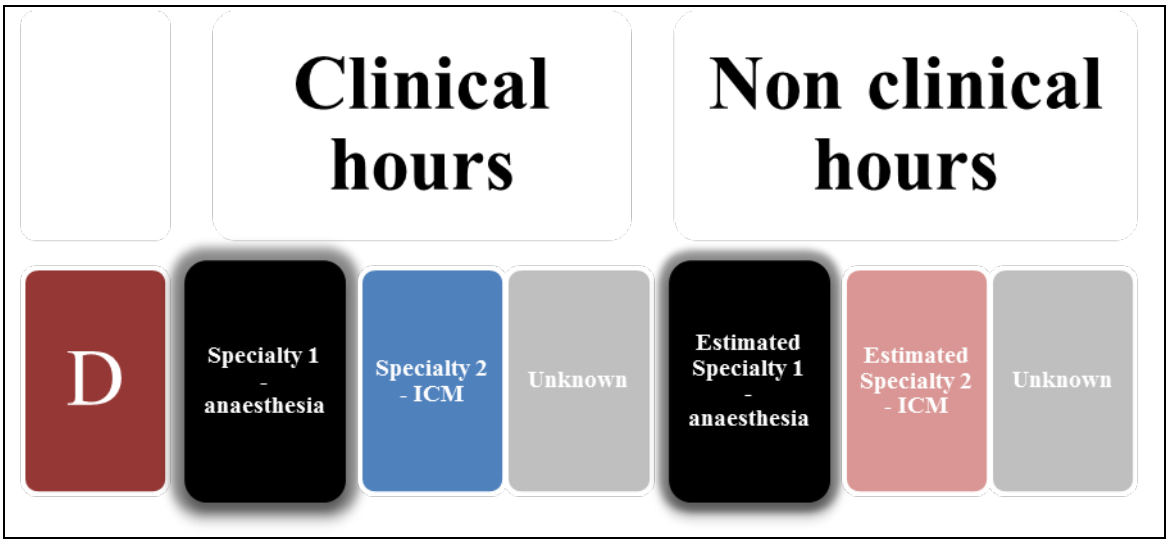
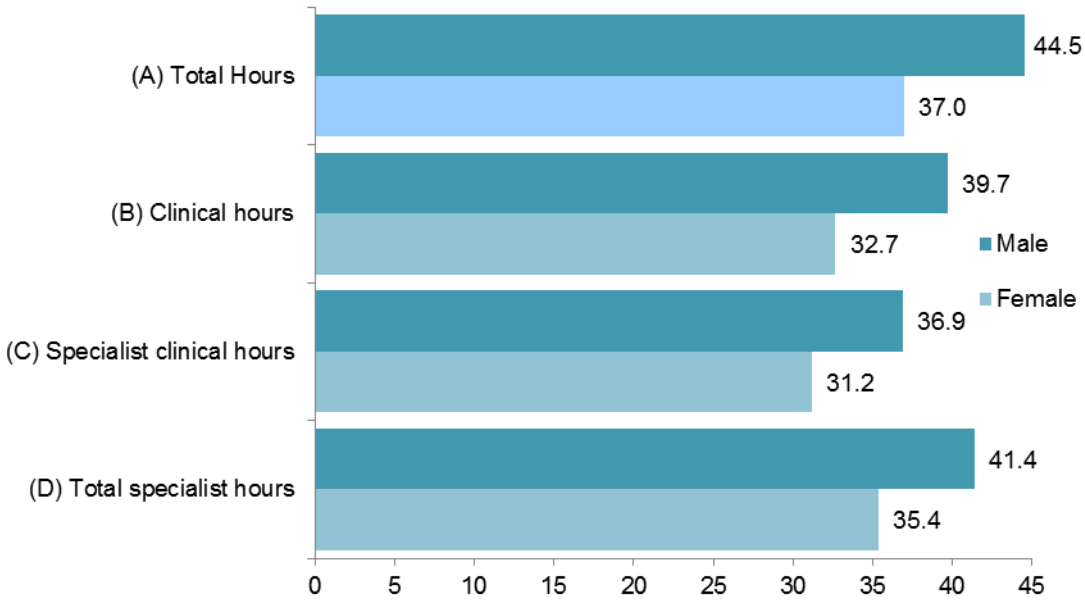


Figure 10 below shows the difference between the hours worked by the anaesthetist workforce, by gender. There is a clear difference between males and females. This difference is almost the equivalent of a standard day's work (on average 7 hours), with females working fewer hours on average. As expected, for both males and females, the total hours are greater than the clinical hours and these are again greater than the specialist clinical hours.

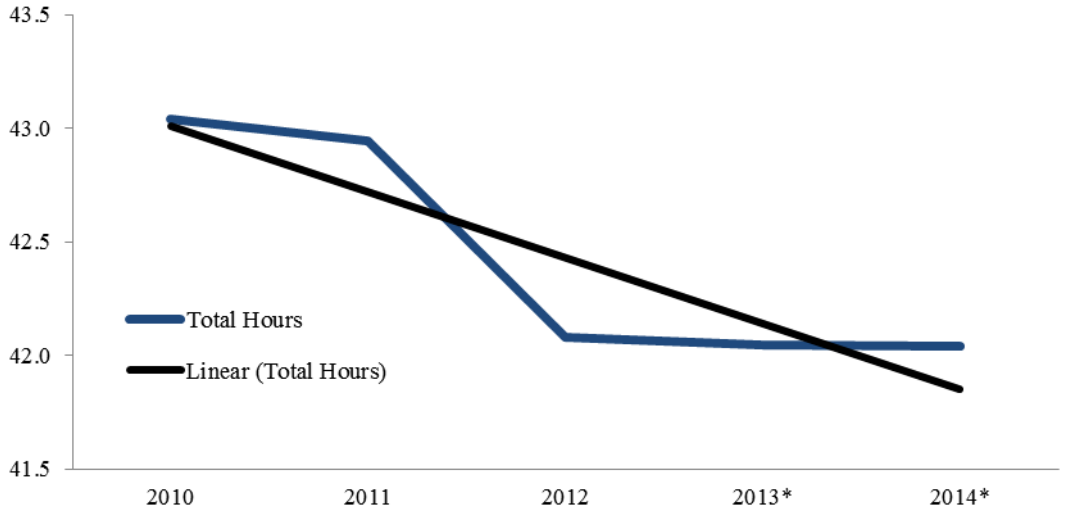
Figure 10. Average hours by total, clinical, specialist clinical and specialist total hours worked, 2014



Source: NHWDS, Medical Practitioner 2014

It is not possible to calculate the total specialist hours by specialty prior to 2013 due to the differences in the file structure of the NHWDS, however Figure 11 shows that the total hours worked (and the trend) by anaesthetists declined between 2010 and 2014.

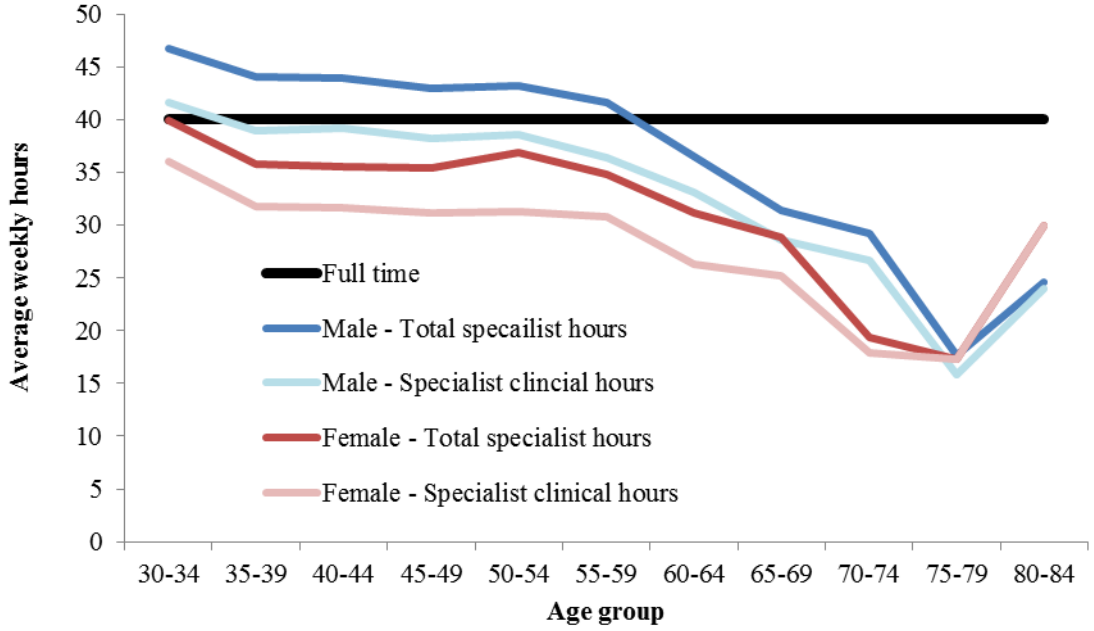
Figure 11. Total hours worked by anaesthetists, 2010-2014



***In order to produce a meaningful series the above data is a reflection of the AIHW derived primary specialty which vary slightly from more recent estimates (using the classifications detailed in Appendix 2).**

Figure 12 below shows the difference between the total specialist hours (D) and clinical specialist hours (C) by gender and age group. A larger gap can be seen between total specialist hours and clinical specialist hours in the younger age groups for both males and females, with the gap closing for older anaesthetists. This indicates that younger anaesthetists are spending more time (roughly 4 hours per week) performing non-clinical work.

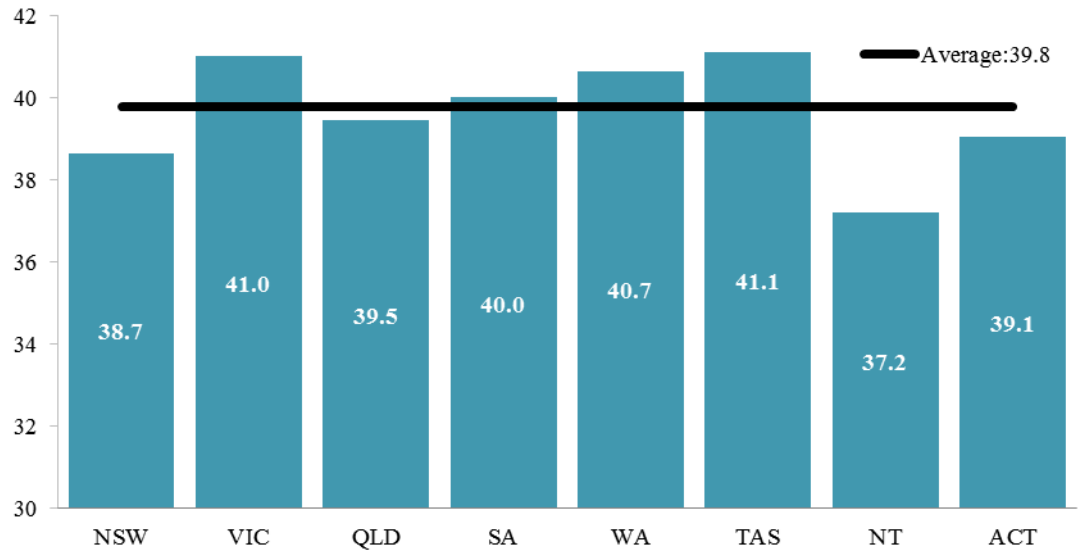
Figure 12. Average total specialist hours and clinical specialist hours by sex and age group, 2014



The average total specialist hours worked by states and territories is shown below (Figure 13). Clinical anaesthetists in NSW, NT and ACT tend to work less than the

national average (39.8 hours), while those in VIC, WA, and TAS tend to work more than the national average.

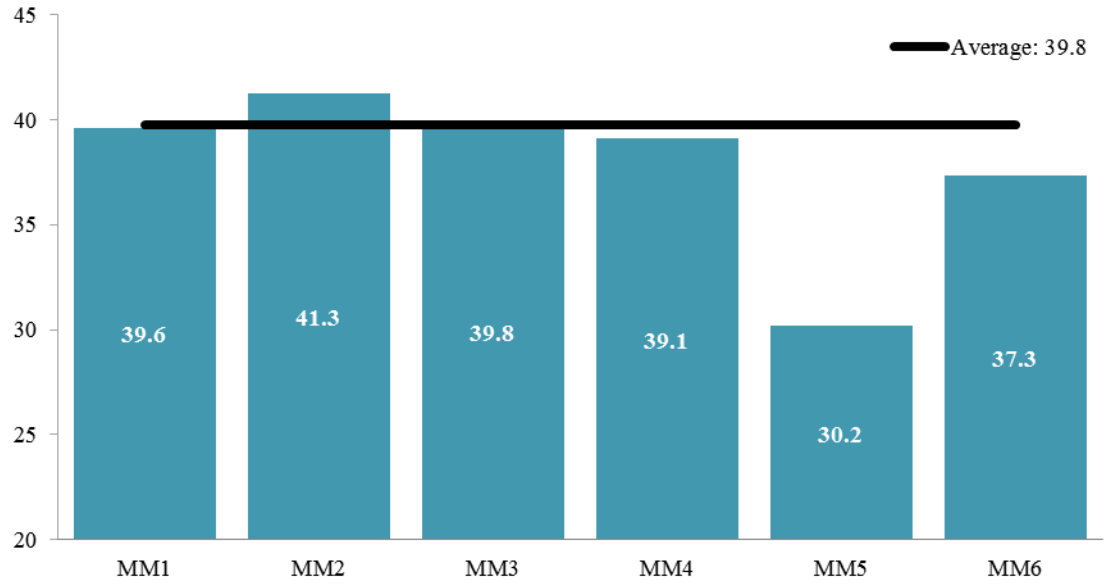
Figure 13. Average total specialist hours by states and territories



Source: NHWDS, Medical Practitioner 2014

Figure 14 shows there are very small variations in the total specialist hours worked between areas, with the exception of remote areas (MM5 and MM6) tending to be lower although these areas also have fewer anaesthetists.

Figure 14. Average specialist clinical hours worked by Modified Monash Model)



Source: NHWDS, Medical Practitioner 2014

Table 2 indicates the anaesthetist clinical workload between public and private sectors and state. The data shows nationwide the majority of anaesthetists work in the public sector (51 percent) with 49 percent working in the private sector. This is consistent across locations, with a high of 66 percent of anaesthetists working in public settings in

the NT, to a low of 46 percent in QLD. The majority of anaesthetists are located in the highly populated states of NSW, VIC and QLD and proportionally less in lower populous territories such as NT and ACT.

Table 2. Specialist anaesthetist clinicians (headcount and sector: proportion of specialist clinical FTE in public and private) by state and territory

	Headcount	Specialist clinical FTE	
		% Public	% Private
NSW	1,238	51%	49%
VIC	960	52%	48%
QLD	847	46%	54%
SA	325	53%	47%
WA	448	51%	50%
TAS	102	54%	47%
NT	31	66%	34%
ACT	70	52%	48%
Total	**4,021**	**51%**	**49%**

Source: NHWDS, Medical Practitioner 2014

Current trainee status

Fellowship program

In 2013 the Australian and New Zealand College of Anaesthetists (ANZCA) revised their curriculum. This was designed in line with recommendations from a curriculum review, which began in 2008. The ANZCA training program is divided into four periods: introductory, basic, advanced and provisional fellowship training:

- Introductory training (IT) – trainees may complete this study unit in a minimum of 26 weeks. This unit introduces the ANZCA Roles in Practice focusing on the development of basic knowledge and skills across the ANZCA Clinical Fundamentals and safe, patient-centred practice. Trainees will develop the ability to manage low-risk cases included in the specialised study units.
- Basic training (BT) – trainees may complete this study unit in a minimum of 78 weeks. This unit further develops the ANZCA Roles in Practice and trainees will also continue to expand and apply their knowledge of anatomy, basic sciences, and equipment, necessary to support safe practice across the ANZCA Clinical Fundamentals. They will extend their clinical assessment knowledge and skills to assess the severity of common medical conditions that require anaesthesia and ensure optimisation of patients by appropriate consultation and supervision. They will be able to participate as a multidisciplinary team member in pain, trauma and resuscitation teams and will demonstrate sufficient knowledge, skills and behaviours to manage cases of moderate complexity with level 4 supervision. They will continue to accrue experience with cases included in the specialised study units.

- Advanced training (AT) – trainees may complete this study unit in a minimum of 104 weeks. By the completion of advanced training, trainees will demonstrate competency across all the ANZCA Roles in Practice, the ANZCA Clinical Fundamentals and specialised study units. They will be able to assume a leadership role in multidisciplinary teams where appropriate, and demonstrate a commitment to the safe and ethical care of patients and others in the dynamic and complex environments in which they work.
- Provisional fellowship training (PFT) – trainees may complete provisional fellowship training in a minimum of 52 weeks and a consultant level of practice is expected by the end of this training period. While provisional Fellows will continue to develop across all ANZCA Roles in Practice, there will be choice available as to the development of special expertise in an ANZCA role or roles or in sub-specialised areas of practice. Provisional Fellows include clinical work as a minimum of 20 percent of their training time unless otherwise approved by the director of professional affairs (assessor), and participate in the College's Continuing Professional Development Program. They will be actively involved in the teaching and assessment of junior colleagues[2].

Trainee demographics

The NHWDS data is used herein to define trainees – those that have identified as specialist-in-training (SIT) (Appendix 3). The following tables make comparisons with the data supplied from ANZCA and that from the NHWDS, as expected there is some variability between these two data sets. Data supplied by ANZCA provides the total number of trainees by training level by state and territory for 2014. Table 3 includes all trainees from introductory training (IT) to provisional fellowship training (PFT); in 2014 there were a total of 1069 trainees.

Table 3. Trainees (Headcount) by training level, age group

Age	Year 0.5 (IT)	Year 0.5- 2 (BT)	Year 3-4 (AT)	Year 5 (PFT)	Total
25-29	102	95	51	3	**251**
30-34	61	128	285	88	**562**
35-39	21	34	90	31	**176**
40-44	5	14	29	5	**53**
45-49	1	5	7	3	**16**
50-54	0	2	6	0	**8**
55+	0	0	0	0	**0**
Total	**192**	**279**	**468**	**130**	**1,069**

Source: ANZCA, 2014

[2] Anaesthesia Training Program Curriculum, December 2014, ANZCA

Table 4 details the trainees by age group, gender and self-reported training year according to the NHWDS. The main trend that can be seen is that trainees are predominantly in the 30-34 age group (51.5 percent of total), and that there is a near even amount of female trainees (44 percent of total).

Table 4. Trainees (headcount) by age (group), gender and training year (current year of training program)

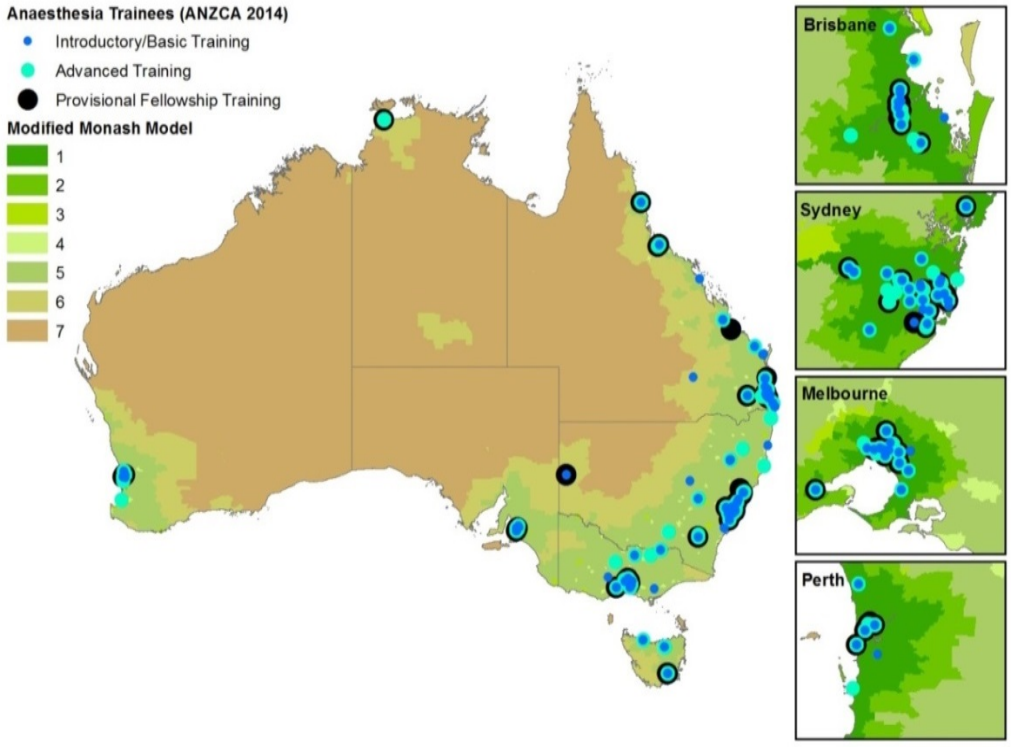
Age	1st	2nd	3rd	4th	5th	6th	7th	8th	Unknown/ NA	Total
Male										
20-25	1	0	0	0	0	0	0	0	0	**1**
25-29	49	33	15	4	0	0	0	0	1	**102**
30-34	44	50	66	72	42	5	0	1	5	**285**
35-39	19	16	23	26	34	6	1	3	4	**132**
40-44	7	7	6	15	11	3	1	3	2	**55**
45-49	2	4	4	3	4	0	1	0	0	**18**
50-54	1	0	1	1	1	0	0	4	0	**8**
60-64	0	0	0	0	0	0	0	0	1	**1**
Total	**123**	**110**	**115**	**121**	**92**	**14**	**3**	**11**	**13**	**602**
Female										
20-25	3	0	0	0	0	0	0	0	0	**3**
25-29	52	32	17	2	2	0	0	0	0	**105**
30-34	35	48	65	71	58	3	3	1	5	**289**
35-39	3	10	16	13	22	4	2	2	2	**74**
40-44	0	2	4	2	4	2	0	1	0	**15**
45-49	0	1	1	3	1	0	0	1	0	**7**
50-54	0	0	0	0	0	2	0	1	0	**3**
60-64	0	0	0	0	0	0	0	0	0	**0**
Total	93	93	103	91	87	11	5	6	7	**496**
Grand Total	**216**	**203**	**218**	**212**	**179**	**25**	**8**	**17**	**20**	**1,098**

Unknown/not stated are included in these totals.

Source: NHWDS, Medical Practitioner 2014

The following diagram (Figure 15) gives a visual overview of the location of anaesthesia trainees, by their training level at a point in time.

Figure 15. Distribution of anaesthesia trainees by level and location



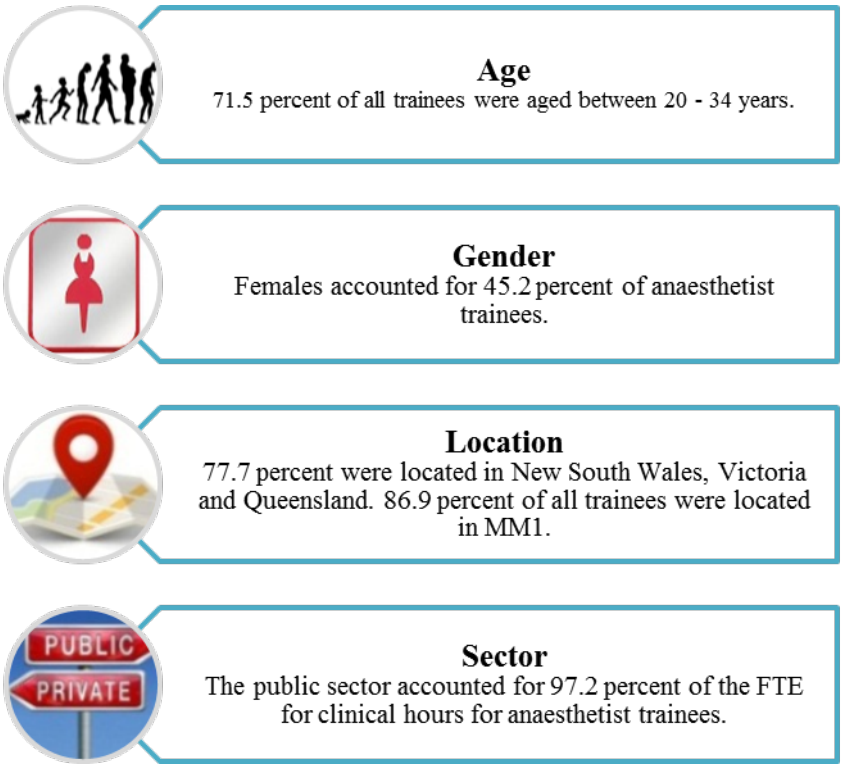
Source: ANZCA, 2014

For the purposes of modelling, DoH has used a combination of data from the ANZCA and the NHWDS: Medical Practitioner 2014 survey, noting that there are variances between these data sources. This is largely due to the self-reported nature of the medical workforce survey data. In comparison to the ANZCA data, the 2014 medical workforce survey data reported a slightly higher (2.8 percent) number of anaesthesia trainees. There are a number of factors for this, including that not every practitioner fills out the survey and each data set has a different collection time point/ cut-off, which will affect the number of trainees entering and exiting the training program in a given year.

The number of trainees by training level is also collected through the Medical Training Review Panel (MTRP) data collection each year from medical colleges and reported on in the MTRP Report. There are differences in the numbers in this report and the MTRP as the latter captures the number of trainees as at 30 June each year.

According to the 2014 NHWDS, there were 1,098 anaesthesia trainees in Australia, with the following characteristics:

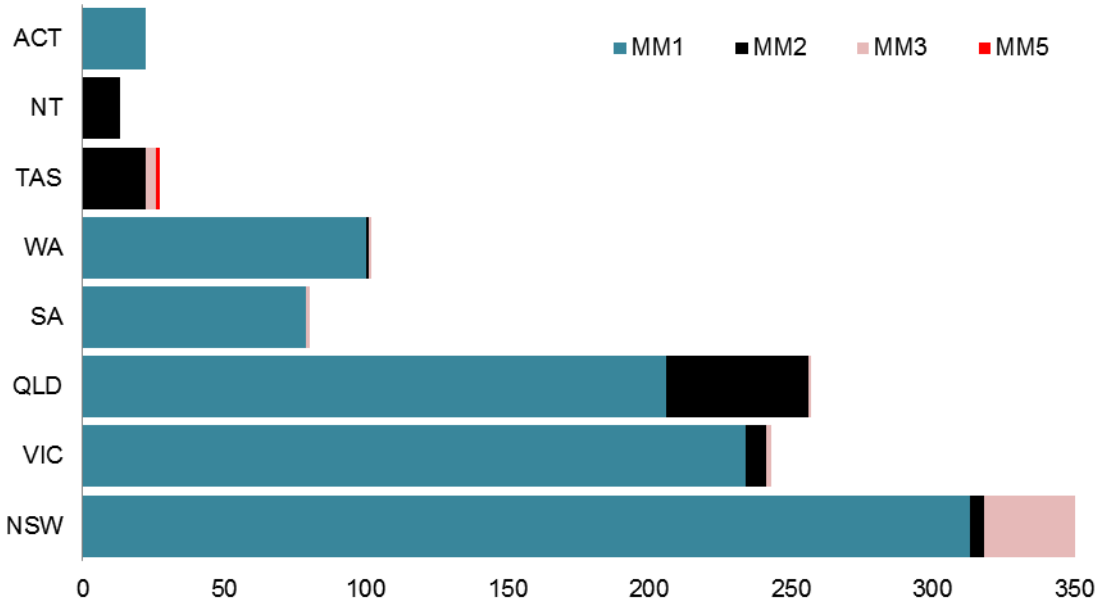
Figure 16. Demographics of the anaesthetist trainees in 2014



Source: NHWDS, Medical Practitioner 2014

Figure 17 outlines the distribution of trainees and shows that the large majority of trainees (87 percent) are located in major cities (MM1). The MM2 category was the second largest; accounting for 9 percent of trainees, with this group being the largest for TAS and NT. The state with the largest number of trainees within the MM2 category is QLD; whereas NSW had the second largest group in the MM3 category. This shows the majority of trainee positions are still located in major cities.

Figure 17. Trainees by state and territory and MMM



Source: NHWDS, Medical Practitioner 2014

Table 5 details the trainees (FTE) by location, current year of training and sector. Nationwide public sector based traineeships are still the dominant sector at 94 percent, with ACT, TAS and NT having only public sector based traineeships.

Table 5. Trainee FTE (total hours) by training year and sector

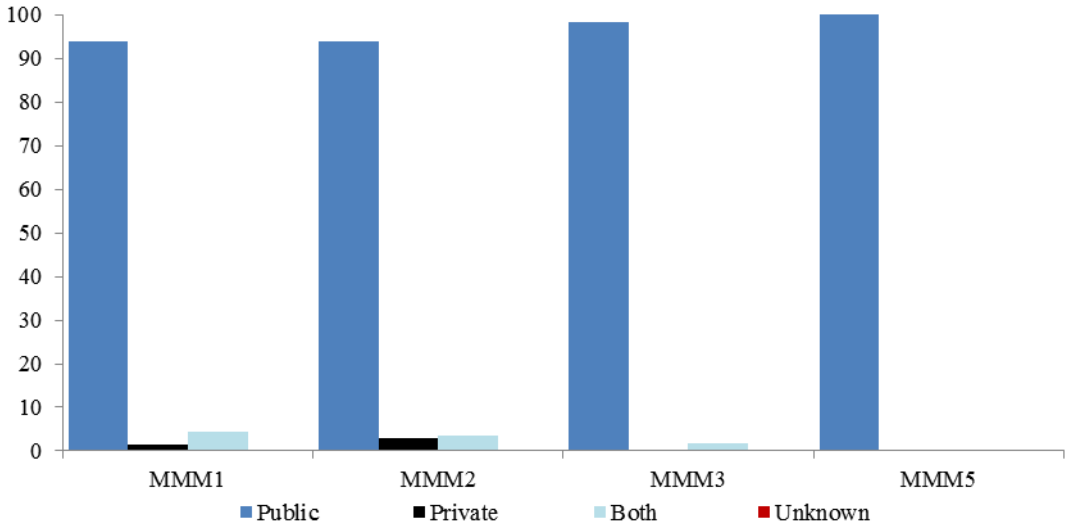
State	Sector	1st	2nd	3rd	4th	5th	6th	7th	8th	*	Total
NSW	Public	94.2	91.8	78.4	74.6	68	12.6	2.4	6.1	5.7	433.5
	Private	1.5	0	3	0	0	0	0	0	0	4.5
	Both	0	5.9	3	2.9	2.9	0	0	0	0	14.6
VIC	Public	52.3	49.2	51.1	49.2	48.4	5.3	3.4	2	8.2	268.9
	Private	1	0	1	0	0	0	1.1	0	0	3
	Both	1.8	4.1	4.2	1.3	1.8	0	0	0	1.5	14.5
QLD	Public	48.8	44.1	55.5	64.3	42	6	1	2.8	2.7	267.1
	Private	1	0.6	1	1	3.6	0	0	0	0	7.1
	Both	2.9	1.1	4.2	5	0	1.2	0	0	0	14.3
SA	Public	20.8	17.8	17.6	14.3	15.5	0	1.2	3.2	0	90.2
	Private	0	0	0	0	1.4	0	0	0	0	1.4
	Both	0	3.1	0	0	0	0	0	0	0	3.1
WA	Public	18.1	19.2	23.6	21.6	11.4	4.3	0	5.3	3.1	106.5
	Private	0	0	0	1.1	1.9	0	1	0	0	4
	Both	0	0	2.8	1.6	2.5	0	0	0	0	6.9
TAS	Public	12.2	4.8	4.4	5.8	3.1	0	0	0	0	30.3
	Private	0	0	1	0	0	0	0	0	0	1
	Both	0	0	0	0	0	1.2	0	0	0	1.2
NT	Public	1	1.8	4.2	0	4.5	0	0	0	0.8	12.1
	Both	0	0	0	1.4	0	0	0	0	0	1.4
ACT	Public	6.4	2.3	10.4	2.5	6.1	0	0	0	0	27.5
Australia	Public	253.6	230.8	245.1	232.3	198.7	28.2	8	19.2	20.3	1236.1
	Private	3.5	0.6	5.9	2.1	6.8	0	2	0	0	20.9
	Both	4.6	14.2	14.2	12.2	7.1	2.3	0	0	1.5	56
	% Public	19.30%	17.60%	18.70%	17.70%	15.10%	2.10%	0.60%	1.50%	1.50%	94.10%
	% Private	0.30%	0.00%	0.40%	0.20%	0.50%	0.00%	0.20%	0.00%	0.00%	1.60%
	% Both	0.40%	1.10%	1.10%	0.90%	0.50%	0.20%	0.00%	0.00%	0.10%	4.30%

Source: NHWDS, Medical Practitioner 2014

The proportion of trainees by MMM (Figure 18) also adds to the view that public sector based traineeships is dominant, including in all MM categories, with private sector traineeships mostly being available in major cities or inner regional areas.

It should be noted that if training was devolved to rural areas ANZCA has indicated that trainees will have trouble with case mix and volume of practice of sufficient complexity to complete specialty training.

Figure 18. Proportion of trainee FTE by geographic distribution (MM) and sector



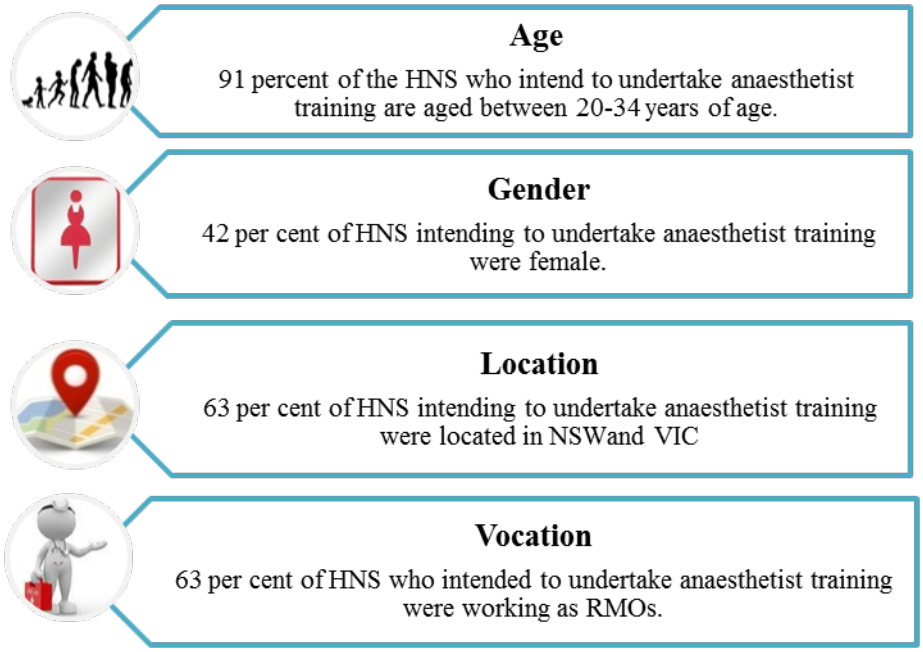
Source: NHWDS, Medical Practitioner 2014

Prevocational intentions

In 2013, a new question was included in the Medical Practitioner workforce survey which identifies those who intend to undertake vocational training. The information collected from this questions forms part of the future planning process of having an indicative number of the future intentions of trainees (Appendix 3).

Figure 19 details the characteristics of the 421 hospital non-specialists (HNS) who intend to undertake anaesthesia training, according to the 2014 NHWDS:

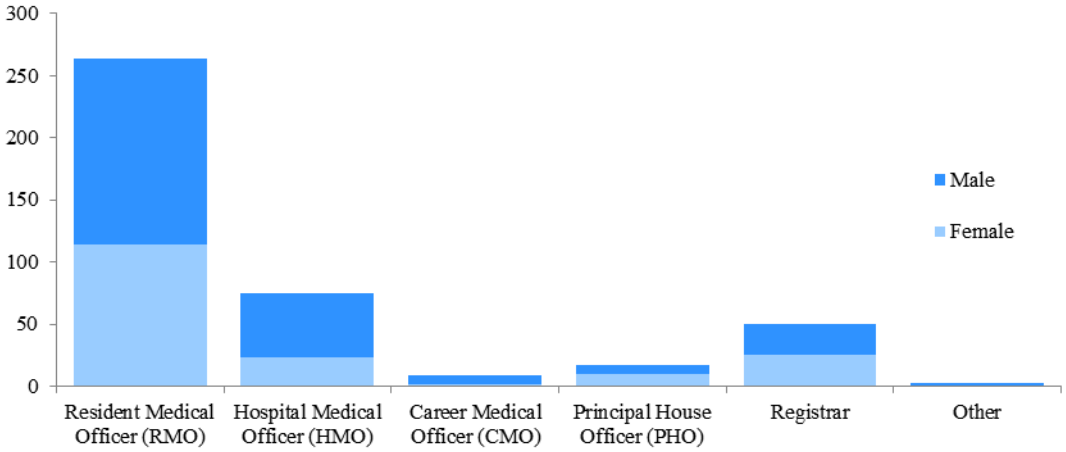
Figure 19. Characteristics of HNS who intend to undertake anaesthetist training



Source: NHWDS, Medical Practitioner 2014

The primary group of HNS who wish to undertake anaesthesia training are Resident Medical Officers, followed by Hospital Medical Officers and Registrars (Figure 20).

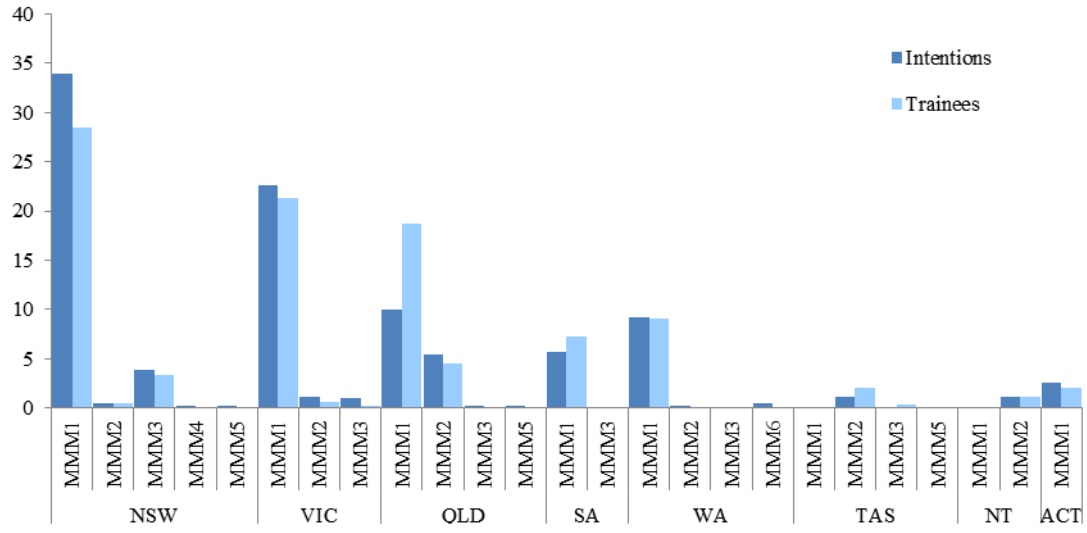
Figure 20. HNS who intend to undertake specialist anaesthetist training by vocation



Source: NHWDS, Medical Practitioner 2014

Similar to the location of trainees in Figure 15 and Figure 17, it appears that the intention of trainees and HNS are to train primarily in major cities. States such as QLD, NT and TAS with large MM2 numbers and NSW with large MM3 numbers also have proportionally the same amount of trainees who want to train in these locations as seen in Figure 21. This may show that trainees who may wish to train in very remote or regional locations are limited by the opportunities available with most new trainees and existing trainees being concentrated in specific public hospitals located in existing areas.

Figure 21. Proportion of trainees by geographic distribution (MM) and sector



Source: NHWDS, Medical Practitioner 2014

Summary of total workforce by remoteness classification

Table 6 is a broad summary of the population and remoteness characteristics of the anaesthetist workforce. As can be seen the number of anaesthetists and trainees are highest in areas with the most population. The number of anaesthetists and trainees per 100,000 population is 26.1 in MM1 areas, 22.2 in MM2 areas and 17.0 in MM3 areas.

The level in MM6 areas is only 4.5, for MM4 there is only 1.3 and only 0.5 anaesthetists and trainees per 100,000 population in MM5 categories.

Table 6. Summary of anaesthetist's workforce (Headcount and FTE) by MM

State & Territories	Modified Monash Category	2014 population	Specialists and trainees (headcount)	Headcount per 100,000 population	Specialists and trainees (FTE)	FTE per 100,000 population
AUST	**1**	16,611,193	4,342	26.1	4,435	26.7
	2	2,167,671	482	22.2	502	23.2
	3	1,531,627	261	17.0	269	17.6
	4	869,540	11	1.3	11	1.2
	5	1,776,229	9	0.5	6	0.4
	6	313,323	14	4.5	13	4.2
	7	221,153	0	0.0	0	0.0
	Grand Total	**23,490,736**	**5,119**	**21.8**	**5,235.89**	**22.3**

Note – Trainee FTE is based on clinical hours and specialist FTE is based on total specialist hours.

General Practitioners providing anaesthesia services

Background

It is important that General Practitioners (GP) are able to offer anaesthesia services in rural areas where there is no ongoing specialist cover available. It means that a general practitioner is able to offer this service to their community to avoid patients having to travel to larger regional centres to access surgery.

GP anaesthesia training is administered by the Joint Consultative Committee on Anaesthesia (JCCA). This is a tripartite committee with representatives from the Australian and New Zealand College of Anaesthetists (ANZCA), the Royal Australian College of General Practitioners (RACGP- Rural) and the Australian College of Rural and Remote Medicine (ACRRM). It sets the standards, monitors and examines GP registrars from the rural training stream of the RACGP and ACRRM who are completing a 12 month skills post in anaesthesia using the Curriculum Statement in Anaesthesia for advanced rural skills and advanced specialised training as the basis of the training. This training includes –

- A twelve month training period in a JCCA-accredited post
- A satisfactory report from the director of the training department. Registrars must produce this satisfactory report of training from their supervisor before they are permitted to sit for the examination.
- Success in the JCCA examination.

Upon successful completion of training, these GPs are considered suitable to offer services to patients in the ASA1-3 rating categories, with some in the ASA3 category after appropriate assessment.

The total of GP anaesthetists' included in this section under-represents the number of GP anaesthetists currently practising. Since the JCCA commenced its training in 1992 approximately 600 GPs have been trained to offer this service. The range of procedures covered are more than those listed above as GPs can comfortably assist with other essential services that are not captured by MBS item numbers such as emergency medicine, airway management, retrieval preparation and pain management.

Furthermore, the number of anaesthetics provided in rural and remote areas by GP anaesthetists may be higher than the number recognised by this method. The discrepancy could, in part, be due to the different funding model used for the provision of services in many areas, including salaried medical positions in many rural and remote areas of Western Australia and Queensland. The fee for service model is underrepresented in public hospitals, which are the predominant mode of delivering healthcare in rural and remote areas.

The NHWDS combines the AHPRA registration data with workforce survey data. A more complete picture of GP anaesthetists could be achieved if the JCCA qualification were included on the AHPRA registration system and made available for the NHWDS.

Current MBS services

The Medicare Benefits Schedule (MBS) data is able to provide a partial picture of the GP anaesthetist workforce. This only includes GPs who have a Medicare provider

number and bill Medicare for the anaesthetics service. This does not include services provided in a public hospital.

The definition of a GP anaesthetist is based on the Medical Benefits Division Derived Medical Specialty (DMS), whereby each doctor's derived major specialty is determined taking into consideration both their medical qualifications (relevant registered specialties) and their service pattern, and is based on the provider's main area of practice each quarter.

Table 7 provides the number of MBS services provided by anaesthetists and GPs delivering anaesthetic services in 2013 GPs provided 6.7 percent of services and in 2014 this decreased slightly to 6.3 percent, The MBS services delivered by Specialist Anaesthetists increased by 5.7 percent from 2013 to 2014, with the GP services decreasing by 0.8 percent.

Table 7. MBS items billed in 2013 & 2014

Year	Specialist anaesthetist*	GP anaesthetist **	Total Services	Percentage services delivered by GP
2013	4,993,644	358,342	5,353,999	6.7%
2014	5,279,720	355,440	5,637,174	6.3%

Figure 22 and Table 8 provides a geographical representation of GP Anaesthetists providing services in Australia by jurisdiction. Table 8 indicates that whilst the highest headcount in numbers are based in NSW and QLD, VIC provides the 40 percent of the GP Anaesthetic claimed services.

Figure 22. General Practitioner anaesthetist

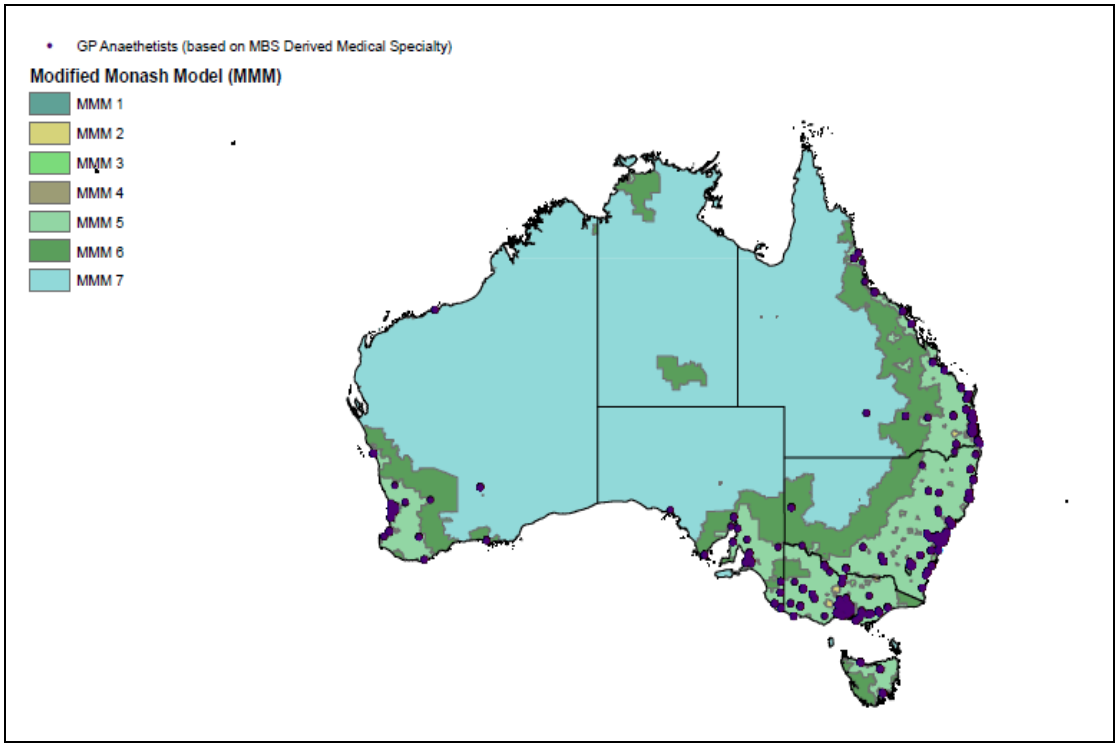


Table 8. Headcount GP anaesthetist by state and number of services provided

State	Headcount	Services
Australian Capital Territory	8	17,849
New South Wales	89	96,708
Queensland	64	64,204
South Australia	21	5,335
Tasmania	*	1,925
Victoria	63	141,877
Western Australia	31	27,542
Total	-	355,440

Table 9 shows the top ten items claimed by GP Anaesthetists of the 335,440 services provided. Item 17610 for pre-anaesthesia consultations covered 52 percent of all services, with item numbers 20740, 20810 and 20940, which covered initiation of management, all sitting around 16 percent to 10 percent of services.

Table 9. Summary of the top ten items claimed by GP anaesthetist

MBS items (top ten items)	Services
17610 - ANAESTHETIST, PRE-ANAESTHESIA CONSULTATION	169,263
20740 - INITIATION OF MANAGEMENT OF ANAESTHESIA for upper gastrointestinal endoscopic procedures	52,803
20810 - INITIATION OF MANAGEMENT OF ANAESTHESIA for lower intestinal endoscopic procedures	49,599
20940 - INITIATION OF MANAGEMENT OF ANAESTHESIA for per vagina and vaginal procedures (including biopsy of vagina, cervix or endometrium), not being a service to which another item in this Subgroup applies	34,131
17615 - a consultation on a patient undergoing advanced surgery or who has complex medical problems, involving a selective history and an extensive examination of multiple systems and the formulation of a written patient management plan documented in the patient notes	6,786
22900 - INITIATION OF MANAGEMENT BY A MEDICAL PRACTITIONER OF ANAESTHESIA for extraction of tooth or teeth with or without incision of soft tissue or removal of bone	6,450
20142 - INITIATION OF MANAGEMENT OF ANAESTHESIA for lens surgery	3,274
22012 - BLOOD PRESSURE MONITORING (central venous, pulmonary arterial, systemic arterial or cardiac intracavity), by indwelling catheter - once only for each type of pressure on any calendar day, up to a maximum of 4 pressures (not being a service to which item 13876 applies) when performed in association with the administration of anaesthesia	2,216
22905 - INITIATION OF MANAGEMENT OF ANAESTHESIA for restorative dental work	1,687
20100 - INITIATION OF MANAGEMENT OF ANAESTHESIA for procedures on the skin, subcutaneous tissue, muscles, salivary glands or superficial vessels of the head including biopsy, not being a service to which another item in this Subgroup applies	1,373
Total	**327,582**

Table 10 shows that of the GP Anaesthetist workforce that provide services, 57.6 percent are based in MM1 and provided over 78 percent of the services, with the next highest being in MM3 with 15 percent of the headcount and 10 percent of services.

Table 10. headcount and services of GP anaesthetist by Modified Monash Model

MMM	Headcount	Headcount %	Services	Service %
1	159	57.6%	279,898	78.7%
2	16	5.8%	17,435	4.9%
3	42	15.2%	35,153	9.9%
4	39	14.1%	15,654	4.4%
5	21	7.6%	6,230	1.8%
6	*		1,055	0.3%
7	*		15	0.0%
Total	**-**		**355,440**	**100%**

Table 11 shows that of the 279,898 services in MM1 the services by items numbers closely align with those in table 9, with over 50 percent of services provided under the 17610 items and item numbers 20740, 20810 and 20940, which cover initiation of management, all sitting around the 17 to 13 percent of services provided.

Table 11. MBS item claimed by MM1

MBS item - MMM1 GP Anaesthetists	Services
17610 - ANAESTHETIST, PRE-ANAESTHESIA CONSULTATION	132,953
20740 - INITIATION OF MANAGEMENT OF ANAESTHESIA for upper gastrointestinal endoscopic procedures	43,851
20810 - INITIATION OF MANAGEMENT OF ANAESTHESIA for lower intestinal endoscopic procedures	40,122
20940 - INITIATION OF MANAGEMENT OF ANAESTHESIA for per vagina and vaginal procedures (including biopsy of vagina, cervix or endometrium), not being a service to which another item in this Subgroup applies	32,289
22900 - INITIATION OF MANAGEMENT BY A MEDICAL PRACTITIONER OF ANAESTHESIA for extraction of tooth or teeth with or without incision of soft tissue or removal of bone	5,029
17615 - a consultation on a patient undergoing advanced surgery or who has complex medical problems, involving a selective history and an extensive examination of multiple systems and the formulation of a written patient management plan documented in the patient notes	3,878
22012 - BLOOD PRESSURE MONITORING (central venous, pulmonary arterial, systemic arterial or cardiac intracavity), by indwelling catheter - once only for each type of pressure on any calendar day, up to a maximum of 4 pressures (not being a service to which item 13876 applies) when performed in association with the administration of anaesthesia	2,171
22905 - INITIATION OF MANAGEMENT OF ANAESTHESIA for restorative dental work	1,501
20142 - INITIATION OF MANAGEMENT OF ANAESTHESIA for lens surgery	479
20100 - INITIATION OF MANAGEMENT OF ANAESTHESIA for procedures on the skin, subcutaneous tissue, muscles, salivary glands or superficial vessels of the head including biopsy, not being a service to which another item in this Subgroup applies	404
Total	262,677

Workforce projections

Supply

Health professionals who are registered as an anaesthetist through the Australian Health Practitioner Regulation Agency (AHPRA) have been identified using the National Health Workforce Data Set (NHWDS), which includes registrant data and other characteristics obtained through the voluntary medical workforce survey as shown in the demographic data in the sections above.

In this analysis, only those who were registered/accredited, employed clinicians in 2014 are included (i.e. does not include those in the categories of administration, teacher/educator, researcher and 'others'). Health professionals who are hospital non-specialists (HNS) or specialists-in-training (SIT) with intentions of entering anaesthesia training, or working towards the specialisation, are excluded at this point of modelling.

Please see Appendix 2 and 3.

Demand

The demand forecasts use a combination of Acute Inpatient Hospital and Medicare Benefits Schedule (MBS) data to measure increases/decreases in demand for Anaesthesia on a per capita basis. The acute inpatient hospital data used to form the basis of the public component and the MBS data the private component. This utilisation is assigned accordingly to the hours reported by the Anaesthetists through the medical workforce survey, with consideration for additional capacity to work additional hours within the Profession. Projected patient utilisation takes into account population growth and ageing, as well as clinical trends, by projecting age and sex for Anaesthesia MBS services based on patient utilisation rates. The historical data uses the number of services and separations by age of patient captured as a quarterly time series and forecasts the resulting estimates multiplied by the estimated residential population3.

The utilisation rates are examined at the individual age group level and forecast using a series of exponential smoothing models. Forecasts for each individual age group have been generated using the SAS statistical package. Exponential smoothing has been chosen due to its successful use by DoH in forecasting MBS services for financial modelling purposes.

One area to consider on the demand side is that whilst the number of MBS episodes/services may be increasing over time, anaesthetists may also become more productive over time and able to do more work in fewer hours. This means an increase in services should not necessarily result in an increase of commensurate magnitude for FTE/headcount. However, ANZCA are of the view that with increased patient autonomy, assessment and consent takes longer, and more complex surgical procedures (for example, laparoscopic instead of open) take longer. At this stage there is no productivity changes factored in to the modelling method or the scenarios modelled. In the future, this can be objectively evaluated by investigating the temporal changes in the ratio of MBS services: episodes: anaesthetist FTE.

[3] Forecast services use ABS catalogue 3222 Population Projections Series B.

Projections

The projections conducted in this section have three different scenarios, the first utilises clinical hours only (B in Figure 7). This scenario is NOT recommended by DoH. This scenario is presented for comparison purposes only as it uses the same methodology as previous modelling. Please refer to the discussion in the 'Hours worked' section (page 15, 16 &17) regarding the issues associated with using total clinical hours for modelling individual specialties.

The second scenario utilises the total specialist hours (D in Figure 8 and Figure 9) which includes non-clinical specialist hours in the modelling. This more accurately represents the anaesthetic workforce.

The third scenario is based on the colleges view regarding the future movements of IMGS. The major assumption is that most of the current partially comparable IMGS (67) will complete their requirements and progress through to fellowship over the next three years resulting in a decrease in the total number of partially comparable IMGS and IMGS new Fellows in the future. The college has since indicated that not all of current cohort of partially comparable is expected to attain fellowship and therefore the alternative pipelining does not reflect this.

The pipelining analysis for this can be found in Table 17.

Interpretation of results for workforce position

It is acknowledged that projections and workforce supply and demand modelling are not an exact science and rely on various assumptions holding true, therefore it is recommended that the final workforce position be interpreted with an error margin of +/- 3%. That is, if the workforce is projected to be in under or oversupply to the magnitude of 3 percent or less, then the workforce is considered to be in balance.

Clinical Hours only scenario

The workforce projection results for anaesthesia utilising total clinical hours are shown in Table 12 below. Note, this scenario utilises the same methodology as previous modelling and is presented for comparison purposes only. Clinical hours do not provide a true picture of the workforce.

The initial year for the projections is 2016, and assumes that supply and demand is in balance in this year. The demand rate for anaesthesia is estimated to grow at 3.1 percent. The inflow of New Fellows uses the updated trainee pipeline methodology of the training pipeline, while the IMG new Fellows are assumed to remain static over the same time period (albeit a percentage of the total new Fellows).

The following scenario indicates that by using total clinical hours the workforce will be in a small undersupply of 0.3% by 2030.

The demand is equal in all three scenarios to simplify the modelling results and to provide a baseline of comparison between the two methods. No scenarios have been produced where demand for anaesthetists has been impacted.

Table 12. Anaesthetists: Total Clinical Hours Scenario

Headcount	2016	2018	2020	2025	2030
Supply	**4,021**	**4,139**	**4,411**	**5,073**	**5,669**
New fellows	166	152	154	159	166
IMGS new fellows	41	57	58	60	63
Exits (% of supply)	2.91%	1.83%	1.82%	1.78%	1.99%
Demand	**4,021**	**4,112**	**4,364**	**5,015**	**5,686**
Excess/Shortfall	-	**27**	**47**	**58**	**- 17**

Total specialist hours scenario

Whilst the projections in Table 12 are based on total clinical hours, the following scenario in Table 13 utilises total specialist hours which incorporates both clinical and non-clinical hours (D) worked in anaesthesia. Modelling has been historically conducted using total clinical hours; however due to feedback from stakeholders and improvements in data quality, totals specialist hours are now used. This also better reflects the demand model method.

The College has indicated that the specialist hours scenario is potentially too narrow, as it may not adequately provide a picture of the number of anaesthetists required to undertake the full scope of practice in which anaesthetists are employed. As discussed in the 'Hours worked' section, 9 percent (360) of anaesthetists worked hours in anaesthesia and in another specialty.

The projections indicate that the workforce would be in an oversupply during the whole projection period. By 2030 this oversupply is approximately 1.6 percent of the required number.

Table 13. Anaesthetists: Total Specialist Hours Scenario

Headcount	2016	2018	2020	2025	2030
Supply	**4,021**	**4,240**	**4,501**	**5,155**	**5,776**
New fellows	166	152	154	159	166
IMGS new fellows	41	57	58	60	63
Exits (% of supply)	2.91%	1.83%	1.82%	1.78%	1.99%
Demand	**4,021**	**4,112**	**4,364**	**5,015**	**5,686**
Excess/Shortfall	-	**128**	**137**	**140**	**91**

Reduced migration scenario

The following scenario in Table 14 represents what the College anticipates will unfold in relation to the current bottleneck of partially comparable IMGS after the change in regulations and a reduction in migration. This scenario also utilises total specialist hours. The projected number of IMGS in Table 12 and Table 13 use the historical observed transition rates for this cohort, however, the College has indicated that the current bottleneck will be reduced over the next three years, which translates into a decrease of IMGS Fellows from 2018.

To account for this scenario, an alternate training pipeline was conducted (shown in Table 17). The projections indicate that by 2030 the workforce is in balance, with approximately 0.5% more than the required number of anaesthetists.

Table 14. Anaesthetists: College Scenario Reduction to Migration

Headcount	2016	2018	2020	2025	2030
Supply	**4,021**	**4,259**	**4,525**	**5,147**	**5,712**
New fellows	166	152	154	159	166
IMGS new fellows	43	63	55	51	51
Exits (% of supply)	2.91%	1.83%	1.83%	1.80%	2.03%
Demand	**4,021**	**4,112**	**4,364**	**5,015**	**5,686**
Excess/Shortfall	-	**147**	**163**	**131**	**26**

Ongoing monitoring

These supply and demand projections are only the first step of the process in determining supply and capacity. The next step is determining the training pathway and trajectory. The development of such a training plan begins to unpick the issues and recognise the drivers and/or barriers that a long term plan will need to address to maintain adequate supply to meet demand in the future. This will also be closely monitored by continually adjusting the modelling projection to address policy changes and other government initiatives that are likely to impact on the supply and demand for anaesthesia. It, however, does not factor in unmet demand.

Training pipeline

The purpose of the training pipeline analysis is to project future vocational training numbers entering the training program as a basis for forecasting the number of domestic and IMGS new Fellows as inflows into the workforce projections.

Table 15 shows the predicted movement of trainees from Stage 1 right through to becoming a new Fellow (Domestic or IMGS) in a dynamic pipeline. The College has indicated that they do not base transitions on a year-to-year basis. Therefore, the methodology tries to focus on moving through the training levels rather than on a yearly basis. It is still based on historical movements that have been reported in the MTRP, combined with data requested from the College to assist in more accurately determining the movement. In the future, when data over more time points have been collected from the College, more accurate transition rates can be calculated.

Table 15. Training pipeline transitions/churn

Movements	Percent	Comments
New intake	41%	Percent of previous years basic trainees
Introductory Training to Introductory Training	10%	
Introductory Training to Basic Training	84%	
Basic Training to Basic Training	39%	
Basic Training to Advanced Training	55%	
Advanced Training to Advanced Training	68%	
Advanced Training to Provisional Fellowship Training	32%	

Movements	Percent	Comments
Provisional Fellowship Training to Provisional Fellowship Training	20%	
Provisional Fellowship Training to New Fellow	79%	
Retention rate	93.9%	Introductory Training
	94.1%	Basic Training
	99.6%	Advanced Training
	99.5%	Provisional Fellowship Training
Through rate	87.8%	If everyone FT and complete in 60 months
	68.6%	Actual (incorporates PT, waiting for rotation etc.)
IMGS	8%	Of total domestic trainees
Partially comparable	65%	Of IMGS
Substantially comparable	35%	Of IMGS
IMGS new fellow	55%	Percent of IMGS in previous year

The transition rates in Table 15 are data driven and calculated from the changes between two time points (2013 MTRP data and 2014 ANZCA data). These rates are then consistently applied to pipeline trainees and IMGS. This results in somewhat of a bottleneck of partially comparable IMGS in the system (Table 16).

Currently, there is a legacy of partially comparable IMGS in the pipeline who have not been able to progress through the pathway to fellowship.

ANZCA is in the process of amending its IMGS pathway regulations which may have the effect of reducing the size of this cohort in the future. These regulation changes involve providing more emphasis on workplace based assessments rather than examination. In effect, this will ensure a method for these IMGS to obtain fellowship and will result in a temporary spike in IMG new Fellows.

Furthermore, although historically the number of IMGS new Fellows has ranged from 50-71, ANZCA anticipate a steady decrease in numbers over time. As stated previously the college has since indicated that not all of current cohorts of partially comparable are expected to attain fellowship and therefore the alternative pipelining does not reflect this.

If anaesthesia is removed from the Skilled Occupation List (SOL) this may also have an impact in reducing IMGS applications. As such, ANZCA anticipate the assumed level and continued increase in IMGS is unlikely and expects a different training pipeline will transpire.

To account for this scenario (Table 14) an alternative training pipeline was conducted with the following changes to IMGS:

Substantially comparable

- From 2015 onwards the intake of substantially comparable IMGS has been fixed to 36 (the actual number in 2014)
- From 2015 onwards, 95% of the substantially comparable IMGS obtain fellowship each year

Partially comparable

- From 2015 onwards the intake of partially comparable IMGS has been fixed to 15 (just under half the historical trend)
- In 2015 and 2016, 10% of the partially comparable IMGS obtain fellowship each year
- From 2017 onwards, 45% of the partially comparable IMGS obtain fellowship each year (this equates to almost all moving through within 24 months).

The results of this alternative training pipeline are presented in Table 17.

Table 16 below shows the method for the new intake each year. This pipeline takes a percentage of the total number of basic trainees (which has a more historic basis and is projected forward); while it is also linear, the number of new Fellows has a more gradual increase. The following observations of the trainee pipeline have been made:

Table 16. Trainee pipeline analysis, 2008 – 2030

Old curriculum	New curriculum in 2013	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
New intake (start year and midyear intake)								223	226	228	230	232	234	236	238	240	242	244	246	248	250	252	254	256
BTY1	Intro (0.5 year) Basic (0.5 years)	197	169	256	280	314	281	247	249	251	253	255	257	259	261	264	266	268	270	272	275	277	279	282
BTY2	Basic (1 year)	213	340	262	319	301	275	305	308	310	313	315	318	321	323	326	329	331	334	337	340	342	345	348
TOTAL Basic trainees		**410**	**509**	**518**	**599**	**615**	**555**	**552**	**557**	**561**	**566**	**571**	**575**	**580**	**585**	**590**	**594**	**599**	**604**	**609**	**614**	**619**	**625**	**630**
ATY1 & ATY2	Advanced (2 years)			394	387	402	438	489	491	493	496	500	503	507	511	515	519	523	528	532	536	541	545	550
ATY3 & ATY3E & PFP	PFT (1 year)			185	224	207	219	191	192	193	194	195	197	198	200	201	203	204	206	208	209	211	213	215
TOTAL Advanced trainees		**463**	**485**	**579**	**611**	**609**	**657**	**680**	**683**	**686**	**690**	**695**	**700**	**705**	**710**	**716**	**722**	**728**	**734**	**740**	**746**	**752**	**758**	**764**
Substantially comparable					41	41	44	36	36	36	37	37	37	38	38	38	38	39	39	39	40	40	40	41
Partially comparable					32	38	30	67	67	68	68	69	69	70	70	71	72	72	73	73	74	75	75	76
Total IMGS					73	79	74	103	104	104	105	106	107	107	108	109	110	111	112	113	114	115	116	117
Domestic new fellows				**181**	**152**	**179**	**200**	**166**	**151**	**152**	**153**	154	155	156	157	158	159	160	162	163	164	166	167	168
IMGS new fellows				62	71	50	56	41	57	57	58	58	59	59	60	60	60	61	61	62	62	63	64	64
Total New Fellows			**197**	**243**	**223**	**229**	**256**	**207**	**208**	**210**	**211**	**212**	**213**	**215**	**216**	**218**	**220**	**221**	**223**	**225**	**227**	**229**	**231**	**232**

2008 to 2014 data is historical data from MTRP/ANZCA (2013 to 2018 shows the minimum time to complete training with the historical rates applied to these future projections).

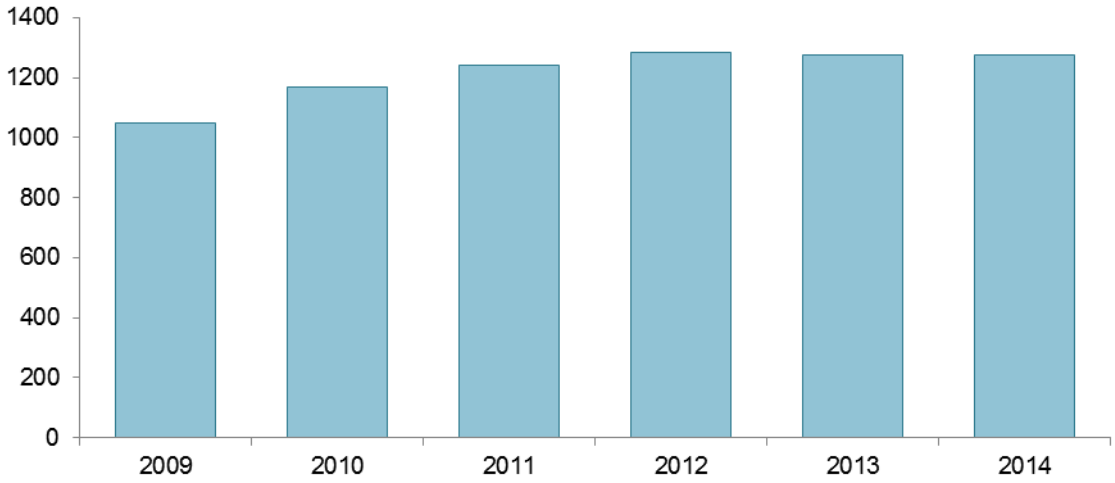
MTRP ***College data*** ***Calculated***

Table 17. Alternate trainee pipeline analysis, 2008 – 2030

Old curriculum	New curriculum in 2013	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
New intake (start year and midyear intake)								223	208	212	214	217	220	222	225	227	230	233	236	239	241	244	247	250
BTY1	Intro (0.5 year) Basic (0.5 years)	197	169	256	280	314	281	229	233	236	238	241	244	247	250	253	256	259	262	265	269	272	275	282
BTY2	Basic (1 year)	213	340	262	319	301	275	288	290	293	297	301	304	308	311	315	319	323	327	330	334	338	342	348
TOTAL Basic trainees		**410**	**509**	**518**	**599**	**615**	**555**	**552**	517	523	529	535	542	548	555	561	568	575	582	589	596	603	610	617
ATY1 & ATY2	Advanced (2 years)			394	387	402	438	476	474	474	476	478	482	487	492	497	502	508	514	520	526	532	539	550
ATY3 & ATY3E & PFP	PFT (1 year)			185	224	207	219	190	187	186	185	186	187	188	190	192	194	196	198	200	202	205	207	215
TOTAL Advanced trainees		**463**	**485**	**579**	**611**	**609**	**657**	**680**	667	661	660	661	664	669	675	681	688	696	704	712	720	729	737	746
Substantially comparable					41	41	44	36	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
Partially comparable					32	38	30	67	75	83	61	48	42	38	36	35	34	34	34	33	33	33	33	33
Total IMGS					73	79	74	103	113	121	98	86	79	76	74	73	72	72	71	71	71	71	71	71
Domestic new fellows				**181**	**152**	**179**	**200**	**166**	148	148	146	145	144	145	145	147	148	149	151	152	154	156	158	160
IMGS new fellows				62	71	50	56	41	41	43	73	63	58	55	53	52	52	51	51	51	51	51	51	51
Total New Fellows			**197**	**243**	**223**	**229**	**256**	**207**	189	192	219	208	202	199	198	199	199	201	202	204	205	207	209	211

Figure 23 shows the total number of trainees from 2009 to 2014 from the MTRP reports. This historical increasing growth has stabilised over 2012-2014.

Figure 23. Number of basic and advanced trainees, 2010-2014

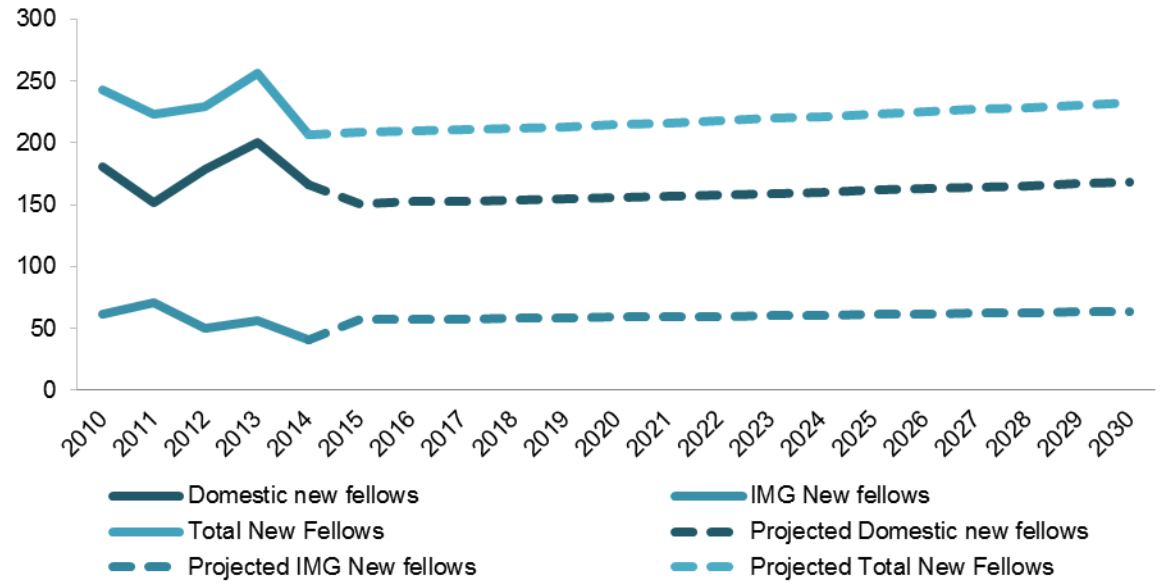


Source: MTRP 13th – 18th Reports (advanced trainees figure includes trainees completing Anaesthesia –pain medicine)

Results of pipelining

Figure 24 shows the historical number of domestic and IMGS new Fellows and the forecasted number of domestic and IMGS new Fellows, based on the above transition rates. The IMGS new Fellows have been estimated based on an average percentage of previous years IMGS and this percentage has been attributed to the number of domestic new Fellows.

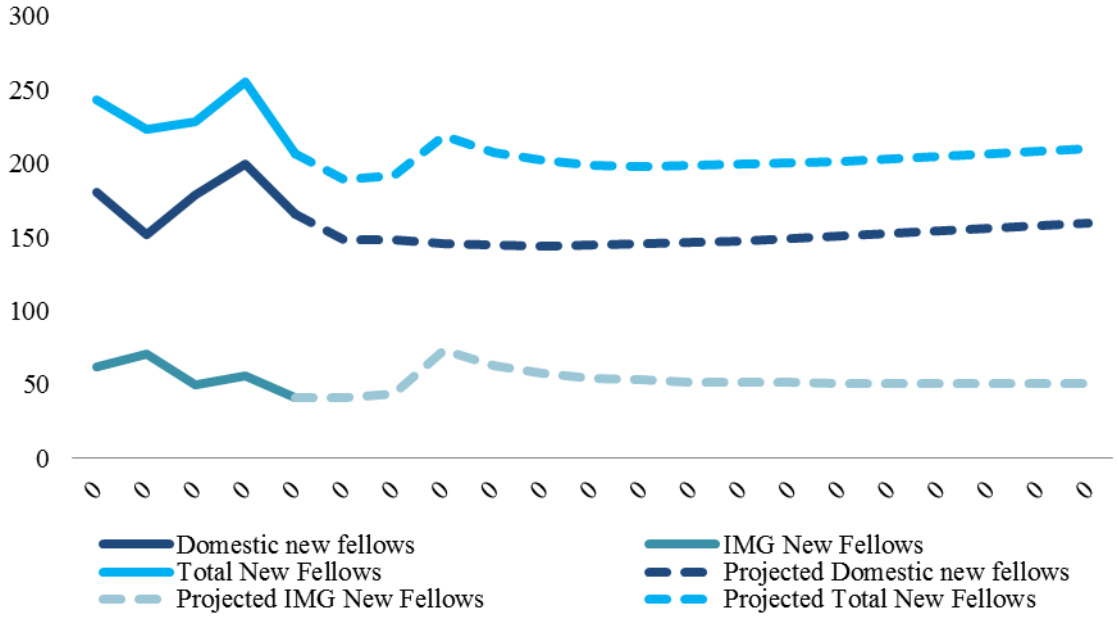
Figure 24. New Fellows pipeline projections



Source: MTRP reports and training pipeline projections based on historical trends

Figure 25 shows the historical number of domestic and IMGS new Fellows and the forecasted number of domestic and IMGS new Fellows, based on ANZCA's assumptions for an alternative training scenario.

Figure 25. Alternative new Fellows pipeline projections



Source: MTRP reports and training pipeline projections based on historical trends and ANZCA assumptions for an alternate scenario

Capacity and Distribution for Training

Vocational medical training is undertaken by most medical practitioners. The process of gaining a vocational training position is competitive, with training provided through the College. The vocational medical training pipeline enables the number of training positions required under various scenarios to be modelled. It provides a representation of the medical workforce from the graduate level through to anaesthesia specialty Fellowship. The model draws together the known flows and inter-dependencies at each stage of the medical education and training pipeline in a dynamic, system wide projection of each component over the period to 2030.

Graduate numbers are only one component of the medical education pathway, with many medical practitioners choosing to pursue vocational training. The vocational medical training pipeline analysis highlights that, based on the existing demand for specialist services being carried forward (and other factors such as the number of expected graduates and a continued migration flow being held constant), there will be more medical practitioners seeking a vocational training position than places available.

Training capacity also impacts on vocational medical training. It recognises training capacity pressures are increasing as the larger cohorts of medial graduates move from intern to prevocational to vocational training positions. This is reflected in the 30 percent in vocational training positions with 15,478 in 2011 moving to 20,069 by 2015 with unclear links to future workforce requirements and the continued reliance on IMGS places additional burden on the training capacity of the system.

The Commonwealth has continued to support the initiative to expand training capacity through the commitment to continue funding for the STP, which provides funding for specialist training positions in expanded settings for 900 training rotations a year in 2014 and to be continued to 2017.

However, the Commonwealth is only a small contributor to the overall number of training places nationally through funding of the STP posts. Responsibility for funding of and organising vocational training lies with many parties: jurisdictions (for post-graduate and specialist training in the public sector) and Colleges (who operate Australia and New Zealand wide). To add to the complexity, medical practitioners will often cross jurisdictional, sectoral, specialty college and international boundaries throughout their training pathway. As a result of the division of responsibilities and the potential myriad of individual medical practitioner's pathways, imbalances in the vocational training pipeline are complex to manage and resolve, and will require partnerships between governments, employers, the College and professional bodies.

Capacity Analysis

The projections reveal a workforce that is in balance with the potential to shift into oversupply if trainee numbers are increased or if there is not a decrease in International Medical Graduates (IMGS).

The number of prevocational medical practitioners who have indicated their intentions to train in anaesthesia (421) is quite large relative to the current annual intake into the training program (just over 200). ANZCA has expressed concern that "trainee intake numbers could go up due to pressure to find vocational training jobs for the large number of medical graduates currently coming through the system".

The results of this report indicate that intake into the anaesthesia training program should not be driven by pressure or demand from medical graduates, rather intake should be attenuated with the aim of achieving a delicate balance between business fiscal interests, medical students' vocational aspirations and evolving community requirements

This next section aims to define the current training requirements and provide analysis of any gaps that are impeding a trainee's progress through the training program within the minimum timeframe.

An analysis tool called the Capacity Analysis Tool (CATool) was developed, which is essentially a dynamic dashboard that enables the interrogation of vast amounts of data to find meaningful insights through interactive data visualisations. More information regarding the CATool can be found in Appendix 2.

Results of consultation

DoH is aware that whilst supply and demand studies are a mix of science and art, understanding the current situation and future scenarios can be challenging, DoH therefore consulted with both the College and ASA on the report.

The following section presents the views of the College and the Professional Association. These different views below highlights the need to update the modelling on a regular basis to ensure the latest data and understanding of the workforce reflected in the studies.

Supervisory capacity requirements

The College has indicated the following:

- If clinical support time of specialists is further eroded there will be insufficient time for teaching and scholarly activity and this will impact on training.
- Trainee intake numbers could go up due to pressure by jurisdictions to find vocational training jobs for the large number of medical graduates currently coming through the system.
- If the trend to an increasing proportion of female trainees continues this could increase training duration due to family and maternity related reduced working hours.

The Australian Society of Anaesthetists (ASA) has indicated the following:

- The gender disparity in hours worked has been well captured by ASA surveys, with the results indicating males are working most commonly four days per week and females three days per week.

Identify non-workforce based requirements and limitations

The College has indicated the following:

- With regard to case mix and volume of practice, if working hours are reduced further or overtime restricted, then trainees may have difficulty reaching the desired competence required. The College has noted that they have a largely competency-based curriculum.
- There needs to be some flexibility to allow for any changes in scope of practice for anaesthetists such as Perioperative medicine (POM), or increased procedures for example bowel screening, and obesity surgery.
- If the job market is saturated and employment prospects low, this could impact on the popularity of the specialty and the number of applicants could fall.

The ASA has indicated the following:

- The ASA supports the current vocational training program of ANZCA.
- 'Overtime' should not be unreasonably restricted and any further reduction in working hours would require an increase in the duration of the training program. The ASA also notes that other specialties believe that training hours should be longer than currently is the case.

Mapping of training capacity

The College has indicated the following:

- Historically there have been training bottlenecks, especially in anaesthesia for neurosurgery, paediatrics, cardiac procedures and sometimes complex obstetrics. These have been reduced by the ANZCA curriculum change, medical advances and STP funded positions.
- If a larger volume of training is fully devolved to rural/regional areas, trainees will have trouble with case mix and VOP of sufficient complexity to complete specialty training within the minimum time.

- Trainee numbers at individual hospitals are primarily determined by the after hour roster needs, and any attempt to have trainees and non-trainees working together will lead to legal action by the non-trainees to get their status changed.
- It is difficult to introduce non accredited training positions without falling foul of competition legislation or trainees claiming recognition of prior learning (RPL). One possible option is to return to the previous arrangement of Post Graduate Year (PGY) 3 or 4 positions. This would require support from state departments/hospitals to fund those positions and/or specific exclusions from the competition authorities.

The ASA has indicated the following:

- With regard to training capacity, there are differences between the nature of public and private practice.
- In public practice, specialists provide clinical services as well as training vocational trainees. This training and supervision may be direct or remote, of one or more trainees. Specialists in public hospitals usually have 'in hours' clinical support time available to them. This is defined in the relevant ANZCA position statement.

Specialist Training Programme

The College has indicated that some hospitals have struggled to integrate into a training network either due to location, inability to attract trainees/FANZCAs, size of the setting or funding to support registrars. The STP has been successful in developing networks beyond the major public metropolitan teaching hospitals by funding positions and supporting accreditation of these sites, and has been vital in supporting hospitals to become integrated into an education and training network, particularly in rural areas.

Appendices

Appendix 1: Summary of modelling inputs

Updating supply and demand

The supply side of the planning equation is determined using the characteristics of the known current workforce and projecting this forward with known and projected trainee inflows and exit trends from the workforce. The demand side uses historical service utilisation patterns and projects these forward based on population growth. It also relies on other factors that have shown to influence the utilisation patterns i.e. funding of specific programs that have either increased or decreased usage of services or seasonal patterns.

Descriptive characteristics of the anaesthesia workforce

The demographic characteristics of the current anaesthesia workforce are outlined as well describing the trainees and those intending to train. It is an important component in understanding the current supply and what is likely to be required into the future.

Capacity

The rapid growth in domestic medical graduates will continue to place pressure on medical training capacity. A significant amount of work has occurred to expand clinical training capacity across professional entry, intern and vocational training levels and additional work is underway to explore internships, however more needs to be done. While there have been recent expansions in medical training in alternate settings, medical training has traditionally been highly concentrated in public hospitals and in particular acute wards. It is important as medical training requirements continue to grow that capacity to expand medical training is considered.

Distribution

The growth in domestically trained medical graduates also presents an opportunity to distribute domestically trained doctors more effectively both geographically and into the traditionally less popular specialties. It has been argued that changing the distribution of medical training might contribute to an improvement in the distribution of the medical workforce. Based on evidence collected by Australian Rural Clinical Schools, it is proposed that if in the course of their training doctors could spend more time in rural locations or in primary care settings, they may be more likely to stay and practice in those settings.

Modelling inputs

The following information details the inputs that will be used in undertaking the modelling for the anaesthesia workforce. The anaesthesia workforce is defined by those medical practitioners that have an accreditation in anaesthesia and have identified anaesthesia as their main speciality by age, gender and average hours worked, along with the number of new fellows and the number of active trainees by year of training.

The following parameters were specified as inputs for the projection modelling:

Flows in

- Workforce stock

- Domestic new fellows
- International new fellows
- Temporary migration (held at a constant total level)
- Skilled migration (exemptions)

Flows out

- Exits from the workforce include all permanent and temporary flows out of the workforce.

Supply assumptions

- Medical practitioners who are registered as a specialist anaesthetist through Australian Health Practitioner Regulation Agency (AHPRA) have been identified through the use of the National Health Workforce Data Set (NHWDS), which includes the registrants and the workforce survey.
- The anaesthesia workforce is defined as those that:
    - Are employed (excluding those on leave for more than three months)
    - Have clinician status
    - Have specialist accreditation in anaesthesia
    - Work the most or second most hours in the specialty field of anaesthesia, and only include practitioners who have one or two accredited specialities in total (with one of them being anaesthesia).
- Inputs to the anaesthesia workforce are based on 2014 data and additional data from the ANZCA as required.
- The trainees that have been identified through the workforce survey have been defined through the following methodology, that assumes that they:
    - Are employed (excluding those on leave for more than three months)
    - Currently undertaking specialist training in anaesthesia as their first field of training (excluding the second specialty field)
    - Include those who have transitioned from trainee to holding a specialist accreditation in anaesthesia due to timing issues of registration and workforce survey.
    - Includes those who were originally classified as intentions and trainees, these were considered to be trainees only (due to AIHW imputation)
    - Includes those who were originally classified as trainee and specialist clinicians, if:
        - They don’t have specialist accreditation, or
        - If they do have specialist accreditation, then the principal area of their main job in medicine was not specialist
- International medical graduate specialists enter into the model through either the temporary or permanent migration streams. The inflow of anaesthetist via migration is obtained from the Department of Immigration and Border Protection (DIBP) and reconciled with the ANZCA data.

- Hours worked are calculated and applied separately for each age/gender cohort for anaesthesia. The data from which hours worked is calculated is taken from the hours reported by specialist anaesthetists on the relevant workforce survey items for 2014.
- Exit rates are calculated on a unique basis for specialist anaesthetists for each five year age/gender cohort.
- Exit rates are calculated by carrying forward the current distribution of ages of the workforce and assuming the same distribution in the future. The rates are based on observed retirements over recent years, not on retirement intentions.
- Exit rates are a composite measure including all forms of removal from the workforce, permanent or temporary.
- All anaesthetists are assumed to remain in the workforce, even in situations of oversupply. That is, exit rates are not adjusted to take account of possible movements away from a profession in an oversupply situation.

Demand assumptions

- The demand forecasts use a combination of acute inpatient hospital and Medicare Benefits Schedule (MBS) data with the acute hospital inpatient data used to form the basis of the public component and MBS data the private component.
- This utilisation is assigned accordingly to the hours reported by the anaesthetists through the workforce survey.
- Projections of acute inpatient utilisation take into account population growth and ageing, as well as clinical trends, by projecting age by sex for same day or overnight stays, specialty-specific trends in admission rates and length of stay.
- Similarly the historical MBS data uses the number of services received by age of patient captured as a quarterly time series and forecasts the resulting estimates multiplied by the estimated residential population[4].
- The utilisation rates are examined at the individual age group level and forecast using a series of Exponential Smoothing models. Forecasts for each individual age group have been generated using the SAS statistical package. Exponential smoothing has been chosen due to its successful use in the Department of Health at forecasting MBS services for financial modelling purposes.
- Demand and supply start from an ‘in balance’ position.
- The demand growth rate for anaesthesia is currently in the range of 3.1 per annum.

[4] Forecast services use ABS catalogue 3222 Population Projections Series B.

Appendix 2: Definition of a Specialist

There are two sources of information used to determine the current supply of anaesthetists; the medical workforce survey data and the AHPRA registration data. These two sources of information are combined by the AIHW into the *National Health Workforce Dataset: Medical Practitioners* (NHWDS). The NHWDS is used to determine whether a medical practitioner should be classified as a specialist (in up to two specialities). These classifications are sued to determine supply for the purposes of modelling the medical workforce.

The Medical Workforce survey provides a rich source of information regarding the current activities of medical practitioners. The answers to this survey are critical to ensure that that data remains an accurate snapshot of medical workforce trends.

The following details the method for using the NHWDS data (as associated survey questions) to classify a medical practitioner as a specialist and therefore 'supply' in the specialty demand and supply modelling.

In order to be classified as a specialist a record must pass three initial conditions.

- Be currently registered as Medical practitioner
- Be accredited as an Anaesthetist
- Be currently employed in the Medical profession
- Be currently working as a Clinician

Current registration as a medical practitioner and specialist accreditation in anaesthesia are data items maintained by AHPRA.

The following survey questions relate to whether the medical practitioner is employed and working as a clinician. To be classified as a specialist they must have answered that they are currently employed and working as a clinician.

Figure 26. Survey questions relating to Employment Status

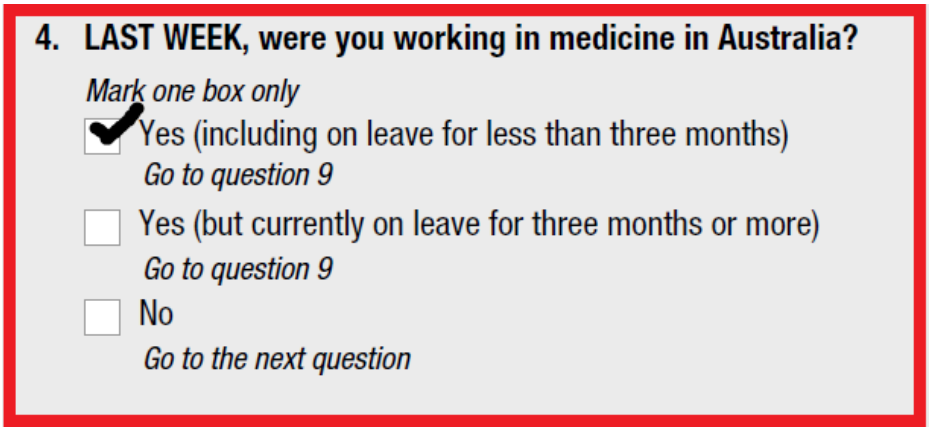
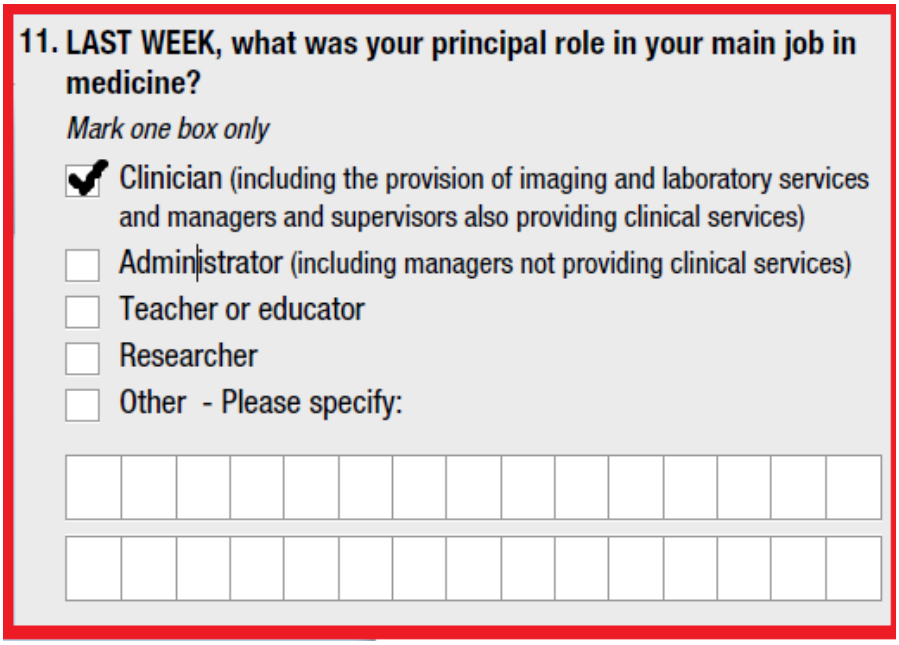
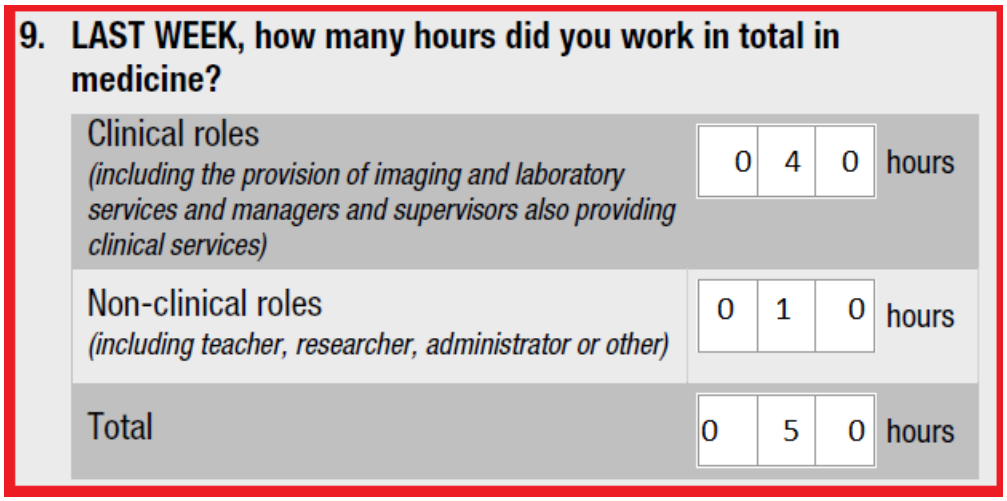


Figure 27 Survey questions relating to Clinician Status



In addition medical practitioners are required to specify that they are working clinical hours. If the practitioner specifies that they are working only non-clinical hours, then they will not be counted.

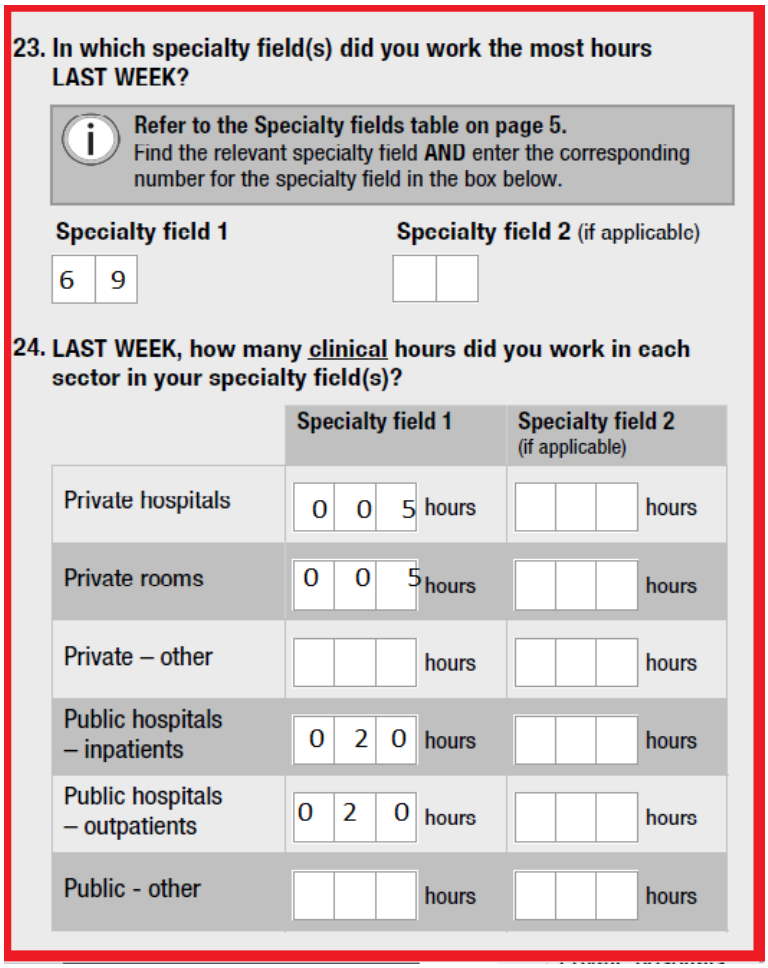
Figure 28. Survey questions relating to clinical and non clinical hours



These conditions are applied initial to ensure a rigorous estimate of the current workforce based on the employment and accreditation status of medical practitioners. For example, to avoid counting medical practitioners who are in retirement the process checks to ensure that medical practitioners are currently employed and working as clinician. This also avoids counting medical practitioners who are currently working as administrators and teachers.

The next step looks at the main area in which the medical practitioner is employed. This is the step where medical practitioners have the opportunity to specify on the survey, in which area of medicine they're currently employed. There is space to fill out *two* professions.

Figure 29. Survey questions relating to principal field of main specialties



23. In which specialty field(s) did you work the most hours LAST WEEK?

Refer to the Specialty fields table on page 5.
Find the relevant specialty field **AND** enter the corresponding number for the specialty field in the box below.

Specialty field 1	**Specialty field 2** (if applicable)
6 9	

24. LAST WEEK, how many clinical hours did you work in each sector in your specialty field(s)?

	Specialty field 1	**Specialty field 2** (if applicable)
Private hospitals	0 0 5 hours	hours
Private rooms	0 0 5 hours	hours
Private – other	hours	hours
Public hospitals – inpatients	0 2 0 hours	hours
Public hospitals – outpatients	0 2 0 hours	hours
Public - other	hours	hours

The above survey question is crucial to the inclusion of a medical practitioner as as an anaesthetist. This question indicates that the medical practitioner will be classified as a specialist in the recorded specialty provided that all previous criteria have been met.

If the medical practitioner is currently registered and is;

- employed,
- working as a clinician
- and has accreditation with AHPRA in Anaesthesia

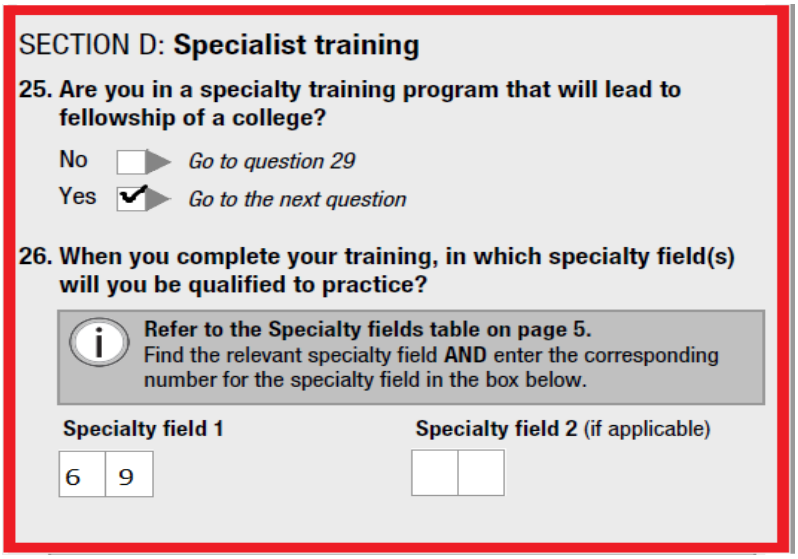
then at this point they will be counted as an Anaesthesia provided they have indicated so in question 23.

With the exception of 3 cases, that is the end of the classification process.

Case 1: Specialist and trainee

If the medical practitioner has also indicated that they are a current anaesthesia trainee and their year of completion is the year of the survey then they will be classified as a trainee and not a specialist. This can occur due to timing issues; the medical practitioner is in a training program on the date they complete the survey, however on the date of data extraction (which can be up to 2 months later) the medical practitioner has obtained fellowship and AHPRA has recorded them as an accredited specialist. The decision was made to classify the medical practitioner according to the date of completion of the survey. In this instance the medical practitioner will be classified as an anaesthetist in the following year.

Figure 30. Survey questions relating to training in Anaesthesia



Case 2 – fails to answer question 23

If the medical practitioner fails to answer question 23 but currently is registered medical practitioner and is;

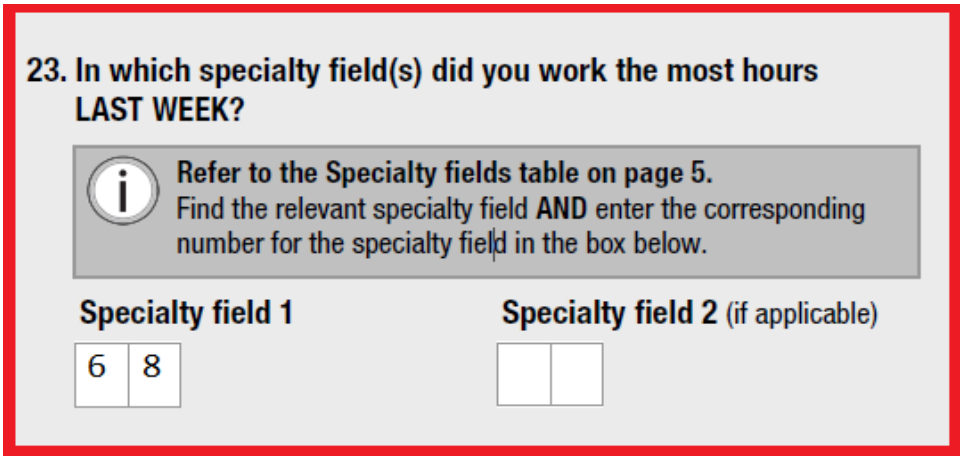
- employed,
- working as a clinician
- has accreditation with AHPRA in Anaesthesia
- and has two or fewer specialities accredited with AHPRA

then their survey response to question 23 is imputed as anaesthesia (69) and they are counted as a Specialist.

Case 3 - Erroneous answer recorded in question 23

The medical practitioner responds to the survey indicating that they are currently working as a vocationally registered GP. They do not currently have accreditation with APHRA as a GP but they do have current accreditation as an anaesthetist and are; currently registered as a medical practitioner, employed, and working as a clinician. The response to question 23 is imputed as Anaesthesia (69) and they are classified as an anaesthetist.

Figure 31. Erroneous answer recorded in question 23



Appendix 3: Trainees and Intentions

The classification of trainees and those intending to train is based on the medical workforce survey. To be classified as a trainee the medical practitioner must answer survey question 26 indicating that they're a current anaesthesia trainee they must also be;

- registered as a medical practitioner and
- employed as a medical practitioner (see Figure 26)

The only exception is if they indicate on the survey that they're also intending to train. If they have a current training year, then they're classified as a trainee (see Figure 30).

Figure 32. Survey question related to current specialist training

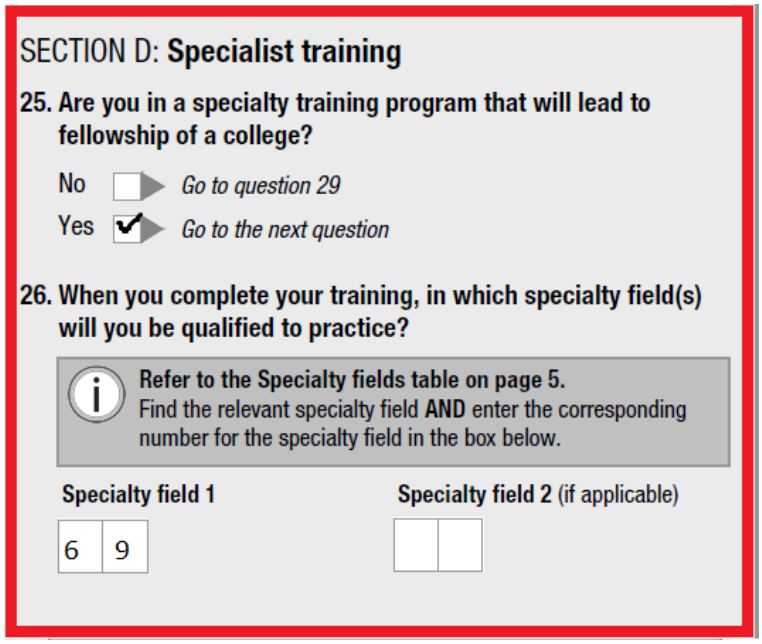
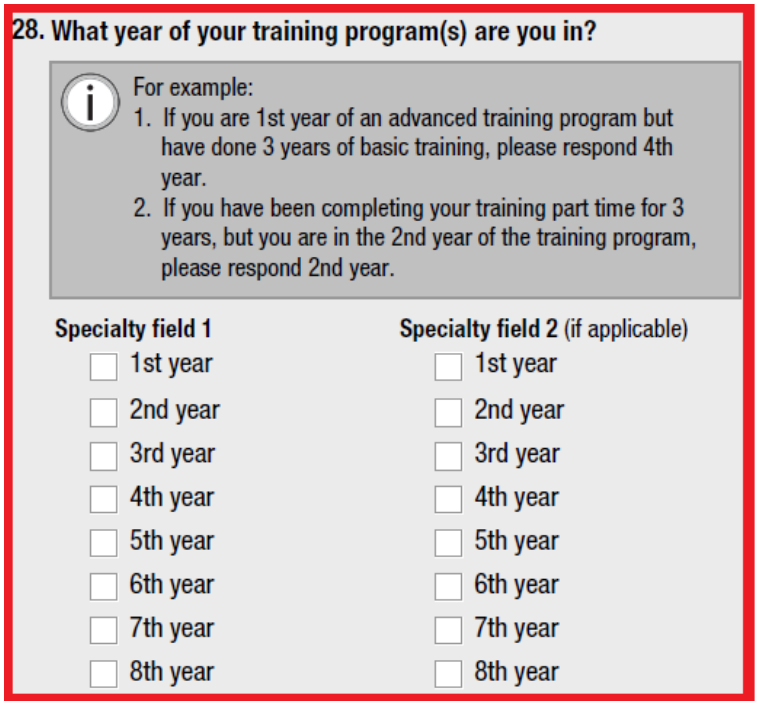
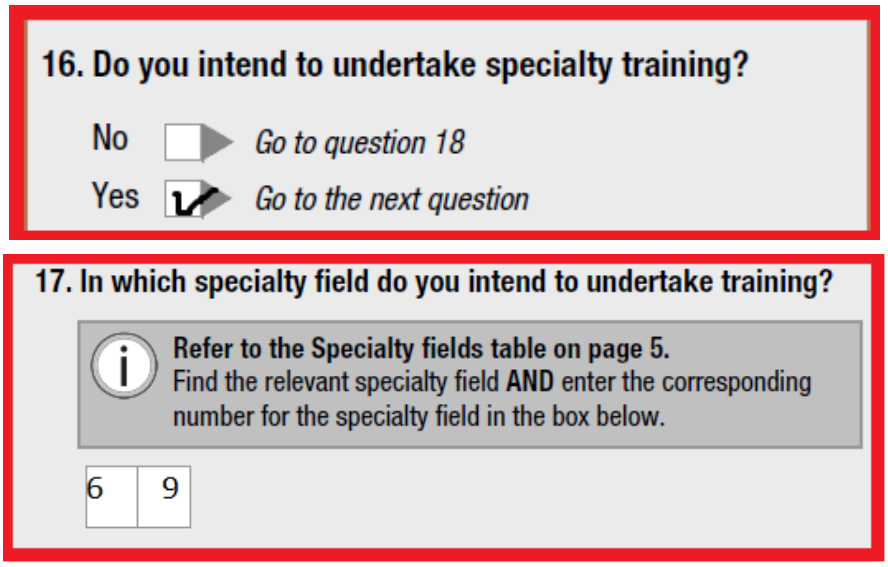


Figure 33. Survey question relating to current year of training program



To be classified as intending to train the medical practitioner needs to answer question 16 indicating that they're intending to undertake training as a specialist and answer question 17 to indicate that they intend to train as an anaesthetists.

Figure 34. Survey questions relating to intending to train in Anaesthesia



Appendix 4: Capacity Analysis Tool (CATool)

The software used to develop the CATool is called SAS® Visual Analytics (VA).

Multiple data sources were included in the CATool in order to combine the large amounts of data variables to create a visual representation of where the location of the workforce, supervisors, trainees, international medical graduate specialists and services were being delivered, albeit only a point in time.

The following data variables were included in the CATool:

Table 18. Data variables and sources of the CATool

Data variables	Data sources
Geography	• 1270.0.55.003 - Australian Statistical Geography Standard (ASGS): Volume 3 - Non ABS Structures, July 2011(State Suburbs ASGS Non ABS Structures Ed 2011 Digital Boundaries in ESRI Shapefile Format). • Geometric values – XY coordinates of the centroid using ABS digital boundaries.
Population	• Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011, ABS 2033.0.55.001 (datacube - SSC indexes).
Socio-Economic Indexes for Areas	• Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011, ABS 2033.0.55.001 (datacube - SSC indexes).
MBS services	• Australia Government Department of Health, Medical Benefits Division
Hospital Separations	• Australia Government Department of Health, Acute Care Division
Hospital Facilities	• Australia Government Department of Health, GIS server and included the category of facility by XY location.
Specialist Training Programme (STP) posts	• Australia Government Department of Health, Health Training Branch
Trainees	• ANZCA 2014 and NHWDS medical practitioner 2014
Supervisors	• ANZCA 2014 and NHWDS medical practitioner 2014
Specialist clinicians	• NHWDS medical practitioner 2014
International medical graduate specialists	• ANZCA 2014 and NHWDS medical practitioner 2014

Appendix 5: Medical Practitioners survey 2014

Medical Board of Australia

Workforce Survey Form

Profession: **Medical**

WKSY-30

COMPLETING THIS SURVEY

Information supplied on this form may be provided to other persons and agencies for workforce planning. The Medical Board of Australia and the Australian Health Practitioner Regulation Agency (AHPRA) are committed to ensuring the privacy and confidentiality of personal information held and will adhere to the National Privacy Principles under the Privacy Act 1988 (Cth) when collecting, using, disclosing, securing and providing access to private information.

- Read all instructions
- Print clearly in BLOCK LETTERS using a black or blue pen
- Place X in ALL applicable boxes
- These questions are optional

Today's date: (DD / MM / YYYY) ☐☐ / ☐☐ / ☐☐☐☐

SECTION A: Your qualifications

1. Where did you obtain your initial medical degree?

Mark one box only

- ☐ Australia
- ☐ New Zealand
- ☐ Other overseas - Please specify country:

2. What year did you graduate from medical school?

☐☐☐☐ (YYYY)

3. If you have a specialist qualification in medicine, where did you obtain your initial specialist qualification?

Mark one box only

- ☐ Do not have a specialist qualification
- ☐ Australia
- ☐ New Zealand
- ☐ Other overseas - Please specify country:

SECTION B: Your employment

ⓘ For the following questions, employed includes: The practice of medicine, or work that is principally concerned with that discipline, e.g. research, administration or teaching of medicine, in which you worked in Australia for a total of one hour or more LAST WEEK in a job or business (including own business) for pay, commission, payment in kind or profit.

4. LAST WEEK, were you working in medicine in Australia?

Mark one box only

- ☐ Yes (including on leave for less than three months) *Go to question 9*
- ☐ Yes (but currently on leave for three months or more) *Go to question 9*
- ☐ No *Go to the next question*

5. LAST WEEK, why were you not working in medicine in Australia?

Mark one box only

- ☐ Working in medicine overseas *Go to the next question*
- ☐ Working in an occupation other than medicine *Go to question 7*
- ☐ Not working in paid employment at all *Go to question 8*
- ☐ Retired from regular work *Go to question 31*

6. LAST WEEK, what field of medicine were you working in?

Go to question 8

7. LAST WEEK, what was your occupation?

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8. LAST WEEK, did you take active steps to look for work in medicine in Australia?

Looking for work includes (either part-time or full-time):
- applying for work
- enquiring about a job
- answering an advertisement
- registering with an employment agency
- advertising for work
- contacting people about a job.

No ▶ *Go to question 31*

Yes ▶ *Go to question 31*

For questions 9-19, if you were on leave last week, answer for a typical week. **Exclude** hours on call not worked.

9. LAST WEEK, how many hours did you work in total in medicine?

Clinical roles *(including the provision of imaging and laboratory services and managers and supervisors also providing clinical services)*	hours
Non-clinical roles *(including teacher, researcher, administrator or other)*	hours
Total	hours

10. LAST WEEK, of the clinical hours worked, how many hours did you work in each sector in medicine?

Private hospitals ___ hours

Public hospitals – inpatients ___ hours

Private rooms ___ hours

Public hospitals – outpatients ___ hours

Private – other ___ hours

Public – other ___ hours

For the following questions, answer for the job in which you worked the most hours last week.

11. LAST WEEK, what was your principal role in your main job in medicine?

Mark one box only

- ☐ Clinician (including the provision of imaging and laboratory services and managers and supervisors also providing clinical services)
- ☐ Administrator (including managers not providing clinical services)
- ☐ Teacher or educator
- ☐ Researcher
- ☐ Other - Please specify:

12. LAST WEEK, what was the principal area of your main job in medicine?

Mark one box only

- ☐ General practitioner (GP) (excluding AGPT program trainees) *Go to the next question*
- ☐ Specialist (other than GP) *Go to question 18*
- ☐ Specialist-in-training (including AGPT program trainees) *Go to question 18*
- ☐ Hospital non-specialist (including pre-vocational doctors) *Go to question 15*
- ☐ Other clinician *Go to question 18*
- ☐ Non-clinician *Go to question 18*

13. LAST WEEK, were you working in General Practice

Mark one box only

- ☐ **with** specialist registration in general practice *Go to question 18*
- ☐ **without** specialist registration in general practice *Go to the next question*

14. LAST WEEK, were you a RACGP/ ACRRM/ RVTS trainee?

No ▶ *Go to question 18*

Yes ▶ *Go to question 18*

15. LAST WEEK, what was your position in the hospital?

Mark one box only

- ☐ Intern
- ☐ Resident Medical Officer (RMO)
- ☐ Hospital Medical Officer (HMO)
- ☐ Career Medical Officer (CMO)
- ☐ Principal House Officer (PHO)
- ☐ Registrar
- ☐ Other - Please specify:

16. Do you intend to undertake specialty training?

No ▶ *Go to question 18*

Yes ▶ *Go to the next question*

17. In which specialty field do you intend to undertake training?

Refer to the Specialty fields table on page 5.
Find the relevant specialty field **AND** enter the corresponding number for the specialty field in the box below.

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18. LAST WEEK, what was the principal work setting of your main job in medicine?

Mark one box only

- ☐ Solo Private Practice
- ☐ Group Private Practice
- ☐ Locum Private Practice
- ☐ Aboriginal health service
- ☐ Community mental health service
- ☐ Community drug and alcohol service
- ☐ Other community health care service
- ☐ Hospital *(excluding outpatient service)*
- ☐ Outpatient service
- ☐ Residential mental health care service
- ☐ Residential aged care facility
- ☐ Commercial/business service
- ☐ Tertiary educational facility
- ☐ School
- ☐ Other educational facility
- ☐ Correctional service
- ☐ Defence force
- ☐ Other government department or agency
- ☐ Other

19. LAST WEEK, where was the location of your main job in medicine?

For state and territory mark one box only

☐ NSW	☐ SA	☐ NT
☐ VIC	☐ WA	☐ ACT
☐ QLD	☐ TAS	☐ Other territories

Postcode

Suburb

20. Other than the location reported in question 19, do you also work in a regional, rural or remote location?

No ☐ ▶ *Go to question 22*

Yes ☐ ▶ *Specify state, postcode and suburb below, then go to the next question*

ⓘ If you work in more than one additional regional, rural or remote location, provide the one in which you work the most hours.

For state and territory mark one box only

☐ NSW	☐ SA	☐ NT
☐ VIC	☐ WA	☐ ACT
☐ QLD	☐ TAS	☐ Other territories

Postcode

Suburb

21. On average, how often do you work in this location?

Mark one box only, and report the frequency worked at this location

	☐ Weekly	day(s) per week
OR	☐ Fortnightly	days per fortnight
OR	☐ Monthly	days per month
OR	☐ Quarterly	days per quarter
OR	☐ Annually	days per year

SECTION C: Specialist registration

22. Do you have a specialist registration in medicine (including specialist registration in general practice)?

No ☐ ▶ *Go to question 25*

Yes ☐ ▶ *Go to the next question*

ⓘ For questions 23-24:
Specialty field 1 relates to the specialty in which you worked the most hours LAST WEEK.
Specialty field 2 (if applicable) relates to the specialty in which you worked the second most hours LAST WEEK.

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23. In which specialty field(s) did you work the most hours LAST WEEK?

Refer to the Specialty fields table on page 5.
Find the relevant specialty field **AND** enter the corresponding number for the specialty field in the box below.

Specialty field 1 **Specialty field 2** (if applicable)

24. LAST WEEK, how many clinical hours did you work in each sector in your specialty field(s)?

	Specialty field 1	Specialty field 2 (if applicable)
Private hospitals	hours	hours
Private rooms	hours	hours
Private – other	hours	hours
Public hospitals – inpatients	hours	hours
Public hospitals – outpatients	hours	hours
Public - other	hours	hours

SECTION D: Specialist training

25. Are you in a specialty training program that will lead to fellowship of a college?

No ☐ *Go to question 29*

Yes ☐ *Go to the next question*

26. When you complete your training, in which specialty field(s) will you be qualified to practice?

Refer to the Specialty fields table on page 5.
Find the relevant specialty field **AND** enter the corresponding number for the specialty field in the box below.

Specialty field 1 **Specialty field 2** (if applicable)

27. (a) In which year(s) did you commence your specialty training program(s)?

Specialty field 1 (YYYY) **Specialty field 2** (if applicable) (YYYY)

(b) In which year(s) do you intend to complete your specialty training program(s)?

Specialty field 1 (YYYY) **Specialty field 2** (if applicable) (YYYY)

28. What year of your training program(s) are you in?

For example:
1. If you are 1st year of an advanced training program but have done 3 years of basic training, please respond 4th year.
2. If you have been completing your training part time for 3 years, but you are in the 2nd year of the training program, please respond 2nd year.

Specialty field 1	Specialty field 2 (if applicable)
☐ 1st year	☐ 1st year
☐ 2nd year	☐ 2nd year
☐ 3rd year	☐ 3rd year
☐ 4th year	☐ 4th year
☐ 5th year	☐ 5th year
☐ 6th year	☐ 6th year
☐ 7th year	☐ 7th year
☐ 8th year	☐ 8th year

SECTION E: Workforce intentions

29. In total, how many years have you worked in medicine in Australia?

Include years regardless of full-time or part-time status. Exclude time spent not working and unpaid leave.

whole years

30. How many more years do you intend to remain in the medicine workforce in Australia?

whole years

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SECTION F: Your details

31. Are you of Aboriginal or Torres Strait Islander origin?

Mark one box only

- ☐ No
- ☐ Yes - Aboriginal
- ☐ Yes - Torres Strait Islander
- ☐ Both Aboriginal and Torres Strait Islander

32. Are you a temporary resident?

No ▶ *Thank you, no further questions.*

Yes ▶ *Specify your visa type below*

- ☐ 309 - Partner (offshore)
- ☐ 402 - Training and Research
- ☐ 417 - Working Holiday
- ☐ 422 - Medical Practitioner
- ☐ 457 - Temporary Work (Skilled)
- ☐ 485 - Temporary Graduate
- ☐ 572 - Vocational Education and Training Sector
- ☐ 573 - Higher Education Sector
- ☐ 574 - Postgraduate Research Sector
- ☐ 820 - Partner (onshore)
- ☐ Other

Thank you, no further questions.

Please return this workforce survey to AHPRA in the same envelope as your renewal application

	Physician		Radiology	57	Paediatric respiratory and sleep medicine
1	Cardiology	29	Diagnostic radiology	58	Paediatric rheumatology
2	Clinical genetics	30	Diagnostic ultrasound	59	Specialist paediatrician
3	Clinical pharmacology	31	Nuclear medicine		**Pathology**
4	Endocrinology		**Obstetrics and gynaecology**	60	General pathology
5	Gastroenterology and hepatology	32	Gynaecological oncology	61	Anatomical pathology (including cytopathology)
6	General medicine	33	Maternal-fetal medicine	62	Chemical pathology
7	Geriatric medicine	34	Obstetrics and gynaecological ultrasound	63	Haematology
8	Haematology	35	Reproductive endocrinology and infertility	64	Immunology
9	Immunology and allergy	36	Urogynaecology	65	Microbiology
10	Infectious diseases	37	Specialist obstetrician and gynaecologist	66	Forensic pathology
11	Medical oncology		**Paediatrics and child health**	67	Specialist pathologist
12	Nephrology	38	Clinical genetics		**Intensive care medicine**
13	Neurology	39	Community and child health	85	Paediatric intensive care medicine
14	Nuclear medicine	40	General paediatrics	86	Specialist intensive care physician
15	Respiratory and sleep medicine	41	Neonatal and perinatal medicine	68	**General practice**
16	Rheumatology	42	Paediatric cardiology	69	**Anaesthesia**
17	Specialist physician	43	Paediatric clinical pharmacology	70	**Psychiatry**
	Surgery	44	Paediatric emergency medicine	71	**Emergency medicine**
18	Cardio-thoracic surgery	45	Paediatric endocrinology	72	**Ophthalmology**
19	General surgery	46	Paediatric gastroenterology and hepatology	73	**Dermatology**
20	Neurosurgery	47	Paediatric haematology	75	**Rehabilitation medicine**
21	Orthopaedic surgery	48	Paediatric immunology and allergy	76	**Radiation oncology**
22	Otolaryngology- head and neck surgery	49	Paediatric infectious diseases	77	**Public health medicine**
23	Oral and maxillofacial surgery	50	Paediatric intensive care medicine	78	**Occupational and environmental medicine**
24	Paediatric surgery	51	Paediatric medical oncology	79	**Medical administration**
25	Plastic surgery	52	Paediatric nephrology	80	**Palliative medicine**
26	Urology	53	Paediatric neurology	81	**Sport and exercise medicine**
27	Vascular surgery	54	Paediatric nuclear medicine	82	**Sexual health medicine**
28	Specialist surgeon	55	Paediatric palliative medicine	83	**Addiction medicine**
		56	Paediatric rehabilitation medicine	84	**Pain medicine**

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