

Medical workforce planning in Australia

AUSTRALIAN MEDICAL WORKFORCE ADVISORY COMMITTEE (AMWAC)

AMWAC is the national medical workforce planning and advisory agency for the Australian Health Ministers' Advisory Council. This paper was prepared for AMWAC by Mr Paul Gavel, Executive Officer, Australian Medical Workforce Advisory Committee; Professor John Horvath, Chairman, Australian Medical Workforce Advisory Committee; and Dr Mary Harris, Senior Policy Officer, Australian Medical Workforce Advisory Committee.

Abstract

The Australian Medical Workforce Advisory Committee (AMWAC) was established by the Australian Health Ministers' Advisory Council (AHMAC) in 1995 to provide information and analysis to AHMAC and the profession about the medical workforce to inform the policy process. This article provides a brief history of the events leading to the formation of AMWAC and of the work of this committee, particularly its approach to medical workforce planning and the outcomes of some of its research. The paper concludes that the forces leading to and maintaining workforce geographic and structural maldistribution are better understood as a result of AMWAC studies and the work of other stakeholders. Further research is required to improve understanding of the hospital medical workforce and the factors influencing the career decisions of young doctors and to monitor the impact of strategies to improve workforce distribution.

Introduction

In 1788, the First Fleet arrived in Australia with four doctors to serve a European population of around 1,000. Today in Australia there are around 50,000 doctors serving a population of over 18 million. The reasoning behind the inclusion of four doctors with the First Fleet has probably been lost to history, but it can be seen to represent not just the beginning of European medical practice in Australia, but also possibly one of the earliest attempts at medical workforce planning. Nationally, until the last two decades there has been comparatively little emphasis placed on medical workforce planning apart from that undertaken by some medical organisations (Australian Medical Association 1968), individuals (Last, 1964; Scotton 1967; Scotton, 1974) and occasionally governments.

There are several reasons for this. For much of the early post Second World War period the economy was generally growing and the population increasing and demand for doctors and all types of health care services were increasing. Until the seventies, there was a commonly held view that increasing the number of doctors could solve most workforce problems (for example maldistribution, shortages in certain disciplines). In this context, workforce analysis usually focused on population growth, doctor-to-population ratios and adjustments (ie increases) to medical school intakes. Just as significant however, there were no reliable data or projection modelling techniques available to inform the policy process. Only in recent years has the information technology revolution facilitated the collection and processing of large, complex data sets.

It is generally accepted that medical workforce planning takes place at two levels. At the macro level planning involves estimating the number of medical practitioners required to meet (but not exceed) future population requirements. This process is generally referred to as balancing supply and requirements. Micro level planning includes determining the functions and task assignments of the workforce (Baker, 1988). In the main, the brief of the Australian Medical Workforce Advisory Committee (AMWAC) has been to advise government on macro

level workforce planning issues. State and Territory health authorities are largely responsible for micro level planning. Ideally, these two levels of planning occur simultaneously because of the effect that each may exert on the other. In this article our focus is concepts and measures associated with macro level workforce planning, including reviews of individual medical disciplines.

The aim of this article is to provide detail on the work of AMWAC, particularly its approach to medical workforce planning. To date, AMWAC has published reviews of 18 specialist workforces, has produced eight special issues reports and has contributed to the publications of the Medical Training Review Panel (MTRP). The article does not provide a critical analysis of public policies relating to medical workforce planning in Australia. Scotton (1998) elegantly provides this type of analysis.

The article begins with a brief history of medical workforce planning in Australia, outlines measures commonly used by workforce planners which inform the approach used by AMWAC, describes AMWAC's approach to medical workforce planning and presents some of the findings arising from recent AMWAC workforce reviews.

Medical workforce planning in Australia 1970-1995

Prior to 1988, formal government supported workforce planning initiatives in Australia can be traced to several ad hoc reports, including, the Report of the Committee on Medical Schools to the Australian Universities Commission (Karmel, 1973). The Committee recommended an increase in medical school intakes, including the establishment of two new medical schools (viz Newcastle and Townsville), to provide 1,560 graduates per year by 1991 (Karmel, 1973). The Report of the Committee of Officials titled 'Medical Manpower Supply' (Sax, 1980) revised estimates of population growth downwards. The Committee of Officials noted that net medical migration was occurring at levels substantially above that projected in the Karmel report, and consequently revised workforce requirement projections downwards (Sax 1980). At the same time, the Jamison inquiry into the efficiency of Australian hospitals noted that the Commission 'was told on many occasions that there was an oversupply of doctors' but 'in attempting to assess this argument, the Commission was confronted with poor data' (Jamison 1981).

In 1988, the Committee of Inquiry into Medical Education and Medical Workforce chaired by Professor Ralph Doherty noted 'the view, widespread in the medical profession, of an oversupply of general practitioners in urban areas so that the prospect of establishing a practice in the city may not be seen as a viable option for some medical graduates' (Doherty, 1988). This report concluded that the medical workforce should be monitored more closely than in the past and recommended the establishment of an ongoing 'Medical Workforce Review Committee' with representation from bodies similar to those represented in the Australian Health Ministers' Advisory Council (Doherty, 1988). Importantly, the Committee drew attention to deficiencies in the quality of medical workforce data and recommended the standardisation of classifications and the establishment of a national data-base, one that was built around a survey of all doctors at the time of re-registration with their primary medical board (Doherty, 1988).

Following publication of the Doherty report, the Medical Workforce Data Review Committee (MWDRC) was established in 1991. Further impetus for the formation of the MWDRC came from growing government concern about the acceleration of Medicare outlays which were generally considered to be associated with growth in doctor numbers and Medicare's system of doctor-reimbursement. Compared with payment systems in other countries, Australia's system is described as being uniquely open-ended with patients having free access to unlimited Medicare benefits and doctors to Medicare fee-for-service payments (Deeble, 1991; Scotton, 1998). At the same time there was recognition that the growth in doctor numbers had failed to address the serious problem of workforce maldistribution. For example, the Doherty report noted that 'there is.... no mechanism for the control of the geographical distribution of doctors or the number of doctors who can be reimbursed by the Health Insurance Commission' (Doherty, 1988: 449). As its name implied, the principal term of reference of the MWDRC was to review data, particularly data related to medical workforce supply. Underpinning this emphasis was the notion that control of medical supply would assist to curtail growth in Medicare outlays (MWDRC, 1993; Douglas 1995). In parallel with the work of the MWDRC, the Australian Institute of Health and Welfare (AIHW) began to develop the questionnaire for survey of doctors at time of re-registration. This survey is now an annual occurrence (AIHW 2000a).

By 1994 there was acceptance by all levels of government that a broader approach to medical workforce planning was required to ensure that future populations have access to appropriate medical services. Concern over the availability of some specialist services in particular, and the overall level of workforce supply had become the subject of widespread debate. These issues were highlighted in two reports considered by government and other organisations with an interest in medical workforce matters (Patterson 1994, Baume 1994). At the October 1994 meeting of the Australian Health Ministers' Advisory Council (AHMAC) the decision was taken to form a new national workforce planning body, with wide ranging terms of reference. The organisation that was formed as a result of that decision was the Australian Medical Workforce Advisory Committee.

Australian Medical Workforce Advisory Committee (AMWAC)

AMWAC was formed as a national advisory committee in 1995 to assist with the development of a more strategic focus to national medical workforce planning. It reports to AHMAC, and through AHMAC to the Australian Health Ministers' Conference. The Committee comprises representatives from Commonwealth government departments, State and Territory health authorities, the Australian Institute of Health and Welfare, the Australian Medical Council, peak organisations representing various sections of the medical workforce (including the Australian Medical Association, the medical colleges and University medical schools), and a consumer representative. It is supported by the AMWAC Secretariat.

AMWAC is by no means the sole government body with an interest in this area. In particular the Committee works closely with the AIHW especially on data issues and through it with the Health Insurance Commission, the Department of Immigration and Multicultural Affairs and the Department of Education Training and Youth Affairs. AMWAC also works closely with the MTRP of the Commonwealth Department of Health and Aged Care, particularly in regard to vocational training issues. Other key workforce players with whom AMWAC works include, State and Territory health authorities, university medical schools, the Australian Medical Council, the medical colleges, Divisions of General Practice and State and Territory Rural Workforce Agencies.

Upon establishment, one of AMWAC's first tasks was to produce an overall strategic framework within which its work would be conducted. The resultant report - *Australian Medical Workforce Benchmarks* - suggested that Australia had too many doctors and for the first time attempted to quantify the imbalances (AMWAC & AIHW 1996a). It was estimated that there was an excess of supply of urban general practitioners (GPs) in 1994 of 4,400 (2,900 full-time equivalent GPs), an undersupply of GPs in rural areas of 510 (445 full-time equivalents), an undersupply of specialists of 1,838, an undersupply of hospital non specialists of 400 and an undersupply of locums of 200 (AMWAC & AIHW 1996a). For policy makers, this report highlighted the complexities inherent in macro level workforce planning, namely, of having to develop ideas to deal with the somewhat mutually exclusive problems of shortage and surplus.

The benchmark project also highlighted the need for more detailed assessments of some of the main sectors of the workforce and of some of the key supply drivers. As a result, a large part of AMWAC's work program has involved further research on key macro influences such as, increased female participation in the workforce, Australia's use of temporary resident overseas trained doctors, trends in medical education and the likely impact of changes in the characteristics of medical students and the development of guidelines for the provision of sustainable specialist services. The other main focus of AMWAC's work has been a series of studies of individual medical disciplines. The following two sections focus on this latter aspect of AMWAC's work program.

A rationale for medical workforce planning

It is widely accepted that the general aim of national level planning is the provision of an adequate number of doctors with appropriate competence to meet the service needs of the population and to ensure that public resources are not wasted by the production of too many doctors (Greenberg and Cultice, 1997; Horvath et al., 1998). Too few doctors is likely to result in under servicing of patients, poor population health outcomes, overworked practitioners, higher prices and longer waits by patients for medical services. Too many doctors is likely to result in over servicing of patients, underemployment of doctors with a corresponding loss of skills,

growth in non-price competition, potentially poorer health outcomes for the population and unnecessary training costs (AMWAC & AIHW, 1998). Both scenarios have negative patient care and cost implications for the community.

Other factors underscoring the importance of medical workforce planning include the central role played by doctors in the highly labour intensive health industry and the long lead time required to produce a fully qualified doctor (Goldacre, 1998). Of the 610,000 persons employed in the health industry in 1998, 8% (48,934) were doctors (AIHW, 2000). The AIHW estimates that total expenditure on health services amounted to \$47.03 billion in 1997-98 and that labour costs for all persons employed in the industry accounted for 65% of this expenditure (AIHW, 2000b). On average, it takes between eight to twelve years of training for a person to enter the medical workforce depending on choice of discipline within medicine.

Measures available to workforce planners

In terms of policy intervention medical workforce planning provides essential advice to government, relevant regulatory authorities and the medical profession, particularly advice on supply and demand issues and potential policy implications.

In brief, macro level workforce planning involves selecting and employing measures for analysing and projecting (Doherty, 1988; Maynard and Walker, 1996; Greenberg and Cultice, 1997): population requirements for services (demand side measures); workforce supply (supply side measures); workforce productivity; and matching future supply and demand. AMWAC maintains that while a strict balance between supply and demand may be difficult to achieve in medical workforce management, planning to minimise divergences between the two are possible.

Within this broad analytic framework there are a number of measures available to workforce planners and judgement needs to be exercised in the type of measures used for review of any particular workforce. It is hardly surprising that the choice of measures is influenced by a range of factors, such as, international and national trends, the research methodologies favoured by those responsible for the analysis and the expectations of members of the workforce. Internationally, there is growing support for the use of a multi-modal approach to medical workforce planning drawing on a range of measures. As expressed by a well known economist there is a need “for the metamorphosis of health manpower forecasting per se into a better coordinated discipline of health manpower analysis” (Reinhardt, 1993).

1. Panel of experts

Employment of a multi-modal approach to workforce planning demands the careful selection of measures appropriate to the workforce under review so that unnecessary data collection is avoided. AMWAC has found the use of a panel of experts especially useful for dealing with this issue and for advising on the likely impact of technological advances, evidence based medicine and financial and health service organisation reforms on workforce utilization and productivity. In addition, the panel is able to assist in making judgements on the assumptions to be incorporated into any projection modelling and to advise on the reliability and validity of data from various sources. Selection of the panel of experts is undertaken in consultation with members of AHMAC, the profession and the Consumers Health Forum. Each AMWAC workforce working party is chaired by a member of AMWAC and supported by a member of the AMWAC Secretariat.

2. Supply side measures

Selection of workforce group

Choice of workforce group for review is the first decision that needs to be made. Several indicators may be used. For example, known workforce problems (maldistribution, shortage, oversupply etc) and size and importance of the workforce. In Australia, these decisions are made by AHMAC following consultation with State and Territory health authorities, medical organisations and other organisations with an interest in medical workforce matters.

Definition of workforce group

Secondly, the selected workforce needs to be defined (ie which sub-groups are represented within the workforce group of interest). For example, in reviewing the medical oncology workforce, AMWAC decided to include both medical oncologists and haematologists working in oncology.

Describing the workforce

Thirdly, the current workforce needs to be counted and described in order to establish a baseline from which to project future workforce supply requirements. Among relevant characteristics are age, sex, qualifications, income, ethnicity, type of practice (eg private sector, public sector), geographic location of practice and type and number of services provided by geographic location (Baker, 1988). Age and sex are factors known to influence the number of hours worked per week, doctor distribution and type of practice (AMWAC 1996b).

Most countries experience problems in accurately estimating and describing the current medical workforce due to paucity of data. Since the establishment of Medicare and the AIHW's Labour Force Unit in 1992, Australia has developed one of the most comprehensive medical workforce data-sets in the World. AMWAC's approach is to complement data from these established data-bases when necessary through survey of the workforce being reviewed and any other relevant sources. For example, to gain information about the provision of public hospital services, rural outreach services and services provided via telehealth.

Productivity measures

Measuring productivity is recognised to be one of the most complex and sensitive aspects of medical workforce measurement because of the wide range of services (procedural and cognitive) provided by clinicians both within and across disciplines (Harding and Conn, 1999). Adding to the complexity is the fact that within most disciplines some doctors spend more time than others in activities, such as multidisciplinary team work, administration (particularly in the public sector) and population health activities. The likely impact of technology on future doctor productivity is also difficult to predict.

Until improved measures become available, AMWAC's approach has been to use average hours worked per week and number of patients seen as indicators of doctor productivity within a given discipline. In addition, expert opinion and the views of members of the relevant workforce have been canvassed with respect to the likely impact of medical advances in technology on doctor productivity, work patterns and patient demand for services.

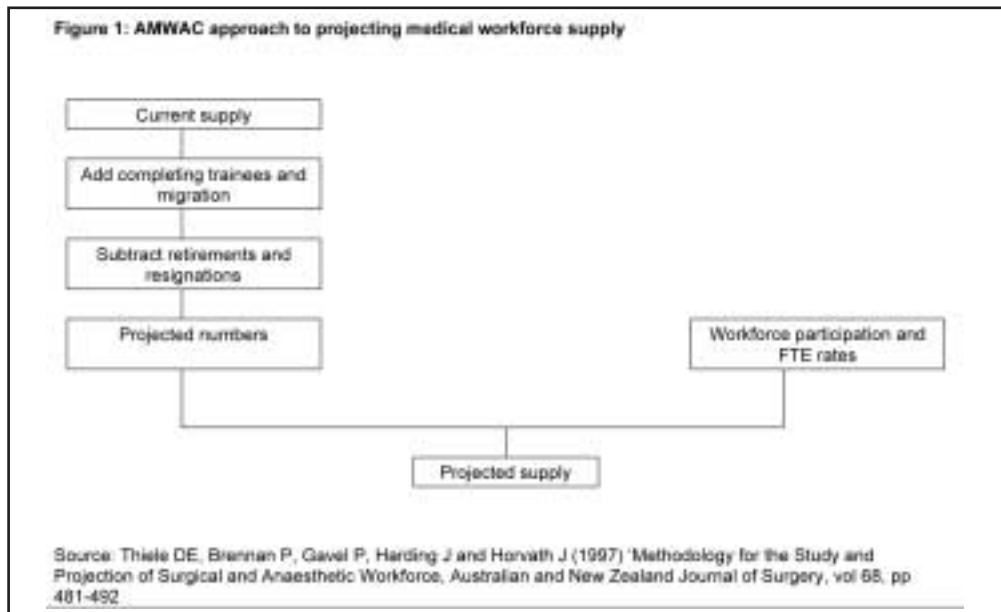
Projecting workforce supply

Increases in workforce supply come mainly from new graduates and from immigration. As with the current workforce, the number and characteristics of doctors from these two sources need to be assessed and factored in to the projection modelling because of their known impact on hours worked.

Measures of workforce losses include expected losses due to retirement, temporary withdrawal from the workforce, death and migration. Interestingly, within the Australian medical workforce AMWAC has found wide variation in the age of retirement by medical discipline, with doctors in some disciplines (for example psychiatry) working well beyond 65 years of age (AMWAC 1999a). Figure 1 summarises AMWAC's approach to projecting medical workforce supply.

3. Demand side measures

Many measures have been developed to assist planners to assess the adequacy of current doctor supply and to predict future workforce requirements. These include the traditional 'normative' approach, whereby existing professionally accepted (national or international) doctor-to-population ratios (DPRs) are accepted as representing a desirable norm, population 'needs-based' measures and population 'demand-based' measures. Most researchers agree that limitations apply to each individual method. For this reason there is growing support for the use of a multi-modal approach (Reinhardt, 1993; MWDRC, 1994; O'Connor and van Konkelenberg, 1995; Greenberg and Cultice, 1997; Roos et al, 1997; Horvath et al., 1998).



Doctor population ratios

Doctor to population ratios (DPRs), nationally and internationally defined, is the best known approach to medical workforce assessment. During 1995, when AMWAC analysed requirements for GPs in Australia, the only published methodology for determining need for GPs was application of DPRs (AMWAC & AIHW 1996a). With this approach data requirements are minimal and therefore the method is easily used. Known limitations of this measure include that it fails either to determine the suitability of present DPRs or to take account of the hours worked by doctors or changes in demand for services associated with technological innovations or population demographics (Doherty, 1988; Douglas, 1995).

In 1988, the Doherty report concluded that DPRs should mainly be used for describing trends over time. It recommended that in the future doctor 'full-time equivalent' based on hours worked be the measure of choice because it allows for 'changes in the feminisation of the workforce and changes in average weekly number of hours worked ... in planning overall workforce requirements' (Doherty, 1988, p 455).

Consistent with the recommendations of the Doherty report and others, AMWAC uses DPRs mainly for descriptive purposes and does not use them for benchmarking purposes or for estimating future workforce requirements.

Needs-based measures

In the main, needs based workforce planning seeks to link workforce supply requirements to estimates of population health need, as evidenced by population growth and patterns of morbidity using a range of epidemiological and expressed need indicators (Roos et al, 1997). The data demands are greater than the more straightforward DPR analysis, and as a consequence this approach is more time consuming and resource intensive. The AMWAC approach is to select needs-based indicators of relevance to the particular medical discipline under review.

Limitations associated with using this approach to predict future workforce requirements include that it tends to perpetuate current levels of utilisation and ignores the evidence that an increased supply of medical resources leads to increased utilisation and not necessarily to an increase in health status (Goodman et al., 1996). Others note that it does not take into account whether the society will actually be willing to finance all of the treatments deemed to be needed or whether members of the workforce will actually locate their practices where services are most needed (Reinhardt, 1993; Scotton, 1998).

To address some of these limitations AMWAC usually complements needs based planning data with information derived from survey of members of the workforce under review and from consumer support organisations, health authorities and referring doctors. For most specialist workforces the latter involves survey of Divisions of General Practice and may also involve survey of an associated specialist discipline. The aim of these surveys is to gain the views of health authorities, the profession and consumers on the adequacy of current levels of supply (ie shortages and excesses) by geographic location.

Medical workforce benchmarks

The process of benchmarking in medical workforce planning involves assessment of workforce supply against pre-determined or established 'benchmarks'. The chosen benchmark(s) can be based on international indicators or indicators from within an homogenous health system so that comparisons can be made between defined geographic areas. Goodman et al., (1996) maintain that benchmarking addresses some of the limitations associated with needs based planning and advocate selection of benchmarks that achieve low levels of deployment of clinically active doctors without measured loss of patient welfare due to shortage of doctors (Goodman et al., 1996).

The methodology used in the first report published by AMWAC (AMWAC and AIHW, 1996a) took a major step forward from the DPR methodology used in previous Australian workforce reviews. It derived for the statistical subdivisions of Australia estimates of population need for consultations, after standardising for age and sex and adjusting for low socioeconomic status. It then estimated how many FTE doctors would be needed to service these consultation workloads, after adjusting for increased female participation and the effects of practice rurality and remoteness on the per week consultation workloads of doctors. These estimates were then compared with actual 1994 workforce numbers (AMWAC & AIHW, 1996a).

More recently, the AMWAC General Practice Working Party used data from various sources to develop a workforce-in-balance benchmark based on measures of population need and on current levels of GP utilisation by geographic location (AMWAC, 2000a). This analysis was informed by a set of qualitative indicators of medical workforce shortage and oversupply (AMWAC & AIHW, 1998) (Table 1). In addition, this joint AMWAC/AIHW report noted that a workforce surplus could be masked by elasticity of medical practice. This elasticity involves expansion of the patient workload to compensate for declining numbers of patients per doctor in an over-supplied area (AMWAC & AIHW, 1998).

Health service targets

This approach to workforce planning seeks to match workforce supply with health service facility targets. Ideally these are based on established best practice guidelines. It involves estimating the number of essential facilities and support staff available, both now and in the future, for the provision of a particular medical service. For example, state and territory health authority and private hospital plans would be taken into account for the provision of adequately equipped and staffed acute care hospitals, emergency departments and radiology units. For most medical disciplines the provision of a service requires access to some health service facilities and support staff (AMWAC, 1998b). However, for some disciplines the level of infrastructure required places a major constraint upon the size of the workforce. AMWAC has found that this approach to planning is most useful in these situations. For example, this approach has been used with respect to emergency medicine, intensive care medicine and radiation oncology in which service provision occurs in defined units (for example emergency departments, intensive care units and facilities with megavoltage machines). It follows that there is little point in promoting growth in the medical workforce beyond the physical capacity of the system to utilise that workforce optimally.

Table 1: Indicators of medical workforce shortage, oversupply and in-balance**Indicators of shortage**

doctor provision well below the national average;
 services priced significantly above the average;
 level of Medicare bulk billing below average;
 under-servicing and unmet need;
 unacceptably long waiting times;
 over worked practitioners;
 high levels of dissatisfaction with the stresses of overwork and inability to meet population need;
 substitution of services by alternative providers;
 employment of temporary-resident doctors to fill unmet need;
 unfilled public positions; and
 consumers dissatisfied with access.

Indicators of oversupply

doctor provision well above any national average;
 growth of the workforce well in excess of population growth;
 prices significantly below the average, or high adherence to a floor price;
 declining average practitioner incomes;
 declining average patient numbers;
 supplier-induced demand and over-servicing;
 under-employment;
 insufficient work/variety of work to maintain skills;
 market restructuring; and
 growth in marketing effort.

Indicators of a workforce in balance

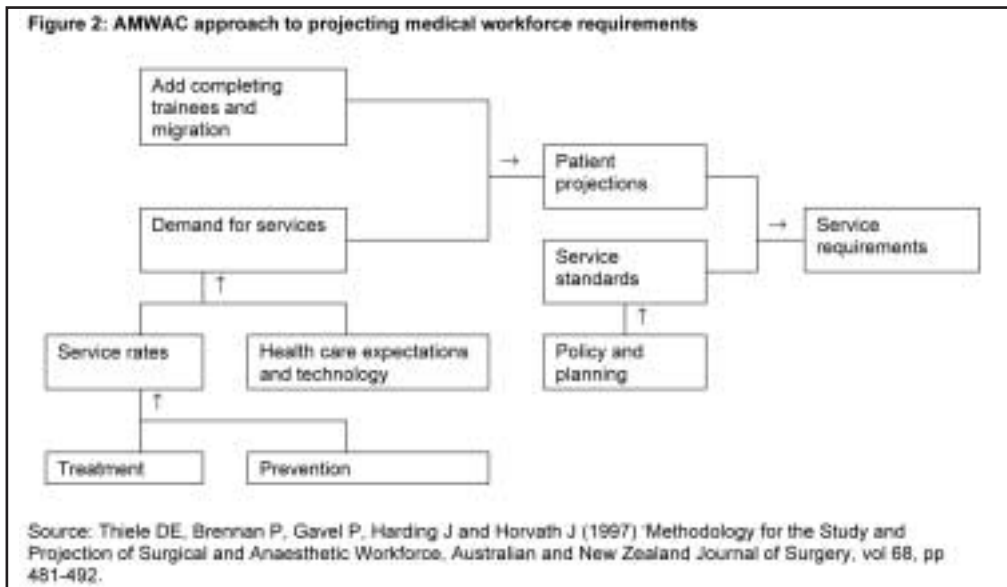
a 'lean' but adequate workforce with waiting times generally accepted by the community as reasonable;
 pricing of services neither at the floor price nor at a level which discourages patient attendances;
 long hours or short hours are worked by choice and not necessity; and
 workforce growth in line with need indicators.

Source: Australian Medical Workforce Advisory Committee and Australian Institute of Health and Welfare (1998), Medical Workforce Supply and Demand in Australia: A Discussion Paper, AMWAC Report 1998.8, AIHW Cat. No. HWL 12, Sydney.

Economic demand-side measures

These measures are predominantly associated with estimates of future economic demand for medical services based on an analysis of current levels of utilization, population demographics and socioeconomic attributes (influencing willingness to pay for services) and the prices being charged by doctors for their services. This approach appears to be particularly relevant when examining predominantly private sector workforces (Reinhardt, 1993). AMWAC has found this approach useful for assessing the adequacy of workforce supply and not so useful for predicting future workforce requirements. The obvious requirements are access to accurate data on patient ability and willingness to pay for medical services, on the prices being charged by doctors and the payments being received. In Australia, this includes Medicare payments, patient co-payments and income derived from other sources (eg public sector work, medico-legal work).

Budgeted public sector vacancies are proposed as a useful economic measure of demand for use with predominantly public sector workforces (Baker, 1988; MWDRC, 1994). This approach is favoured by AMWAC and is part of most medical workforce reviews.



4. Balancing supply and demand

Having estimated future requirements for a given workforce and the expected future supply under a no change scenario, it is then essential to analyse the discrepancies between the two.

However, before launching into such an analysis certain assumptions need to be articulated. For example, AMWAC generally assumes that there will be no radical change in existing national health structures over the ten year projection period, that population growth will be in line with estimates provided by the Australian Bureau of Statistics (ABS), that the current length of the respective training program will remain constant and that the number of overseas doctors entering the workforce annually will not change markedly. It is also assumed that the pattern of hours worked per week and service delivery of the current workforce (by age and sex) provides a suitable basis on which to project future workforce requirement. Other factors requiring careful consideration are the likelihood of a change in doctor productivity and of society using health care providers, other than doctors.

To facilitate the projection analysis AMWAC uses a computerized software model designed specifically for this purpose by van Konkelenberg (1995). On the supply side, the model takes into account any shortfall in the current workforce, expected entrants to the workforce and those leaving and converts the number of doctors to a full time equivalent figure using the average hours worked per week by age and gender. On the requirements side, the likely trend in demand for services is included, based on the growth estimates (eg population growth and other needs based indicators) selected for use with the respective discipline. Both supply and requirements are then projected over a ten-year period using a range of demand side growth estimates and supply side scenarios (eg doctors working fewer/more hours per week, increases/decreases in the number of overseas doctors entering the workforce).

5. Potential outcomes

Ultimately, planners need to recommend how any expected workforce shortages or excess in supply will be addressed. This may involve recommending an increase or a decrease in the number of people being trained or of the number of overseas doctors entering the workforce, or recommending measures likely to increase workforce productivity or perhaps the greater use of 'doctor-substitutes' (Baker, 1988). Whatever course of action is recommended it will have implications for the respective medical workforce, health authorities and the general community.

In general AMWAC favours adjustment to trainee intake as the best long-term solution to any anticipated imbalance between supply and estimated requirements. This approach is consistent with Australia's policy of 'self sufficiency' with respect to the supply of health personnel; a policy which we have in common with the United Kingdom, the Council of Europe, and Canada (Medical Workforce Standing Advisory Committee, 1995; Sullivan et al., 1996). However, it should be noted that this policy recognises that there will always be country to country exchanges of doctors and that Australia is likely to continue to employ a certain number of overseas doctors, both on a temporary resident basis and a permanent resident basis.

Summarising AMWAC's approach to workforce planning

AMWAC's brief is to provide information and analysis to AHMAC and the profession about the Australian medical workforce so as to inform the policy process. With respect to reviewing individual medical disciplines, AMWAC's strategy is to access data from existing data bases (AIHW, Medicare, ABS etc) and to collect whatever other information is required for the relevant workforce working party to:

- describe the current workforce (viz size, characteristics, distribution and service provision) and training program;
- estimate workforce inputs and outputs from retirements, death, migration, immigration and the training program;
- assess the adequacy of the supply and distribution of the current workforce drawing on any international and national benchmarks, the views of the profession and other key stakeholders (for example GPs, consumer organisations and state/territory health authorities);
- project workforce supply requirements for the next ten years using a range of needs based and demand based indicators;
- assess the likely impact of new technologies on doctor productivity and future demand for services;
- assess the likelihood of the community deciding to use other providers to provide some of the services currently provided by the respective medical workforce;
- project levels of workforce supply required to meet projected workforce requirements (ie to achieve a balanced workforce);
- recommend adjustments to training program inputs to achieve a balanced workforce within the ten year planning timeframe and to draw attention to any other pertinent issues raised as a result of the review;
- monitor and report to AHMAC whether supply and requirements are changing as expected, and also that recommendations are being implemented as agreed; and
- at least every five years revisit each workforce and review again. This process may need to be brought forward should the monitoring process indicate unforeseen changes or problems in implementing the recommendations.

Key findings arising from AMWAC reviews of individual disciplines

Until 1999, the priority focus of AMWAC's review program has been specialist disciplines thought to be in short supply. It is hardly, surprising therefore that for all specialties, apart for paediatrics and in the longer-term emergency medicine, there has been a need for more trainees to meet projected increases in demand associated with growth in the population, ageing of the population and advances in medical technology. This finding is consistent with the general conclusions of the first AMWAC report (AMWAC & AIHW, 1996a). However, apart from this general trend, reviews of individual disciplines have been characterised by diversity rather than similarity; indeed much more diversity than had been anticipated. For example the process has highlighted disciplines that (AMWAC, 2000b):

- have definite shortages (for example anaesthesia, dermatology and thoracic medicine);
- are expected to experience shortages if not corrected (for example urology, ear nose and throat surgery and orthopaedic surgery);
- have a definite surplus (for example paediatrics)
- are in a supply growth phase, because they are relatively new areas of specialisation, but in the longer term are expected to have to cut back on the number of trainees (for example emergency medicine);
- are not experiencing much growth in demand for services but have a large cohort of older practitioners moving through to retirement who will need replacing (for example general surgery and ear nose and throat surgery, where for both 40% of the workforce is aged over 55 years);
- are not experiencing much growth in demand for services but have a comparatively large cohort of older male practitioners moving through to retirement and a significant number of female practitioners moving into the workforce (for example obstetrics and gynaecology where 32.0% of the workforce is aged over 55 years and nearly 60% of current trainees are female);
- have current shortages of both practitioners and trainees and have problems attracting trainees to the discipline (for example rehabilitation medicine, geriatric medicine and intensive care);
- have structural shortages, which are unlikely to be overcome by only increasing training program output, but rather require a range of strategies (for example psychiatry);
- require changes in the approach to vocational training due to the changes that are occurring in the way services are being provided (for example dermatology and ear nose and throat surgery, where there has been a move away from service provision in public hospitals to service provision in the specialists' private rooms). This has been true for psychiatry for some time and the Royal Australian and New Zealand College of Psychiatrist's training program now provides training experiences in a wide range of health care settings in addition to public sector hospitals (AMWAC, 1999a).

As indicated above, AMWAC's work program includes monitoring and reporting to AHMAC on the implementation of workforce recommendations. Tables 2 and 3 indicate that, while the timeframe for implementation spans ten years, around 80% of recommended training program adjustments have been put in place. When disciplines where government funding has proved to be a barrier to implementation are excluded from the calculation (radiation oncology, ear, nose and throat surgery), compliance with AMWAC recommendations increases.

Table 2: AMWAC medical workforce reviews, recommended increase in advanced training positions and summary of implementation progress as at August 2000

Specialty	Number of training positions at the time of the AMWAC review ^a	Recommended increase in training positions ^b	Recommended total number of training positions ^b	Year 2000 positions (increase)
Anaesthesia	369 (1996)	120 (2006)	489 (2006)	454 (85)
Dermatology	42 (1998)	10 (2001)	52 (2001)	56 (14)
ENT surgery	40 (1997)	20 (2000)	60 (2000)	46 (6)
General surgery	176 (1997)	40 (2000)	216 (2000)	225 (49)
Ophthalmology	79 (1996)	12 (2006)	91 (2006)	91 (12)
Radiation oncology	52 (1998)	12 (2000)	64 (2000)	52 (0)
Urology	33 (1996)	9 (2006)	45 (2006)	38 (5)

a - the year in brackets after the number of training positions refers to the year the workforce review was completed (using training position numbers from the previous year)

b - the year in brackets after the number of training positions refers to the year by which the recommended increases should ideally be in place

Source: AMWAC and medical colleges

Table 3: AMWAC specialist workforce reviews, recommended first year advanced training placements and summary of implementation progress as at August 2000

Specialty	Estimated first year trainee intake at the time of the AMWAC review ^a	Recommended first year trainee intake ^b	First year trainee intake 2000
Cardiology	24 (1999)	24-28 (2000-2003)	29
Emergency medicine	120 (1997)	120 (1997-1999), 100 (2000) 70 (2001), 40 (2002), 25 (2003 on)	150
Geriatric medicine	16 (1997)	25 (1999-2000), 22 (2001-2002)	18
Intensive care	16 (1999)	24 to 26 (2000-2008)	19
Obstetrics & gynaecology	42 (1998)	55 (1999-2000)	50
Orthopaedic surgery ^c	32 (1999)	38 (2000), 40 (2001), 44 (2002-2005)	33
Paediatrics	58 (1998)	Around 35 from 2001	68
Psychiatry	111 (1999)	124 (2001) 131 (2002 onwards)	117
Rehabilitation medicine	15 (1997)	Increase up to 25 (1998-2000)	20
Thoracic medicine	13 (1999)	16 (2001), increasing by 2 per year up to 24 (2005)	15

a - the year in brackets after the number of trainees refers to the year the workforce review was completed (using trainee numbers from the previous year)

b - the year in brackets after the number of trainees refers to the year by which the recommended changes in trainee placements should ideally be in place

c - output in 2003 expected to be 36 based on 3 lateral entry candidates entering in period 2000-2002

Source: AMWAC and medical colleges

To date, AMWAC has undertaken only one detailed stage 2 review and this concerned orthopaedic surgery. In the original 1996 report, workforce requirements were estimated to increase by 3% per annum. The 1999 review found that growth in requirements was marginally lower than first estimated (viz 2.7% per annum) (AMWAC 1999b). Further updates are in progress for several of the earlier studies, including anaesthesia and emergency medicine.

It is also interesting to note that the list of individual medical workforces requiring adjustment in trainee numbers as recommended by AMWAC is similar to the list proposed by Patterson (Table 4) who used price and copayment analysis to derive his conclusions (Patterson 1994). This is of some interest, given that AMWAC in adopting a multi-modal approach to its work with an emphasis on population needs chose not to consider copayment analysis, due partly to its more controversial methods and also because needs based planning combined with the use of benchmarks offers a more comprehensive approach. AMWAC's approach also allows quantification of the adjustments required to trainee intakes. This is obviously an advantage when it comes to advising governments and the profession on strategies to bring workforce requirements and supply in to balance.

Table 4: Comparison of AMWAC recommended workforce adjustments (using needs based analysis) with those suggested by Patterson (using price and co-payment analysis)

AMWAC, 1995-2000	Patterson, 1994
Increase trainee intake	Evidence of need to increase the workforce
Anaesthesia	Anaesthesia
Dermatology	Cardiology
ENT surgery	Cardiothoracic surgery
General surgery	Dermatology
Geriatric medicine	ENT surgery
Intensive care	General surgery
Ophthalmology	Neurosurgery
Orthopaedic surgery	Ophthalmology
Psychiatry	Orthopaedic surgery
Radiation oncology	Plastic surgery
Rehabilitation medicine	Vascular surgery
Thoracic medicine	Urology
Vascular surgery	
Urology	
Maintain trainee intake at current levels	
Cardiology	
Obstetrics and gynaecology	
General practice	
Decrease trainee intake	Evidence for reducing the workforce
Paediatrics	General practice
Emergency medicine (in long term)	General medicine
	Neurology
	Paediatrics
	Psychiatry

Source: Derived from Patterson, John 1994, 'A new look at national workforce strategy', Australian Health Review, 17:1, pp 5-57; and Australian Medical Workforce Advisory Committee 2000, Annual Report 1999-2000, AMWAC Report 2000.5, Sydney.

Key findings arising from AMWAC research to inform policy

The first AMWAC report in 1996 - *Australian Medical Workforce Benchmarks* - achieved two important objectives. First it once again highlighted the fact that the workforce was seriously maldistributed, both geographically and structurally (ie across disciplines). Secondly, it quantified the extent to which the Australian medical workforce was oversupplied and estimated the time it would take for the workforce to move in to balance with population requirements. In other words, nationally, the country had too many doctors, while at the same time there were too few doctors in some localities and some sectors of the workforce (viz specialists, particularly some disciplines, hospital non-specialists and locums). These findings stimulated not only the reviews of individual disciplines, but also a desire for greater understanding of the factors responsible for these problems so that policy makers could be better informed.

The 1996 AMWAC report *Female Participation in the Medical Workforce in Australia* described the extent to which the participation of women in the workforce was increasing and drew attention to variation in the hours worked by male and female doctors. It also pointed out that general practice was apparently popular with women and that, should this trend continue, it would likely compound the current structural problems with general practice becoming a predominantly female workforce and most specialist disciplines predominantly male. Added to this was the fact that the male workforce was ageing and that maldistribution among disciplines was likely to increase unless more women chose to become specialists. Furthermore, it appeared that a greater proportion of women had a preference for urban practice and that, should this trend continue, it could escalate the problem of geographic maldistribution (AMWAC & AIHW, 1996b). Subsequent AMWAC reviews of individual specialist workforces have confirmed these general trends.

The AMWAC 1996 report *The Medical Workforce in Rural and Remote Australia* recommended strategies to improve the supply of doctors (general practitioner and specialist) in rural and remote areas (AMWAC, 1996). A number of strategies were recommended for consideration by government (Commonwealth, State/Territory and Local), the medical profession, university medical schools and other stakeholders and some have been progressively adopted (General Practice Rural Incentives Program, 1998; DHAC 2000). Among the recommended strategies were:

- incentive schemes (for example providing a Higher Education Contributions Scheme rebate to doctors who spend a minimum period of time in a rural area and increased payments for doctors working in poorly supplied rural and remote areas);
- changes to medical school admission and education policies;
- changes to medical college vocational training programs to stimulate interest in rural practice;
- increased support for doctors working in isolated rural areas; and
- use of nurse practitioners in designated areas of need.

As its title implies, the 1997 AMWAC report *Characteristics of Students Entering Australian Medical Schools 1989 to 1997* described demographic trends among medical students, including the representation of Aboriginal and Torres Strait Islander students and students with a rural background. It found that while some improvements had occurred during the last decade, there was room for further improvement. Importantly, the report found that most medical schools were implementing admission and educational content policies and strategies with the long-term view of addressing known workforce problems. As a result of the significant changes occurring in medical schools and the external environment it was recommended that the impact of these changes should be monitored. The report also drew attention to the fact that the number of students training in Queensland and Western Australia would be inadequate to replace temporary resident doctors employed in those states should they no longer be deemed as medical practitioners for Medicare purposes (AMWAC & AIHW, 1997).

To inform policy on specialist supply to rural and remote areas, AMWAC worked collaboratively with the medical colleges and their respective societies to produce guidelines for the provision of sustainable resident and regular visiting specialist services in a range of geographic settings (AMWAC, 1998a). This report highlighted the fact that few specialist disciplines are able to provide an appropriate service in isolation. A strong association was found between population size requirements for a viable service and health care facility infrastructure requirements (for example specialist departments with specialist support staff such as nurses and allied health

staff and requirements for access to other specialists). Important to most specialist disciplines were good working relationships with local general practitioners. For some disciplines, it was essential to have the support of colleagues from the same specialty with the result that population requirements increased (AMWAC, 1998a).

The 1998 report *Influences on Participation in the Australian Medical Workforce* (AMWAC 1998b) articulated the barriers confronting women in gaining entry to, and succeeding in, some specialist disciplines and the factors leading them to choose certain disciplines. The report found that women sought training programs that allowed sufficient flexibility for them to fulfil their other important social roles (spouse/partner and mother). Many women also expressed negative views about the hospital environment with its demanding shift work, comparatively rigid management practices, lack of part time training and work opportunities and child care facilities. Specialist disciplines perceived to have similar characteristics were also avoided by women (AMWAC 1998b).

Since 1997, the MTRP has produced a series of reports with a focus on improving the training experiences of medical trainees (MTRP, 1997; MTRP, 1998a, MTRP, 1998b, MTRP, 1999). AMWAC works in close collaboration with the MTRP and other key stakeholders with an interest in the welfare of medical vocational trainees (medical colleges, the Australian Medical Association and State/Territory health authorities). In 1999 a joint workshop was convened involving key stakeholders in medical vocational training from all States/Territories of Australia. The express purpose of the workshop was to identify workable solutions to the issues raised in the 1998b AMWAC report and the MTRP report *Trainee Selection in Australian Medical Colleges* (also known as the Brennan report) (MTRP, 1998b). At the close of this workshop there was general support among the stakeholders:

of the principles of transparent, fair and accountable selection processes for postgraduate clinical vocational training;

that in the process of making working practices and training schemes flexible for women, any changes should not increase the overall length of vocational training;

for greater collaboration among medical colleges and hospitals and health departments to facilitate appropriate selection processes and adaptable training schemes (AMWAC & MTRP, 2000).

An important component of AMWAC's review process was release in early 1999 of the discussion paper *Medical Workforce Supply and Demand in Australia* (AMWAC & AIHW 1998). This report discussed strengths and weaknesses of AMWAC's approach to medical workforce planning and identified areas in which the methodology could be strengthened drawing on international research and AMWAC experience. In addition, the report concluded that before setting new benchmarks for the total Australian medical workforce, a review of the general practice workforce should be undertaken using a similar methodology to that used by AMWAC to review medical specialist workforces (AMWAC & AIHW 1998).

In 1999, AMWAC found that the contribution made by temporary resident doctors (TRDs) to the Australian medical workforce was significant and that their use highlighted areas of current shortage (AMWAC, 1999c). Their greatest contributions were to the public hospital workforce and the locum workforce, both urban and rural. Junior doctors have traditionally filled these types of position as part of their journey to becoming part of the permanent general practice or specialist workforce. The report also found that TRDs were considered by employers to be a flexible workforce that could be used to fill gaps as required. Furthermore, their use was increasing and this trend was expected to continue. Between 1992-93 and 1997-98, the number of TRDs increased by 25.9%, with 1,702 entering Australia in 1997-98. The majority of TRDs were from the United Kingdom, Ireland and North America. Opportunity to work in Australia for approximately 12 months enabled many TRDs to broaden their work experiences. The report was unable to quantify the number of Australian doctors travelling overseas for a similar purpose (AMWAC, 1999c).

Conclusions and challenges for the future

The findings of the above TRD report suggest that while much has been achieved with respect to medical workforce planning in Australia, considerable challenges lie ahead. The 'global market' for highly skilled medical practitioners is adding to the complexities associated with medical workforce planning in many countries with TRDs being used in increasing numbers to address problems associated with geographic and structural maldistribution.

Shortages within specialist disciplines have been identified and medical colleges and health authorities have generally joined forces to make the necessary adjustments to training programs. These collaborative efforts will need to continue.

Access to specialist rural outreach services has increased during the last five years and changes in medical education and other rural initiatives should improve the geographic distribution of the workforce in the future. However, currently access to services in many rural locations remains problematic. The outcomes of initiatives to improve workforce geographic distribution require ongoing monitoring and evaluation (Australian Health Ministers' Conference, 1999).

Developments in information technology transfer, such as telemedicine and e-health have enabled access to specialist services for some patients and their primary care providers. Unfortunately, most forms of rural outreach service is ad hoc and therefore vulnerable; dependent upon the creativity, energy and commitment of individual clinicians and the health and hospital authorities that support them.

The forces leading to and maintaining workforce structural maldistribution are better understood as a result of AMWAC studies and the work of other stakeholders (for example General Practice Strategy Review Committee, 1998). AMWAC has identified that ongoing research aimed at further improving our understanding of the factors influencing the career decisions of young doctors needs to commence.

Strategies have been articulated for addressing some of the barriers for women in gaining access to some disciplines. However, it is yet to be seen whether these strategies will be sufficient to encourage a more even distribution of male and female trainees across disciplines and eventually the medical workforce.

Health care system changes have impacted on the teaching hospital environment such that for some specialist disciplines alternative community based training experiences need to be found. This trend is likely to continue and to extend to more disciplines.

Summary

Forces leading to and maintaining workforce geographic and structural maldistribution are better understood as a result of AMWAC research and the work of other stakeholders and strategies have been implemented. However, the outcomes of these strategies require monitoring, while work needs to continue on exploring ways to improve access to medical services for people in currently underserved areas.

The immediate demand is to review those disciplines within the workforce not yet examined by AMWAC and for further research to improve understanding of the hospital medical workforce and of factors influencing the career decisions of young doctors. Some of this work is already in progress.

There is also need to develop improved methods for analysing and predicting workforce supply and requirements. For example, benchmarks for assessing workforce adequacy and requirements by geographic location and appropriate and reliable measures of workforce productivity. Other challenges confronting AMWAC are the likely effects of changes in medical practice and service delivery on future requirements for doctors. For example, evidence-based medicine and efforts to improve service coordination and efficiency.

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