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July, 2001
Executive Summary

1. Objective of report

The objective of this report is to provide the Australian Competition and Consumer Commission with an evaluation of the 1999 Report of the AMWAC Orthopaedic Surgery Workforce Working Party.

2. Methodology of AMWAC report

The main objectives of the AMWAC Orthopaedic Surgery Workforce Working Party Report are to assess the adequacy of the current size of the orthopaedic surgery workforce, and to make recommendations on the optimal workforce size for 1999 to 2009.

The methodology used by the Working Party can be summarised as:

a) Assessment of adequacy of current supply –
• Estimate current levels of supply of services by orthopaedic surgeons.
• Assess whether current supply of services by orthopaedic surgeons is adequate.
• Adequacy is determined with reference to: Surgeon/Population ratio; Public hospital orthopaedic surgery vacancy rate; Trends in hours worked by orthopaedic surgeons; and Surgery waiting times.

b) Recommendation on number of training positions –
• Forecast future demand for services of orthopaedic surgeons.
• Forecast future supply of services by orthopaedic surgeons assuming current inflows to the workforce from the training program remain unchanged.
• Compare forecasts of future demand and supply.
• Make recommendations on changes to number of training positions in order to achieve balance between future demand and future supply.

3. Conclusions of AMWAC report

a) On the issue of adequacy of supply of orthopaedic surgeons the 1999 Report of the AMWAC Orthopaedic Surgery Workforce Working Party makes the judgement that “…the weight of evidence still pointed to the current workforce adequately meeting requirements” (AMWAC, 1999, page 28).

b) It is recommended that training program output should increase from about 32 per annum to between 38 and 44 per annum for the period between 2003 and 2009. Demand for services of orthopaedic surgeons is forecast to increase at 2.7 per cent per annum. In the absence of any adjustment to the orthopaedic training program labour supply of orthopaedic surgeons would increase at a slower rate. Hence, it is necessary to increase the number of training positions.
4. Outline of evaluation

The evaluation of the Orthopaedic Surgery Workforce Working Party Report is undertaken in several stages:

a) Evaluation of the AMWAC process for making recommendations on the orthopaedic surgery workforce, and issues regarding implementation of those recommendations;

b) Evaluation of the methodology for assessing adequacy of current size of the orthopaedic surgery workforce;

c) Evaluation of the methodology for forecasting future labour supply of orthopaedic surgeons, and the methodology for forecasting future demand for services of orthopaedic surgeons;

d) Evaluation of recommendations on changes to number of training positions for orthopaedic surgery; and

e) Discussion of other issues relating to adequacy of the orthopaedic surgery workforce not addressed in the AMWAC report.

The scope of the evaluation of AMWAC medical workforce planning that is undertaken in this report is intended to include all issues relating to medical workforce planning that have potential competition implications. Hence it is important to note that – although the evaluation is concerned with matters that arise directly from the 1999 report - some issues considered are outside the terms of reference of AMWAC, or involve medical workforce outcomes over which AMWAC does not have direct control.

5. Evaluation of AMWAC process

Composition of the Working Party:

i) The composition of the Working Party (two orthopaedic surgeons and one other surgeon out of six members) raises the possibility that the decision-making process is dominated by that group; and

ii) The absence of a role for any body with the objective of representing consumer interests and with significant expertise in economics and quantitative methods may limit the scope for consumers to be effectively represented.

Implementation of recommendations:

It is noted in the AMWAC Report that recommendations made by an earlier (1996) review of the orthopaedic surgery workforce were not fully supported by the Australian Orthopaedic Association.

i) It must be of some concern that the Australian Orthopaedic Association is able to effectively disregard recommendations of the AMWAC Working Party without formal scrutiny of its justifications either by AMWAC or the Working Party; and

ii) An evaluation is made of the reasons why it is suggested that the Australian Orthopaedic Association chose to restrict increases in training positions to less than the increases recommended in the 1996 report. The evaluation casts considerable
doubt on whether those reasons do constitute an acceptable explanation for failure to adopt the recommendations.

6. Evaluation of assessment of adequacy of current workforce size

Is the methodology adequate?

The methodology for assessing the adequacy of the current size of the orthopaedic surgery workforce involves two stages: first, estimation of the current level of supply (weekly hours of labour supplied by orthopaedic surgeons); and second, evaluation of the adequacy of current supply.

The methodology for estimating current supply is satisfactory – although there are some reasons for thinking it would be sensible to incorporate data on weeks worked by orthopaedic surgeons into the calculations of labour supply.

The methodology for assessing the adequacy of the size of workforce can be described as an ‘indicator’ approach. A set of indicators or criteria is chosen, measures of each indicator are calculated, and an evaluation of whether each measure is consistent with adequate supply of orthopaedic surgeons is made. Implicit in the choice of indicators for the review of the orthopaedic surgery workforce is that it is appropriate to assess the adequacy of supply using the benchmark of current levels of demand for services of orthopaedic surgeons.

The first issue that arises regarding this methodology is whether it is appropriate to assess the adequacy of supply using the benchmark of current demand, and whether the ‘indicator’ approach is appropriate. In practice, it does seem that this represents the best available methodology. While it might be possible to define alternative approaches to making an assessment of the adequacy of size of workforce that would be superior to the chosen methodology, such approaches are not likely to be able to be implemented in a satisfactory manner.

The second issue is whether the way that the indicator approach is applied in the report of the Orthopaedic Working Party is satisfactory. On this issue several points of concern exist:

i) Justification for indicators:
The choice of indicators does not seem to be related in a systematic manner to the overall objective of assessing the adequacy of the orthopaedic surgery workforce;

ii) The way the indicator approach is applied:
One problem is that there is no ex-ante specification of what outcomes for each indicator should be considered to meet adequacy. For example, there is no specification of what would be the threshold patient waiting and clearance times beyond which it would be judged that supply is not adequate. Specification of general principles or benchmarks by which it will be judged that supply is or is not adequate seems essential for the workforce review process to achieve an appropriate standard of transparency. Second, there is an apparent inconsistency in the way that the indicators are applied. For example, the
Surgeon/Population ratio and measures of waiting times are assessed in terms of their current levels; but the hours worked indicator is assessed in terms of whether there has been a change over time. Third, there is no discussion of the way that information on each indicator is aggregated to make an overall assessment of adequacy; and

iii) Other indicators:
Extra indicators – for example, on incomes of orthopaedic surgeons or prices of services supplied by that group- would appear to provide additional information useful for assessing the adequacy of workforce size.

Inconsistency between reports

There appears to be an inconsistency between the conclusion of the 1999 report that the current supply of orthopaedic surgeons was adequate, and predictions made in the 1996 report about future growth in demand and supply, that cannot be reconciled.

Evaluation of adequacy of supply

For the criteria of the Surgeon/Population ratio; Public hospital vacancy rates; and Trends in hours of work by orthopaedic surgeons – the conclusion of the report that each measure is consistent with adequate supply seems reasonable. However, the conclusion that data on waiting times for surgery indicate that supply is adequate does not seem reasonable, and instead, data on waiting times suggest a shortage of orthopaedic surgeons relative to other types of surgeons.

7. Evaluation of forecast of supply

In general terms the approach adopted for forecasting supply – first forecasting the numbers of surgeons in each year by taking the base period number, adding new entries from the training program and immigration/re-entry, and subtracting retirements; and second applying data on hours worked together with the predicted number of surgeons to forecast total weekly hours of labour supply – is reasonable.

Some more specific problems do however appear to exist with the methodology:

a) Assumptions on retirements and immigration –
First, the assumed rate of retirement is far less than the apparent rate of retirement for the years between 1994 and 1998. Some reconciliation of the difference seems necessary to support the assumed rate of retirement in the 1999 report. Second, the assumed rate of immigration of orthopaedic surgeons seems relatively high compared to the preceding period, and it is not clear that it takes account of emigration.

b) Assumptions on hours of work and weeks worked –
It is assumed that current levels of hours of work (by age and gender group) will continue in future time periods. Given data on trends in hours of work this seems a reasonable
assumption. No attempt is made to incorporate information on weeks of work. This could be important where changes in average weeks of work are occurring over time.

8. Evaluation of forecast of demand

In general terms the approach taken to forecasting future demand in the AMWAC report – to first derive a baseline rate of growth in demand due to population growth and changes in the age composition of the population; and second to assume a further growth in demand due to increases in service usage within each age group – seems sensible and reasonable.

Some more specific problems do however appear to exist with the methodology:

a) Method for forecasting growth in service usage –
One problem is that the approach to choosing a forecast growth rate is not sufficiently justified. In the AMWAC Report the figure of 2.7 per cent growth per annum is chosen as this is the rate at which performance of principal procedures had grown from 1994-95 to 1996-97. However, there is no discussion of why the category of principal procedures are likely to be representative of overall future demand growth. Second, where supply constraints exist, data on growth in usage of services will reflect those constraints, and will not be an accurate measure of demand growth. Third, there is no attempt to take into account factors that might cause differences between the growth rate in usage of orthopaedic services in previous periods and in the future (for example, trends in private health insurance).

b) Calculations of demand growth –
Estimates of demand growth in the AMWAC Report are not based on an assumption that demand growth is 2.7 per cent per annum (compound). When this assumption is incorporated it appears that there is an extra shortfall of 10 orthopaedic surgeons compared to what is calculated in the report.

9. Evaluation of recommendations on training positions

Forecasts of demand and supply growth – based on the recommended increases in training positions – show that in 2007 there would remain a gap of 2.9 per cent between demand and supply. This appears to be at the end of the time period over which the size of the labour force would be increasing due to growth in training positions implemented from 1999 onwards. There is no discussion of why the recommended growth in training positions is not sufficient to remove the entire gap between demand and supply by 2007.

10. Other issues

The workforce planning that is undertaken in the 1999 AMWAC Report on the orthopaedic surgery workforce is in many respects a fairly limited exercise. The restriction in scope to assessing the adequacy of the size of the orthopaedic surgery workforce, and making recommendations on workforce size, excludes other workforce-related issues that have important implications for the welfare that society derives from the supply of medical
services. It is suggested that, in particular, it would have been appropriate for the medical workforce review undertaken by AMWAC to have assessed:

a) The adequacy of the training program for orthopaedic surgeons. Issues with regard to the nature of the training program would appear to be the selection process for entry to the program, the quality of training in the program, whether the program provides an equal opportunity for all those who meet the entry standard to participate, and the method of qualification or certification for those completing the training program; and

b) The quality of medical services supplied by the orthopaedic surgery workforce. Dimensions of quality that might be considered are comprehensive waiting time measures (for example, from referral to initial consultation, and from being recommended for surgery to the performance of the procedure), and indicators of outcomes from surgical procedures (for example, rates of post-operative readmission to hospital).

c) The role of other factors – apart from the number of orthopaedic surgeons – in determining the supply of services by orthopaedic surgeons. It would seem important – as part of the process of workforce planning – for AMWAC to evaluate whether factors such as public hospital funding constitute a constraint on supply of orthopaedic surgery services. Where other factors do constitute a constraint then it would seem reasonable for AMWAC to be able to make recommendations on those factors as well as on workforce numbers.
1. Introduction

I am instructed that for some years the Australian Competition and Consumer Commission (ACCC) has had concerns about the medical workforce planning undertaken by the Australian Medical Workforce Advisory Committee (AMWAC). The ACCC has been invited by AMWAC to provide its views about its processes and about medical workforce planning.

The ACCC has therefore sought an assessment of the 1999 report of the AMWAC Orthopaedic Surgery Workforce Working Party. This report to the ACCC provides an evaluation of the 1999 Report of the AMWAC Orthopaedic Surgery Workforce Working Party (AMWAC, 1999; referred to as the 1999 report).

The 1999 Report has as its main objectives to assess the adequacy of the current size of the orthopaedic surgery workforce, and to make recommendations on the optimal workforce size for future years.

The evaluation of the 1999 report in this report addresses several main issues:

a) The AMWAC process for reviewing and making recommendations on the size of the orthopaedic surgery workforce, and issues regarding implementation of AMWAC recommendations;

b) The methodology used by the Working Party for assessing adequacy of current supply of orthopaedic surgeons;

c) The methodology used by the Working Party for forecasting future labour supply of orthopaedic surgeons, and future demand for services of orthopaedic surgeons;

d) The methodology used by the Working Party for making recommendations on changes to number of training positions for orthopaedic surgery; and

e) Other issues relating to the adequacy of the orthopaedic surgery workforce not addressed in the 1999 Report.

The scope of the evaluation of AMWAC medical workforce planning that is undertaken in this report is intended to include all issues relating to medical workforce planning that have potential competition implications. Hence it is important to note that – although the evaluation is concerned with matters that arise directly from the 1999 report - some issues considered are outside the terms of reference of AMWAC, or involve medical workforce outcomes over which AMWAC does not have direct control.

Despite attempting to provide a broad coverage of competition issues, there are also some restrictions on the scope of the evaluation that is undertaken in this report. First, the issue of whether it is appropriate to engage in planning about, and regulation of, the size of workforce is not addressed. (For example, the approach of seeking to control the size of workforce could be contrasted with an approach where relatively greater emphasis would be placed on controlling entry standards to a medical workforce group.) Second, the report does not address whether some preferable alternative to the current structure of workforce
planning by AMWAC exists. That is, the report takes as a given the structure whereby AMWAC refers to separate Working Party groups the responsibility for reviewing and making recommendations on the size of individual medical workforce groups. However, the report does make some comments on weaknesses of the current AMWAC Working Party structure.

The main source of information for the evaluation that is undertaken is the 1999 report. However, two previous reports on the orthopaedic workforce – the 1996 Report of the AMWAC Orthopaedic Surgery Workforce Working Party (AMWAC, 1996a; referred to as the 1996 report), and the 1994 Report of Callaghan and Associates for the Australian Orthopaedic Association (Callaghan and Associates, 1994; referred to as the Callaghan report) – are also used. These reports provide background information, and the 1996 and 1999 reports can be compared to assess whether AMWAC has applied a consistent methodology. (It should be noted that the Callaghan report was not prepared by AMWAC. Hence this report is used to obtain some background information, and its methodology is at some reports compared with the AMWAC reports. But there is no assessment of consistency between the Callaghan reports and the AMWAC reports.) Other AMWAC reports and literature from the health economics field have been used in the preparation of the evaluation.

The next section of the report provides an overview of the methodology used by the AMWAC Orthopaedic Surgery Workforce Working Party. Subsequent sections address the set of issues described above.

### 2. Current methodology

A summary of the methodology used by the AMWAC Orthopaedic Surgery Workforce Working Party in preparing the 1999 report is presented in Figure 1. The summary also draws on the general description of the AMWAC methodology in Thiele et al. (1998) and AMWAC (2000a).

The first objective of the workforce planning by AMWAC is to assess the adequacy of the current size of the orthopaedic surgery workforce. This objective is undertaken in two stages referred to in Figure 1 as stages 1 and 2. The second objective of the workforce planning is to make recommendations on the number of orthopaedic surgery training positions that should exist in future years (in order to achieve the ultimate objective of an optimal workforce size). This objective is undertaken in three stages referred to in Figure 1 as stages 3, 4 and 5.
Figure 1: Workforce Review Methodology:

1. What is current supply?
   a. Estimate number of specialists by gender by age.
   b. Estimate average hours of work by gender by age.
   c. Combine (a) and (b) to estimate total hours of labour supply

2. Is current supply adequate? [YES]
   Criteria:
   a. Specialist/population ratio
   b. Public hospital vacancy rate
   c. Change in average hours worked
   d. Surgery waiting times
   [Sustainability of service; Opinions of specialists on adequacy of supply]

3. Forecast annual rate of growth in demand
   a. Rate of growth in demand due to population growth/change in age composition.
   b. Rate of growth in demand due to increase in usage of services (within age group)
   c. Combine (a) and (b) for estimate of overall annual rate of growth in demand

4. Forecast annual rate of growth in supply

5. Recommendations on supply
   a. Compare rate of growth in demand and supply for each year relative to starting year.
   b. Where forecast demand growth exceeds forecast supply growth – Increase assumed entry levels from training until supply growth and demand growth are equal.
   c. Recommend increase in training positions sufficient to achieve balance between demand supply.

For each year forecast number of specialists by gender by age (Assume entry from training is constant at current levels). Combine with data on current average hours by age by gender to estimate total hours supplied in that year.
rate of growth in demand
Stage 1 involves estimation of the current level of supply of services by orthopaedic surgeons. The level of supply is expressed as a measure of hours of labour supply per week. To calculate an estimate of hours of labour supply it is necessary to obtain data on: a) the number of orthopaedic surgeons; and b) average weekly hours of work by each surgeon (disaggregated by age and gender).

Stage 2 is an assessment of whether current supply of services by orthopaedic surgeons is adequate. In the 1999 report this involves evaluating whether current supply meets a set of criteria:

i) Adequacy of Surgeon/Population Ratio (SPR);
ii) Public hospital orthopaedic surgery vacancies;
iii) Trends in hours worked; and
iv) Adequacy of surgery waiting times.

In the 1999 report the judgement is made (AMWAC, 1999, p.28) that “…the weight of evidence still pointed to the current workforce adequately meeting requirements…”.

Stages 3 and 4 involve an assessment of whether the future supply of services by orthopaedic surgeons will be satisfactory to meet future demand for services. In stage 3 future demand is forecast. Assuming it is concluded that the current level of supply is adequate this is done by adjusting current supply by an assumed annual rate of growth in demand. A benchmark (or minimum) rate of growth in demand is estimated as the annual rate of growth due to forecast population growth and changes in the age composition of the population. The benchmark rate of growth in demand is adjusted upwards to take into account increases in service usage over time within age groups. A range of sources of information on demand growth in preceding years is examined in order to make this adjustment. In the 1999 report (AMWAC, 1999, p.30) the overall rate of growth in demand is assumed to be 2.7% per annum.

In stage 4 future supply is forecast. Starting with the current number of surgeons, a forecast of the number of surgeons in each future year is made by taking the number of surgeons in the previous year, adding the estimated number of new surgeons from training programs (assuming current numbers of training positions are unchanged), adding an estimate of the new entry from immigration and re-entry, and subtracting the estimated number of retirements. The forecast number of surgeons is converted to an estimate of weekly hours of labour supply using data on current average hours of work per surgeon (disaggregated by age and gender). A comparison of forecast demand of and supply for services of orthopaedic surgeons provides a measure of the adequacy of future supply.

In stage 5 an assessment is made of the numbers of orthopaedic surgeons that will be required in future years in order to adequately meet forecast demand for services. Recommendations are made on changes to the number of orthopaedic surgery training positions that should be implemented in order to achieve the required change in the number of surgeons. Specifically, it is recommended that output from the orthopaedic surgery training program should increase from the current level of about 32 to between 38 and 44 per annum for the period from 2003 to 2009.
3. Process

a. How recommendations are made - Composition of AMWAC Orthopaedic Surgery Workforce Working Party

The composition of the Working Party that prepared the 1999 report included, out of six members, two orthopaedic surgeons, one other surgeon, and no consumer representatives (Other members were from the Commonwealth Department of Health, AMWAC, and the Australian Institute of Health and Welfare (AIHW)). The composition of the Working Party that prepared the 1996 report, out of seven members, included two orthopaedic surgeons, one other surgeon, and one consumer representative (Other members were from AMWAC, the NSW Department of Health, and the Commonwealth Department of Human Services and Health.)

An issue that arises with regard to composition of the Working Party is the potential dominance of decision-making by surgeons. Involvement of orthopaedic surgeons in the workforce advisory process is obviously a necessity. Their expert knowledge and perspective are likely to be an essential ingredient for developing an appropriate workforce review methodology, and for implementing that methodology in a sound manner. Moreover, participation in the advisory process is likely to promote ‘ownership’ of recommendations, and hence to make compliance with those recommendations more likely. However, it must also be recognised that existing members of the surgical profession may have some interests or goals that will conflict with society or government objectives. With a potential divergence of interests, it does not seem desirable to have a situation where members of the profession are able to dominate decision-making in the advisory process. Yet, where members of the surgical profession make up one-half of the Working Party, and are likely to have an enhanced influence due to their knowledge of the profession, such an outcome must be considered a strong possibility.

A second issue is the absence of a role for any body with the objective of representing consumer interests and with significant expertise in economics and quantitative methods. A representative with expertise in economics and quantitative methods would bring an ability to evaluate public policy in terms of efficiency and welfare criteria, and is likely to be significantly better equipped to undertake the type of data analysis required in a review of workforce issues, than consumer representatives without that expertise.

b. Implementation of recommendations

b.i. Recommendations on total number of surgeons

In its 1996 report the Orthopaedic Surgery Workforce recommended an increase of 12 training positions per annum between 1996 and 1999. This would have resulted in an ultimate increase of 48 training positions (AMWAC, 1996a, p.28). However, in its 1999 report the Orthopaedic Surgery Workforce noted that the Australian Orthopaedic
Association (AOA) “…had not followed through on the recommendations, only increasing total trainees by eight” (AMWAC, 1999, p.2).

The difference between forecast new entries to the profession based on recommendations of the 1996 report, and forecast new entries at the time of the 1999 report based on actual training program positions, is shown below:

**Table 1: New entries to orthopaedic surgery, 1998 to 2003**

<table>
<thead>
<tr>
<th>Year</th>
<th>Forecast – 1996 – With recommendations on increases in training positions</th>
<th>Forecast – 1999 – Based on actual training positions data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>1999</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>2000</td>
<td>38</td>
<td>31</td>
</tr>
<tr>
<td>2001</td>
<td>39</td>
<td>27</td>
</tr>
<tr>
<td>2002</td>
<td>40</td>
<td>32</td>
</tr>
<tr>
<td>2003</td>
<td>41</td>
<td>34</td>
</tr>
</tbody>
</table>

Sources: AMWAC (1996a, Table 6, page 27); and AMWAC (1999, Table 25, page 32).

The decision of the AOA to restrict the increase in training positions to below what had been recommended in the 1996 report will result in a reduction in new entries to the profession from the training program of around 7 or 8 in each year from 2000 to 2003 relative to what would have occurred had the recommendations been implemented.

The 1999 report suggests that several factors explain why the AOA chose not to adopt the recommendations: primarily, that the forecast rate of growth in demand for services of orthopaedic surgeons of 3 per cent per annum was too high; and that supply of orthopaedic surgeons had been increased through immigration of seven new orthopaedic surgeons since the time of the 1996 review.

Evaluation of the process of implementation of recommendations from the AMWAC report indicates two main areas of concern. First, it is revealed that the AOA is able to effectively disregard those recommendations without formal scrutiny by the Orthopaedic Working Party or by AMWAC of its justifications. This would appear to be a significant issue in assessing whether an optimal size of workforce is likely to result from the existing workforce planning process, and for assessing the competition implications of that process. Second, undertaking an evaluation of the reasons why it is suggested that the AOA chose not to adopt the recommendations of the 1996 report casts considerable doubt on whether those justifications do constitute an acceptable explanation for failure to adopt the recommendations.
On the first justification, it is not clear what evidence the AOA might have used to conclude that growth was below 3 per cent per annum by such a sufficiently large magnitude to warrant the significant difference between recommended increases in training positions and the actual increase implemented. The 1999 report concludes – using nationally representative data – that growth in principal orthopaedic services was 2.9 per cent in the one year for which data are available following the 1996 report (AMWAC, 1999, Table 12, page 20). And other measures of demand growth reported show even higher rates of growth in the post-1996 period.

On the second justification, it does not seem to be the case that the 1996 report ignored the effect on supply from immigration. Although the exact assumption about increase in number of surgeons per annum from immigration is not described, the consultancy report appended to the main report does state (AMWAC, 1996a, Appendix p.29) that “‘In migration’ and newly qualifying specialists are added” in calculating the number of surgeons each year. Hence, only to the extent that the immigration of seven surgeons is in excess of assumed levels of immigration is this a valid argument for not expanding the number of training positions.

An overall evaluation of the AOA’s response to the recommendations of the 1996 report can also be made. Suppose that 1994 is taken as a starting point with the assumptions from the 1996 report of 674 surgeons supplying 28,855 hours per week (that is, an average per surgeon of 42.81 hours – AMWAC, 1996, Appendix page 30, Table 7). (Note that this exercise is based on the 1996 report that uses the Callaghan report’s hours of work data. But this does not affect the outcome. The same exercise could equally have been undertaken using hours of work data from the 1999 report). Suppose it is then assumed that each year from 1996 to 2003 there were two extra new surgeons due to immigration (in excess of what is already assumed by the 1996 report), but that new entry from the training program, instead of following the recommended numbers from the 1996 report, follows the actual numbers from the 1999 report. In this case there would be 16 extra new surgeons due to immigration, but 34 less new surgeons from training programs. Hence there is a net deficit of 18 surgeons. Assume that each surgeon would have worked 42.81 hours per week. This deficit of surgeons amounts to a reduction in weekly hours of 770. Hence, supply in 2003 would be 35,326 hours rather than 36,096 hours as forecast in the 1996 report. This represents a rate of growth of 2.05 per cent per annum since 1994. In other words, the AOA’s actions in departing from recommended increases in training positions would only be justified if demand was increasing at 2.05 per cent per annum. But a rate of growth of 2.05 per cent per annum is significantly below any of the estimates of average demand growth for that period that are presented in the 1999 report.

[It also seems worth noting that in the AMWAC Annual Report for 1999-2000 (AMWAC, 2000b, pp.9-10) it is stated that “The level of first year trainee intake in 2000, and that expected in 2001, is below the AMWAC recommendation but the RACS has advised that the output from those years will be boosted by lateral entry candidates to give an output of 36 in 2003 and 37 in 2004. This will need to be monitored closely…”].

b.ii. Recommendations on geographic distribution of surgeons
The Orthopaedic Working Party also has the role of making recommendations on the geographic distribution of the workforce. Data on existing supply suggest that there are significant imbalances in the distribution of surgeons between states, and within states between country and city regions. The table below shows SPRs by state for 1994 and 1997:

Table 2: Surgeon/population ratio by state, 1994 and 1997

<table>
<thead>
<tr>
<th>State</th>
<th>1994</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>1/25,085</td>
<td>1/25,846</td>
</tr>
<tr>
<td>VIC</td>
<td>1/30,141</td>
<td>1/30,443</td>
</tr>
<tr>
<td>QLD</td>
<td>1/27,325</td>
<td>1/26,592</td>
</tr>
<tr>
<td>SA</td>
<td>1/18,701</td>
<td>1/17,423</td>
</tr>
<tr>
<td>WA</td>
<td>1/29,345</td>
<td>1/28,299</td>
</tr>
<tr>
<td>TAS</td>
<td>1/35,185</td>
<td>1/33,699</td>
</tr>
<tr>
<td>ACT</td>
<td>1/25,333</td>
<td>1/22,071</td>
</tr>
<tr>
<td>NT</td>
<td>1/34,200</td>
<td>1/94,593</td>
</tr>
</tbody>
</table>

Sources: AMWAC (1996a, Table 1, page 7), and AMWAC (1999, Table 2, page 11).

With regard to the intra-state distribution of orthopaedic surgeons, in 1996/97 the number of surgeons per 100,000 population was 4.3 in capital cities, 4.5 in other metropolitan areas, but only 1.7 in rural areas (AMWAC, 1999, Table 3, page 12).

In this context it seems worth noting that failure of the AOA to adopt the recommendations of the 1996 report on the overall expansion of training positions has been accompanied by an apparent failure to significantly alter the distribution of training positions between states. Hence, geographic mal-distribution of surgeons will persist beyond the period envisaged by the 1996 report. The table below shows trainees by state in 1996 and 1998, and the number of training positions that the 1996 report recommended should exist by 1998:

Table 3: Orthopaedic trainees by state, 1996 and 1998

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW/ACT</td>
<td>42</td>
<td>44</td>
<td>52</td>
</tr>
<tr>
<td>VIC/TAS</td>
<td>25</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>QLD</td>
<td>22</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>SA/NT</td>
<td>8</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>WA</td>
<td>12</td>
<td>13</td>
<td>18</td>
</tr>
</tbody>
</table>
There is no discussion regarding the failure to significantly alter the distribution of training positions between states (from 1996 to 1998) in the 1999 report.

4. Adequacy of current workforce size

In this section the assessment of adequacy of current workforce size in the 1999 report is evaluated. The methodology for assessing the adequacy of current supply of services by orthopaedic surgeons involves two stages: first, estimation of the current level of supply; and second, evaluating the adequacy of current supply. In sub-section (a) comments are made on the suitability of the methodology for assessing adequacy that is applied in the report. In sub-sections (b) and (c) comments are made on the implementation of the methodology in the report. And, in sub-section (d) the issue of geographic distribution of orthopaedic surgeons in examined.

a. Is the methodology for assessing adequacy adequate?

a.i. Method for estimating current levels of supply

Data on number of surgeons and weekly hours of work
The methodology for estimating current supply is to use data on the number of surgeons, and aggregate weekly hours of work by those surgeons.

Number of Surgeons: The exercise undertaken by Callaghan and Associates (1994, Table 15, page 27) for determining the number of surgeons through reconciliation of alternative data sets seems ‘best practice’ and should be regarded as producing a highly reliable estimate of the number of surgeons. The 1996 AMWAC report relies on the same estimates also using 1994 as its base period. The 1999 AMWAC report is somewhat looser in its approach. It provides data on the number of surgeons in 1998 from a range of sources, and then chooses a number that seems reasonable based on the range of data sources. This estimate for 1998 – which is not arrived at by seeking to reconcile the data sources - is not likely to be as robust as for 1994. However, given that the data sources report numbers of surgeons that are fairly close together it is unlikely that application of the methodology from the earlier report would significantly alter the estimated number of surgeons in 1998.

Weekly hours of work: The method for obtaining data on weekly hours of work - from the AIHW medical labour force survey - seems reasonable. (The only point to note it that differences in surveys mean that data from the Callaghan and Associates (1994) report, and the AMWAC report (1999), are not directly comparable.)
Data on weeks of work

Estimation of current supply seems to make an implicit assumption that surgeons work for 52 weeks per year. (For example, hours per week are estimated to be 40,231 in 1998, and the number of surgeons is 710 (AMWAC, 1999, Table 25, page 32). If all surgeons are assumed to be working in any week this gives an estimate of hours per week per surgeon of 56.6 which is very close to the data reported on hours worked per week (55.7 – AMWAC, 1999, Table 5, page 15).)

The only data that is apparently available on weeks worked in Australia – reported in Callaghan and Associates (1994, page 22) – however suggests that surgeons work on average 42 weeks per year. Hence, the estimate of total hours supplied per week in the 1999 report is likely to be an over-estimate of actual supply. If each surgeon works for 42 weeks per year then at any time only about 80 per cent of the potential workforce will actually be engaged in providing services to patients. Therefore, the estimate of labour supply would need to be revised downward by that amount. For example, where the potential SPR in 1998 was 1/26,400, the ‘effective’ SPR at any time would be 1/33,000.

Even if it is argued that use of the potential SPR in the 1999 report to assess the adequacy of supply does implicitly take into account that surgeons do not work for 52 weeks per year, nevertheless, the issue of weeks worked per year would also seem to have important implications for how to forecast supply. Hence, it seems important – as part of any basic data collection on labour supply of medical practitioners – to collect data on weeks of work.

a.ii. Method for evaluating adequacy of workforce size

The methodology for assessing the adequacy of workforce size can be described as an ‘indicator’ approach. A set of indicators or criteria is chosen, measures of each indicator are calculated, and an evaluation of whether each measure is consistent with adequate supply of orthopaedic surgeons is made. Adequacy of supply is assessed primarily with respect to whether supply meets demand. However, there is also some attention to the question of whether supply is sustainable (for example, whether hospital and ancillary services are sufficient for the size of the workforce group).

In the 1999 report the set of indicators is:

i) Adequacy of SPR;
ii) Public hospital orthopaedic surgery vacancies;
iii) Trends in hours worked; and
iv) Adequacy of surgery waiting times.

Implicit in these indicators is an important assumption – that the appropriate benchmark for assessing adequacy of workforce size is current demand for services of orthopaedic surgeons. Measures of hours worked and waiting times are a reflection of the relative magnitudes of current demand for and supply of services of orthopaedic surgeons. Hence it is whether current supply meets current demand that is being considered when these measures are used to assess adequacy.
The first issue that therefore arises regarding this methodology is whether the use of current demand as a benchmark for assessing adequacy of workforce size is appropriate. In practice, it does seem that this type of approach represents the best available methodology. Although it is possible to define alternative benchmarks that appear in theory to be superior to using current demand as the benchmark for assessing adequacy, such approaches are not likely to be able to be implemented in a satisfactory manner.

To illustrate the difficulties of alternative methodologies it is useful to consider how an economist might ‘ideally’ go about determining the optimal workforce size. For an economist concerned with maximising efficiency, and where the output under examination is a relatively homogeneous good, a simple rule can be used to characterise the optimal workforce size – Choose a workforce size such that at that size the marginal social value of output equals the marginal social cost.

In the case of a medical workforce, implementation of this rule would require calculating measures of the marginal social benefit and marginal social cost from services provided by the workforce. Given existing institutions in the market for medical services in Australia, and existing data sources, this seems an impossible task. There are three main problems:

• Subsidisation of the cost of medical services (through the Medicare system), and the potential for medical practitioners to affect the level of demand for medical services (through provision of a joint product of diagnosis and treatment), make it very difficult to draw inferences on the marginal social value of medical services using data on usage of those services;
• Where the existence of entry barriers to the medical profession cause some component of rents in the payments to medical practitioners, then it will be difficult to make inferences on the marginal social cost of medical services from data on current costs; and
• There is the potential for a high degree of heterogeneity in the quality of medical services so that application of the efficiency rule would also need to take account of the relationship between workforce size and quality of services.

An alternative benchmark for assessing adequacy might be some measure of the amount of medical services that it is estimated would be required for the population to achieve and maintain defined minimum acceptable health levels. But once again it seems that it would be very difficult to implement such an approach.

Hence, it seems that analysis of whether current supply meets current demand is the best practical method for assessing the adequacy of the size of the medical workforces. It should also be noted that where government intervention in the market for medical services is designed to induce levels of demand that are socially optimal (for example, to achieve equity goals or to correct for market failures that would otherwise exist) then the current demand for medical services might be considered as a reasonable proxy for the social value of those services, and therefore constitutes a strong rationale for its use in assessing adequacy of supply.

A second issue is whether the ‘indicator’ approach is appropriate. Again, this does seem the best available methodology for assessing the adequacy of current workforce size. The
justification for this approach is that there does not appear to be any one measure that could be applied to adequately characterise whether current supply of medical services meets demand for those services, and whether the services are sustainable. Instead, it seems desirable to use a range of measures or indicators to assist in making these judgements.

The third issue is whether the way that the methodology – assessing adequacy of supply against current demand, and the ‘indicator’ approach - is applied in the 1999 report is satisfactory.

One point on implementation of the methodology concerns the choice of indicators. It seems reasonable to assume that the specific indicators that are applied should be related to the overall objective of assessing the adequacy of current supply. No detailed justification for the indicators for adequacy used in the 1999 report is however presented, either in the report itself, or in related background reports. There is some discussion of possible adequacy indicators in AMWAC reports on benchmarks (AMWAC, 1996b, and 1998b), but no motivation for indicators in terms of overall objectives. Explicit consideration of how an indicator relates to overall objectives that medical workforce planning is intended to achieve would have two main benefits – first, it provides a context for assessing the appropriateness of an indicator; and second, for deciding the relative weight that should be attached to each indicator. Consider, for example, the SPR indicator. This indicator seems useful for assessing whether a specialist workforce is sustainable (for example, using the benchmarks for resource sustainability set out in AMWAC, 1998b). However, it seems less directly informative about whether a workforce meets current demand.

A second matter concerns the way in which the indicators that are used in the report are applied. Here, there are many points that can be made. One is that there is no ex-ante specification of what outcomes for each indicator should be considered to meet adequacy. For example, there is no specification of what would be the threshold waiting and clearance times beyond which it would be judged that supply is not adequate. Specification of general principles or benchmarks by which it will be judged that supply is or is not adequate seems essential for the workforce review process to achieve an appropriate standard of transparency. Second, there is an apparent inconsistency in the way that the indicators are applied. For example, the SPR and measures of waiting times are assessed in terms of their current levels; but the hours worked indicator is assessed in terms of whether there has been a change over time. Third, there is no discussion of the way that information on each indicator is aggregated to make an overall assessment of adequacy.

A third matter is whether the indicators in the report provide a sufficiently comprehensive perspective for assessing adequacy. There is at least one dimension where the indicators applied in the 1999 report do not appear satisfactory. Information on income of surgeons, or on the price of a fixed ‘basket’ of procedures performed by surgeons, would provide additional information on the balance between supply and demand in the market for orthopaedic surgery services beyond what is available from the indicators in the 1999 report. The important point to understand about price or income measures is that they are determined as a joint outcome from the interaction of supply and demand. Hence, these measures can (for example) provide information on the way that the balance between
demand and supply changes over time. Whereas, a measure such as SPR, which is purely a supply-side measure, can provide only a partial perspective on that issue.

b. Inconsistency between reports

In its 1996 report the Orthopaedic Surgery Working Party – on the basis of analysis of surgeons’ opinions on the adequacy of the workforce; growth in elective surgery waiting lists; hours of work data; and vacancy date – concluded that at that time “…the orthopaedic workforce was satisfactory” (AMWAC, 1996a, page 16).

At the same time the 1996 report forecast that in 1998 there would be a 4.3 per cent shortfall in supply relative to demand (AMWAC, 1996a, Table 6, page 27). If the argument (made in the 1999 report) that there were additional entries to the workforce from immigration beyond what was forecast in 1996 is accepted, then this shortfall would be reduced to 3.5 per cent. (This assumes 7 extra surgeons each working 42.8 hours per week). If it is also accepted that demand growth was 2.7 per cent per annum rather than 3 per cent the shortfall in supply falls to 2.1 per cent.

Despite the prediction of the 1996 report, in the 1999 report it is concluded that in 1998 “…the weight of evidence still pointed to the current workforce adequately meeting requirements” (AMWAC, 1999, page 6). Yet it is difficult to know (apart from the extra immigration and slower growth in demand – which are not sufficient to remove the gap between supply and demand) what other factors might have altered between 1996 and 1999 for the later report to contradict the predictions made in the earlier report.

It seems important that reports on the same medical workforce group undertaken at different points in time should be consistent. This means that a judgement on the adequacy of the workforce in 1999 should be able to be reconciled with forecasts of demand and supply in 1999 made in the 1996 report. (This would involve either showing that actual demand and supply conditions in 1999 are the same as had been forecast in an earlier report, or showing why those forecasts do not accurately reveal the state of supply and demand in 1999.)

c. Evaluation of adequacy of workforce size using specified criteria

The 1999 report evaluates adequacy of the size of the orthopaedic surgery workforce using the four criteria described above. On the basis that the current SPR falls within the range of 1/22,000 to 1/30,000 that is regarded as necessary to sustain an orthopaedic surgery service it is concluded that current supply is satisfactory on the SPR ratio criterion. Second, the public hospital vacancy rate for orthopaedic surgeons is found to be 2.0%, which is regarded as satisfactory. Third, the absence of any strong trend in hours worked by orthopaedic surgeons, also appears to be interpreted as meeting the standard for adequacy. While the conceptual basis for using these three criteria as a method for assessing adequacy of current workforce size can be questioned (see discussion above in section 4.a), the judgement that the 1999 report makes about whether each criterion is met, seems reasonable.
However, for the fourth criterion of surgery waiting times, it seems less obvious that it should be concluded that current workforce size is adequate, based on the evidence that is presented. Information is presented on median waiting time to admission, and clearance time, by surgical speciality areas (AMWAC, 1999, Tables 22 and 23, pages 27-28). It is acknowledged in the report (AMWAC, 1999, page 28) that “…waiting times for non-urgent surgery were well above the average, average waiting times for urgent surgery were in line with the national average for all surgery”. On both measures of waiting time orthopaedic surgery is very close to the average for all types of surgery for urgent (category 1) surgery. But for non-urgent surgery (categories 2 and 3) orthopaedic surgery is about 50 per cent above the average for all types of surgery. On the median waiting time measure orthopaedic surgery ranks 9th out of 11 surgical specialties; and on the measure of clearance time it ranks 11th out of the 11 specialties.

The conclusion that the waiting time criterion for adequacy is satisfied must rest on a weighting scheme that attaches almost 100 per cent weight to urgent conditions. Yet no justification for such a weighting scheme is offered. In the absence of such justification, the information on waiting lists would appear – contrary to what is concluded in the report - to provide evidence of a shortage of orthopaedic surgeons relative to other types of surgeons.

(This analysis accepts that it is a valid methodology to examine inter-speciality waiting times as an indicator of adequacy. Some arguments for why this might not be appropriate have been presented in section 4(a.ii). For example, there is an implicit assumption that the ‘average’ waiting time from a set of specialty groups is the appropriate measure of adequacy. There is no reason why such an assumption should necessarily be correct.)

d. Geographic distribution

The appropriate geographic boundaries of a labour market for a professional service are defined by the catchment region from which consumers would be willing to travel to purchase services from a professional supplying that service. Obviously this definition involves some ambiguity in that a consumer may live at a location that is in a catchment area for more than one professional. At the same time, particularly when applied to Australia, it is obvious that there are consumers who are not in the same labour market. For example, a person who lives in Western Australia would presumably only travel to Victoria to receive treatment by an orthopaedic surgeon in exceptional circumstance. It therefore seems reasonable to think of each of the capital cities as a separate labour market, and non-city regions to also be broken into sub-regions with separate labour markets for supply of orthopaedic services.

To the extent that the relevant markets for consumers or orthopaedic services in Australia are particular geographic regions, it seems appropriate that adequacy of supply should be assessed for those regions. However, most of the analysis that is undertaken in the 1999 report is for the whole area of Australia. This is despite the fact, as shown in the table below for 1997, that the SPRs in some states are considerably in excess of what is regarded as appropriate for Australia.
It is the case that the recommendations in the 1999 report are disaggregated by state so that SPRs between states would be in balance by 2008 (AMWAC, Table 26, page 33). However, recommendations in the 1999 report do not include measures to attempt to remedy imbalances in supply between rural and city/metropolitan areas.

Table 4: Surgeon/population ratio by state, 1997

<table>
<thead>
<tr>
<th>State</th>
<th>SPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>1/25,846</td>
</tr>
<tr>
<td>VIC</td>
<td>1/30,443</td>
</tr>
<tr>
<td>QLD</td>
<td>1/26,592</td>
</tr>
<tr>
<td>SA</td>
<td>1/17,443</td>
</tr>
<tr>
<td>WA</td>
<td>1/28,299</td>
</tr>
<tr>
<td>TAS</td>
<td>1/33,699</td>
</tr>
<tr>
<td>ACT</td>
<td>1/22,071</td>
</tr>
<tr>
<td>NT</td>
<td>1/94,593</td>
</tr>
</tbody>
</table>

Source: AMWAC (1999, Table 2).

5. Forecasting supply

In general terms the approach adopted for forecasting supply – first forecasting numbers of surgeons by taking the base period number, adding new entries from the training program and immigration/re-entry, and subtracting retirements; and second applying data on hours worked together with the predicted number of surgeons to forecast total weekly hours of labour supply – is reasonable.

The exact method for combining hours data with numbers of surgeons – using hours data that are disaggregated by age and gender – is appropriate. With this methodology predictions of future labour supply can, for example, take account of changes in the gender composition of medical workforces allowing for differences in hours of work for males and females. This is not, however, a significant issue for orthopaedic surgery where female participation is minimal.

The comments in the remainder of this section focus on specific aspects of the methodology for forecasting supply.

a. Assumptions on retirements and immigration per annum

An evaluation of assumptions made in the 1999 report on retirements and immigration can be undertaken using two criteria – first, whether assumptions made in the 1999 report are consistent with assumptions made in previous reports; and second, whether the assumptions made are consistent with actual outcomes in the past.
(Both these criteria are ‘backward looking’ – that is, they use historical data to assess whether assumptions on future outcomes are reasonable. It would also be possible to assess whether the assumptions are consistent with ‘forward looking’ criteria – for example, with expectations on retirement dates of orthopaedic surgeons. In the 1999 report, however, no data are presented that allow such an evaluation to be made.)

\textit{a.i. Retirements}

In the 1999 report it is assumed that retirements will be 10 per annum (AMWAC, 1999, page 29). The same assumption was made in the 1996 report. The 1996 report derives this assumption by combining estimated rates of retirement by age with data on the age distribution of surgeons. (Using the ‘average retirement rate’ from AMWAC, 1996, Table 5 in appendix – applied to data on number of surgeons by age from Callaghan and Associates, 1994, Table 1, and AMWAC, 1996a, Figure 2.) In the 1994 report it was assumed that retirements would be 14 per annum (Callaghan and Associates, 1994, page 36). In that report the forecast number of retirements per annum was derived from survey responses from surgeons on their expected year of retirement.

No supporting argument for the assumption on retirement is presented in the 1999 report. However, as noted above, it is the same assumption as was made in the 1996 report. The retirement rates in that report are based on forecast exit rates by age from the 1994 report. Hence a comparison between the 1999 report and earlier reports reveals them to be largely consistent – mainly because each is based on the same assumptions on retirement by age derived from the expectations data from the 1994 report.

Where there appears to be a larger discrepancy is between the assumed number of retirements and actual data on retirements from 1994 to 1998. This point can be made in two ways. First, in 1994 there were 674 surgeons, and in 1998 710 surgeons. In the 1996 report (AMWAC, 1996a, Table 6, page 27) it is forecast that new entries from the training program would be 26 per annum – in other words, a total of 104 between 1994 and 1998. Add to this the seven extra surgeons from immigration and there is an inflow between 1994 and 1998 of 111 surgeons. Hence, exits from the profession between 1994 and 1998 must equal $674 + 111 - 710 = 75$. In other words, the actual data suggest an average of 18 to 19 surgeons exiting from the profession each year between 1994 and 1998.

The second way to make the point is to examine data on the number of surgeons by age:

\begin{center}
\textbf{Table 5: Number of orthopaedic surgeons by age, 1994 and 1997}
\end{center}

\begin{tabular}{|l|c|c|}
\hline
Age group & 1994 & 1997 \\
\hline
45-54 years & 220 & 208 \\
55-64 years & 144 & 141 \\
65+ years & 131 & 98 \\
\hline
\end{tabular}

Sources: AMWAC (1999, Table 4, page 14); and Callaghan and Associates (1994, Table 2, page 13).
Making the assumption that surgeons are uniformly distributed over the age interval 55-64 years implies that between 1994 and 1997 there would have been about 43 extra surgeons reaching age 65+. Hence the total reduction in surgeons aged 65 years and above between 1994 and 1997 is $43 + 131 - 98 = 76$. This exercise suggests that the number of surgeons exiting the profession was about 25 per annum.

Hence a comparison of actual data on retirement between 1994 and 1998 suggests much higher levels of retirement than is assumed in the 1999 report. Some reconciliation of the difference seems necessary to support the assumption that is made in the 1999 report.

**a.ii. Immigration**

In the 1999 report it is assumed that immigration and re-entry will increase the number of surgeons by six per annum.

In the 1994 report it was assumed that one overseas qualified surgeon each year would graduate from the lateral entry program (Callaghan and Associates, 1994, page 44). In the 1996 report it was assumed that immigration of surgeons would increase supply by 2-3 per annum (AMWAC, 1996a, page 27). Hence, there appears to be some contrast between the assumption made in the 1999 report and those made in earlier reports. (Although this may in part reflect that the 1999 report includes a more extensive definition of sources of supply from outside the training program.)

No data are presented to allow a comparison between the assumption made in the 1999 report and actual increases in supply due to immigration and re-entry in previous years. However, it can be noted that the 1999 report does state that there had been an increase of seven overseas qualified surgeons between 1996 and 1998 (AMWAC, 1999, page 2). This appears to be consistent with a level of immigration of 2-3 per annum.

Another issue that is not explicitly addressed is emigration of orthopaedic surgeons. It is stated that immigration and re-entry will increase the number of surgeons in each year by six. However, it is not clear whether this amount is intended to be net of those Australian trained surgeons who emigrate. If it is not net of emigration, an adjustment would need to be made to take account of this factor.

**b. Assumption on hours of work**

In estimating future supply it is assumed that current hours of work (disaggregated by age and gender) are an appropriate estimate of future hours of work of orthopaedic surgeons. This is a reasonable approach provided that there are no strong trends evident in hours of work. For the case of orthopaedic surgeons it does not seem that any strong trend is evident so that the approach is appropriate (AMWAC, 1999, pages 26-27).

**c. Assumption on weeks worked**

No information is incorporated into forecasts of supply on weeks worked. Yet the most appropriate measure of labour supply is annual hours supplied by each surgeon. Where
average weeks worked is not constant then the measure of weekly hours supplied will not be an accurate measure of annual hours of labour. For example, if average weeks worked are declining then the forecast of weekly hours of labour will be an over-estimate of the proportionate change in annual hours of labour supplied. This seems an important issue that warrants further investigation, and it is surprising that a question on weeks worked is not included in the AIHW Labour Force Survey.

6. Forecasting demand

In general terms the approach taken to forecasting future demand in the report – to first derive a baseline rate of growth in demand due to population growth and changes in the age composition of the population; and second to assume a further growth in demand due to increases in service usage within each age group – seems sensible and reasonable.

The comments in the remainder of this section focus on specific aspects of the methodology for forecasting demand.

a. Method for deriving assumptions on growth in service usage

The method for calculating baseline growth in demand due to population growth and changes in the age composition of the population is appropriate. However, the method for deriving an estimate of the further growth in demand due to increased service usage is less satisfactory.

An ideal approach to forecasting total growth in demand would be to have data on usage of each type of service provided by orthopaedic surgeons disaggregated by age of patient, and on the average time taken in performing each type of service. It would then be possible – using forecasts of population growth by age; historical data on increases in usage of each service within each age group; and on changes in average time per service – to forecast total required hours. Such detailed data on usage of individual services do not however appear to be available. Hence this method is not feasible.

The approach therefore taken to derive an estimate of the further growth in demand due to increased service usage is to present a range of historical data on growth in orthopaedic service usage. On the basis of this set of historical estimates of demand growth the Working Party chooses a ‘reasonable’ estimate of the rate of growth in demand in future years. There are three main problems with this approach – that support the conclusion that the method used in the 1999 report is not satisfactory.

One problem with this approach is that there is little justification for the choice of a specific estimate of demand growth from amongst the possible set. For example, in the 1999 report the figure of 2.7 per cent is chosen as this is the rate at which performance of principal procedures had grown from 1994-95 to 1996-97. However, there is no discussion of why the category of principal procedures are likely to be representative of overall future demand growth.
Information was requested from AMWAC on ‘Why is the measure of growth in principal orthopaedic procedures chosen as the appropriate measure for forecasting future demand growth?’ AMWAC has responded to the ACCC that:

“In the case of orthopaedic surgery, two growth indicators were considered, namely population growth and growth in principal orthopaedic hospital procedures. The latter was chosen because this measure was considered to provide the best available indication of future population requirements for the services provided by orthopaedic surgeons.”

This response does not go any further than the 1999 report in explaining why it is concluded that the principal hospital procedures measure is the best measure for forecasting future requirements of services of orthopaedic surgeons.

A second problem is that usage of services may reflect the existence of supply-side constraints. Where there is a relative shortage of orthopaedic surgeons, measures of service usage will not measure demand, but will instead be a measure of available supply. In this situation, there will be a tendency for measures of service usage and supply of medical services to change at similar rates over time, and hence for it to be concluded (incorrectly) that supply is adequate.

A third problem is that there is no attempt to take into account factors that might cause differences in growth of orthopaedic service usage between previous time periods and the future. Other AMWAC reports provide quite detailed treatments of the set of factors that are likely to determine demand (for example, AMWAC, 1996b, pages 8-9 and 1998b, pages 2-3). Some factors that may be relevant for estimating demand growth for orthopaedic services in the short to medium term are, for example, increased coverage of private health insurance, and reductions in performance of orthopaedic procedures by non-orthopaedic surgeons.

b. Calculations of demand growth

In the 1999 report it is assumed that the rate of growth in demand is 2.7% per annum (AMWAC, 1999, page 30). However, analysis of the projections of demand growth in the report shows that a lower rate of growth in fact appears to have been assumed. The table below shows – in columns (1) to (3) – estimates of supply, demand and the shortfall in supply from the 1999 report. Column (4) shows the 2.7 % per annum growth rate compounded through the forecast period. Column (5) then recalculates the level of demand for each year for an assumed rate of growth of 2.7 per cent per annum. It is evident that the demand figures in the 1999 report are an under-estimate of demand assuming a 2.7 per cent rate of growth. Column (6) shows the percentage shortfall in supply for the recalculated estimate of demand. The apparent miscalculation means that in 2007 the correct shortfall in supply is 554 hours more than has been estimated. Assuming each surgeon works 55.7 hours per week, this represents an extra shortfall of 10 surgeons. This would imply that in order to meet future demand a larger increase in training positions would be necessary than proposed in the 1999 report.
Table 6: Forecasts of supply and demand (hours per week) for orthopaedic surgeons, 1998 to 2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Supply AMWAC</th>
<th>Demand AMWAC</th>
<th>Shortfall – AMWAC</th>
<th>Demand – New</th>
<th>Shortfall – New</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>40231</td>
<td>40231</td>
<td>0</td>
<td>40231</td>
<td>0</td>
</tr>
<tr>
<td>1999</td>
<td>40845</td>
<td>41279</td>
<td>1.05</td>
<td>41317</td>
<td>1.14</td>
</tr>
<tr>
<td>2000</td>
<td>41478</td>
<td>42353</td>
<td>2.06</td>
<td>42432</td>
<td>2.25</td>
</tr>
<tr>
<td>2001</td>
<td>42265</td>
<td>43456</td>
<td>2.74</td>
<td>43578</td>
<td>3.01</td>
</tr>
<tr>
<td>2002</td>
<td>42896</td>
<td>44587</td>
<td>3.79</td>
<td>44755</td>
<td>4.15</td>
</tr>
<tr>
<td>2003</td>
<td>43764</td>
<td>45748</td>
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<td>45963</td>
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</tr>
<tr>
<td>2004</td>
<td>44744</td>
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<td>47204</td>
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</tr>
<tr>
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<td>48479</td>
<td>5.26</td>
</tr>
<tr>
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</tr>
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<td>50286</td>
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<td>3.33</td>
<td>52512</td>
<td>4.24</td>
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<tr>
<td>2009</td>
<td>51857</td>
<td>53376</td>
<td>2.84</td>
<td>53930</td>
<td>3.84</td>
</tr>
</tbody>
</table>

Source: Columns (1) and (2) from AMWAC (1999, Table 25, page 32). Column (3) equals [(col(2) - col(1)) * 100 / col(2)]. Column (4) equals 1.027 compounded annually. Column (5) equals 40231 multiplied by column (4). Column (6) equals [(col(5) - col(1)) * 100 / col(5)]. Numbers in columns (3) to (6) have been rounded.

[Note that the growth rate in demand in Table 25 of the AMWAC report does give an average linear growth rate of 2.7 per cent per annum over four years. But the data on principal orthopaedic procedures in Table 12 - from which the figure of 2.7 per cent is derived - show that that set of principal orthopaedic hospital procedures grew over the three year sample period by a 2.7 per cent compound annual rate of growth. So having an average linear annual growth rate of 2.7 per cent over 4 years (which is equivalent to an annual compound rate of growth of 2.6 per cent) is not consistent with the demand data that it is stated (page 30) is being used in the forecasts. An annual compound rate of growth of 2.7 per cent, and not 2.6 per cent, should have been used.]

7. Recommendations on number of extra training positions

Forecasts of demand and supply growth – based on the recommended increases in training positions – show that in 2007 there would remain a gap of 2.9 per cent between demand and supply. This appears to be at the end of the time period over which the size of the labour force would be increasing due to growth in training positions implemented from 1999 onwards. Hence it can be thought of as a gap that would then persist. A gap of 2.9 per cent between demand and supply is 1,519 hours. Based on an estimate of 55.7 hours worked per week, this would mean a shortfall of about 27 surgeons. There is no discussion of why the recommended growth in training positions is not sufficient to remove the entire gap between demand and supply by 2007. Moreover, it is difficult to think why a ten year


horizon should not be sufficient for the planning process to remove any shortfall in a medical workforce group.

8. Other issues

The workforce planning that is undertaken in the 1999 report is in many respects a fairly limited exercise. Its scope is restricted to assessing the adequacy of the size of the orthopaedic surgery workforce, and making recommendations on workforce size. This excludes other workforce-related issues that have important implications for the welfare that society derives from the supply of medical services.

One workforce matter of this type is the nature of the training program for orthopaedic surgery. Issues that might be examined as part of a workforce review with regard to the nature of the training program are - the selection process for entry to the program, the quality of training in the program, whether the program provides an equal opportunity for all those who meet the entry standard to participate, and the method of qualification for those completing the training program. Each of these dimensions is likely to have important implications for the quality of new entrants to the orthopaedic surgery workforce, and hence for the quality of services provided by orthopaedic surgeons.

The value of investigating the adequacy of the training program for orthopaedic surgeons derives from a possibility that some shortcomings currently exist with specialist training programs. One example would be the suggestion that the selection process for some training programs is not based solely on merit. This issue is raised briefly in the report by Baume (1994, p.98) on the surgical workforce in Australia, and in more detail in the AMWAC report on influences on participation in the medical workforce in Australia which provides a range of qualitative survey evidence suggesting that entry to specialist training programs is not solely on the basis of ability (AMWAC, 1998c, pp. 57-59). That report concludes (p.59) that: “…there remain a number of structural constraints limiting the full participation by both women and men in certain specialist areas, particularly surgery.”. Another example would be the suggestion that the nature of surgical training programs acts as a barrier to entry for females to those programs. On this point it has been suggested that the lack of opportunities for part-time training, and the timing of training (for example, night sessions), have been factors that discourage female participation in specialist training (see AMWAC, 1998c, pp.42-43). With regard to the orthopaedic surgery workforce, the 1999 report estimates that just one per cent of the workforce was female in 1997. It seems difficult to believe that such an imbalance in the gender composition of the workforce reflects the distribution of ability to practise surgery in the population of medical graduates.

A second workforce matter concerns the adequacy of the quality of services provided by a medical workforce group. Providing a high quality of medical services is often emphasised as an objective of medical workforce planning. (For example, see the statement of ‘Guiding Principles’ for the 1996 report – AMWAC, 1996a, p.1.) However, the indicators of adequacy in the 1999 report do not provide a comprehensive perspective on quality. The one indicator that is used that could properly be interpreted as a measure of quality is
surgery waiting times. But another important dimension must be quality of treatment (for example, what are rates of post-operative readmission to hospital?). As well, there are other components of waiting time, such as waiting time for an appointment, that affect the total elapsed time between incurring a condition and treatment for that condition.

A third workforce planning issue concerns the role of other factors – apart from the number of orthopaedic surgeons – in determining the supply of services by orthopaedic surgeons. In the AMWAC reports there is an assumption labour supply of orthopaedic surgeons is the sole determinant of the supply of orthopaedic surgery services. But in some situations other factors such as funding for public hospitals or supply of specialist nursing staff may act as a constraint on supply (see for example, Callaghan and Associates, 1994, page 17; and Baume, 1994, page 84). The ultimate goal of workforce planning is to achieve an adequate supply of services of orthopaedic surgeons. Hence it would seem important – as part of the process of workforce planning – for AMWAC to evaluate whether those other factors constitute a constraint on supply of orthopaedic surgery services. Where other factors do constitute a constraint then it would seem reasonable for AMWAC to be able to make recommendations on those factors as well as on workforce numbers. [AMWAC has indicated to the ACCC that it has interpreted its terms of reference to infer that its recommendations on numbers should not be constrained by localised concerns about issues such as funding and hospital access.]
References:


