Australian Medical Workforce Advisory Committee

THE INTENSIVE CARE WORKFORCE IN AUSTRALIA

SUPPLY AND REQUIREMENTS

1997 - 2008

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
ACEM	Australian College for Emergency Medicine
ACT	Australian Capital Territory
AHMAC	Australian Health Ministers' Advisory Council
AIHW	Australian Institute of Health and Welfare
AMA	Australian Medical Association
AMWAC	Australian Medical Workforce Advisory Committee
AN-DRG	Australian National Diagnosis Related Groups
ANZCA	Australian and New Zealand College of Anaesthetists
ANZICS	Australian and New Zealand Intensive Care Society
Aust	Australia
DHAC	Commonwealth Department of Health and Aged Care
FACEM	Fellow of the Australasian College for Emergency Medicine
FANZCA	Fellow of the Australian and New Zealand College of Anaesthetists
FARACS	Faculty of Anaesthesia, Royal Australasian College of Surgeons
FFARACS	Fellow of the Faculty of Anaesthesia, Royal Australasian College of Surgeons
FFICANZCA	Fellow of the Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists
FICANZCA	Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists
FRACP	Fellow of the Royal Australasian College of Physicians
FRACP-IC	Fellow of the Royal Australasian College of Physicians - Intensive Care
FRACS	Fellow of the Royal Australasian College of Surgeons
FTE	Full time equivalent
HMO	Hospital Medical Officer (sometimes also referred to as CMO - Career Medical Officer)

ICU	Intensive Care Unit
IPPV	Intermittent positive pressure ventilation
JSAC-IC	Joint Specialist Advisory Committee - Intensive Care
MET	Medical Emergency Team
MRCP	Member of Royal College of Physicians
NSW	New South Wales
NT	Northern Territory
Popn	Population
Qld	Queensland
RACP	Royal Australasian College of Physicians
RACS	Royal Australasian College of Surgeons
RRMA	Rural, Remote and Metropolitan Areas classification
SA	South Australia
SAC-IC	Specialist Advisory Committee - Intensive Care
SPR	Specialist to Population ratio
SRAC	Specialist Recognition Advisory Committee
Tas	Tasmania
Terr	Territory
TRD	Temporary Resident Doctor
Vic	Victoria
VMO	Visiting Medical Officer
WA	Western Australia

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Appendix D

TERMS OF REFERENCE OF THE AMWAC WORKFORCE WORKING PARTY

The Australian Health Ministers' Advisory Council (AHMAC) established the Australian Medical Workforce Advisory Committee (AMWAC) to advise on national medical workforce matters, including workforce supply, distribution and future requirements.

AMWAC held its first meeting in April 1995.

AMWAC Terms of Reference

1. To provide advice to AHMAC on a range of medical workforce matters, including:

    - the structure, balance and geographic distribution of the medical workforce in Australia;
    - the present and required education and training needs as suggested by population health status and practice developments;
    - medical workforce supply and demand;
    - medical workforce financing; and
    - models for describing and predicting future medical workforce requirements.

2. To develop tools for describing and managing medical workforce supply and demand which can be used by employing and workforce controlling bodies including Governments, Learned Colleges and Tertiary Institutions.

3. To oversee the establishment and development of data collections concerned with the medical workforce and analyse and report on those data to assist workforce planning.

AMWAC Intensive Care Workforce Working Party Terms of Reference

The AMWAC Intensive Care Workforce Working Party was established as a sub-committee of AMWAC and was asked to provide a report to AMWAC on the optimal supply and appropriate distribution of intensive care specialists across Australia, including projections for future requirements.

The Working Party held its first meeting in August 1997 and the report was accepted at the March 1999 AMWAC meeting and the April 1999 AHMAC meeting.

MEMBERSHIP OF AMWAC

Independent Chairman

Professor John Horvath	Physician, Sydney

Members

Mr Eric Brookbanks	Assistant Secretary, Business and Temporary Entry Branch, Commonwealth Department of Immigration and Multicultural Affairs
Ms Meredith Carter	Director, Health Issues Centre
Dr William Coote	Secretary General, Australian Medical Association
Mr Michael Gallagher	First Assistant Secretary, Higher Education Division, Commonwealth Department of Employment, Education, Training and Youth Affairs
Assoc. Prof. Jane Hall	Director, Centre for Health Economics, Research and Evaluation, University of Sydney
Dr Richard Madden	Director, Australian Institute of Health and Welfare
Professor Nick Saunders	Dean, Faculty of Medicine, Monash University
Dr Robert Stable	Director General, Queensland Department of Health
Mr David Theile	Surgeon, Brisbane (former President, Royal Australasian College of Surgeons)
Dr Lloyd Toft	President, Medical Board of Queensland
Mr Robert Wells	First Assistant Secretary, Office of the National Health and Medical Research Council, Commonwealth Department of Health and Aged Care

MEMBERSHIP OF THE AMWAC INTENSIVE CARE WORKFORCE WORKING PARTY

Chairman

Dr Peter Brennan	Medical Advisor, Australian Health Ministers' Advisory Council

Members

Dr Geoff Dobb	President, Australian and New Zealand Intensive Care Society
Dr Alan Duncan	Dean, Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists
Dr David Ernest	Nominee of Royal Australasian College of Physicians and Australian Private Hospital Association
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- Professor John Horvath and Mr Paul Gavel (AMWAC) for helpful editorial comments; and
- Mr John Harding, Mr Graham Angus and Mr Warwick Conn (AIHW); Ms Carol Cunningham-Browne of the Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists (FICANZCA); Mrs Allison Burger of the Australian and New Zealand Intensive Care Society (ANZICS); Ms Karen Warnecke formerly of the Intensive Care Registry, ANZICS; Mr Gary Disher and Mr Tai Rotem of the Royal Australasian College of Physicians (RACP), for assistance with data collection.

INTRODUCTION, GUIDING PRINCIPLES AND METHODOLOGY

Introduction

In preparing this report, the Working Party's aim has been to promote an optimal supply and appropriate distribution of intensive care specialists in Australia, including projections for future requirements to 2008.

Generally, intensive care specialists come from a background of either anaesthesia or internal medicine. Prior to 1976 there was no formal intensive care training program and specialists wishing to practice in intensive care, received training and experience in intensive care through the anaesthesia or physician training programs. Since 1976, there have been two specific programs for training in intensive care in Australia.

- From 1976 - 1992 via the Faculty of Anaesthetists, Royal Australasian College of Surgeons (FARACS). This program culminated in the Diploma Fellow of the FARACS, endorsed in intensive care.

  In 1993 the Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists (FICANZCA) was formed and the program now culminates in the Diploma of Fellow of the FICANZCA (FFICANZCA).

  In 1996, a separate training program in paediatric intensive care commenced and this program also culminates in the Diploma FFICANZCA, but endorsed in paediatric intensive care.

- From the mid 1980s, via the Royal Australasian College of Physicians (RACP) and supervised by the Specialist Advisory Committee - Intensive Care (SAC-IC).

In 1996, a JSAC-IC was formed to oversee both the FICANZCA and RACP training programs. As a result, graduating specialists can now emerge with dual certification, that is FFICANZCA and FRACP.

Definitions

The Working Party defined an intensive care specialist or intensivist as a medical practitioner who has been specifically trained in intensive care medicine. In Australia, intensive care specialists are formally certified in intensive care by completing the training and examination requirements of FICANZCA or the RACP (SAC-IC).

For the purposes of this study, the Working Party widened the definition of an intensive care specialist to include specialist medical practitioners who are currently conducting adult and/or paediatric intensive care consultations, management and procedures on a full time or part time basis either in a salaried or private practice capacity. This wider definition recognises the reality of current practice in intensive care, whereby not all specialists currently practising in intensive care have gained specific qualifications in intensive care. Many of these specialists started the practice of intensive care before formal intensive care

training programs were available. However, the proportion of intensive care specialists holding specific intensive care qualifications will progressively increase as all new intensive care specialists will now hold those qualifications.

It should be noted, however, that this definition does not include neonatal intensive care specialists (neonatologists). The Working Party considers neonatology to be a separate and specific area of practice not associated with the provision of general adult or paediatric intensive care services.

In addition, the definition does not include training registrars who hold positions in hospitals or service registrars who work in intensive care medicine, but are not recognised as being in training positions.

During the course of the project, it became obvious to the Working Party that workforce issues pertaining to paediatric intensive care required some separate analysis. For this reason a separate section on paediatric intensive care is also included in the report.

Guiding Principles

In compiling this report, the Working Party adopted the following guiding principles:

- The Australian community should have available an adequate number of trained intensive care specialists, appropriately distributed to provide the intensive care services it requires.
- The community is best served when intensive care specialists are appropriately qualified and experienced, working to a high standard in appropriately equipped intensive care facilities in both the public and private sectors.
- All Australian citizens must have access to a high standard of intensive care, irrespective of geographical location and economic status. In achieving this, convenience to the patient must be balanced against the practicality of distributing high cost and often technical services. Where such services cannot be provided at a local level, access should be ensured through intensive care retrieval services.
- For the purpose of this report, a wide definition of an intensive care specialist has been adopted. It is expected that there will be a progressive increase in the proportion of intensive care specialists who hold specific intensive care qualifications.
- In processing survey data and considering future workforce needs, only level 3 and level 2 intensive care units (ICUs) have been considered. Data from level 1 ICUs were not considered as these have generally limited ICU medical and support services and are only capable of providing basic multi system life support for a period usually less than 24 hours.
- The impact of out of hours commitments to intensive care and the effects of this on the specialists lifestyle, personal and family obligations need to be taken into account to ensure ICUs can attract and retain an adequate supply of specialists in intensive care.

Methodology

The Working Party analysed existing data sources, and surveyed and consulted with relevant persons and organisations to make informed comments on the factors affecting the current and future market for intensive care specialists.

In estimating workforce numbers, establishing a profile of the workforce and assessing its adequacy, the main sources of data were:

1 Faculty of Intensive Care, Australian and New Zealand College of Anaesthetists

The FICANZCA keeps a variety of data, principally on the number, age, gender, location of Fellows, and data on intensive care training positions and trainees.

2 Australian and New Zealand Intensive Care Society

Data were obtained from the ANZICS membership database and the ANZICS Intensive Care Registry on members' age, gender, location and qualifications; number and level of ICUs, the number of ICU beds and the staffing of ICUs. A full list of ICUs is provided in Appendix B.

3 Royal Australasian College of Physicians

The RACP supplied data on Fellows who indicated to the College that they practised in intensive care and on trainees registered with the College intensive care training program.

4 AMWAC Survey of Intensive Care Units

To supplement the previous three data sets, the Working Party also surveyed level 2 and level 3 public and private ICUs. This survey was conducted in October 1997 and had a 75.2% response rate. The survey results are summarised in Appendix C.

5 AMWAC Survey of ANZICS Members and Intensive Care Trainees

AMWAC conducted a survey of ANZICS members and intensive care trainees in January 1999. The purpose of the survey was to gather information about working arrangements and views on ways in which intensive care practice and training could be made more attractive to prospective trainees. The survey had a 45.0% response rate from specialists and 21.4% from trainees. The survey results are summarised in Appendix D.

6 Australian Institute of Health and Welfare (AIHW)

The principal AIHW data source is the annual Medical Labour Force Survey. The Medical Labour Force Survey presents national labour force statistics for registered medical practitioners, mainly through a survey collected as part of the annual renewal of registration. The survey data used in this report is for 1995 (AIHW 1997). This survey had an overall response rate of 80%.

7 Department of Health and Aged Care (DHAC) Medicare provider database

Medicare provider statistics define medical practitioners according to the predominant services billed to Medicare. The Medicare statistics include all practitioners who have billed Medicare for at least one service during a financial year.

The major deficiency with Medicare data for workforce planning purposes is that they do not identify practitioners who only provide services as salaried specialists in the public hospital system and who do not render services on a fee for service basis which attract Medicare benefits. Medicare data exclude services rendered free of charge to public hospital patients, Veterans' Affairs patients and to compensation cases. For a workforce like intensive care, that is largely public hospital based, this is of minimal value. The Working Party found Medicare data to be of little value to this workforce and decided not use it in the study.

8 AHMAC and DHFS casemix report on hospital activity

Australian National Diagnosis Related Groups (AN-DRGs) are a classification system of acute episodes in hospitals. Each DRG represents episodes of care for inpatients with similar clinical characteristics (for example diagnosis, procedure, age). However, as AN-DRGs do not identify intensive care episodes, the Working Party also found this data source to be of little current relevance to the study.

9 AMWAC Public Hospital Specialist Vacancy Survey

AMWAC surveyed Australian public hospitals in late 1997 to obtain information on public hospital intensive care specialist vacancies for both consultants/visiting medical officers (VMOs) and salaried/staff specialists. A vacancy was defined as a position for which funding was available and which was being actively recruited. The survey also sought information on temporary resident doctors (TRDs) filling vacancies.

10 Australian Bureau of Statistics (ABS)

The Australian Bureau of Statistics (ABS) population data and population projections were used as the sole source on population data. In making its population projections, ABS uses four different series. The population projections in this report are based on Series A/B, where constant fertility and low overseas migration were assumed (ABS 1998).

11 Rural, Remote and Metropolitan Areas classification

Wherever possible, distributional data were interpreted using the rural, remote and metropolitan areas (RRMA) classification developed by the Commonwealth Departments of Human Services and Health and Primary Industries and Energy (DHSH & DPIE 1994). The classification is summarised in Appendix A.

Key Assumption

The Working Party would like to emphasise that the projections on intensive care supply and requirements are based on the assumption that there will be no significant change in existing national health structures or funding arrangements.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

This report describes the current specialist intensive care workforce, assesses the adequacy of that workforce, and projects workforce supply and requirements to 2008.

Background

Intensive care is one of the more difficult specialist workforces to examine. There are several reasons for this, including:

1. The variety of current staffing models for ICUs makes establishing a baseline of current supply difficult. Intensive care is a comparatively new area of specific specialist practice, so not all practising specialists have gained specific qualifications in this discipline.

2. As outlined in the Introduction to this report, there are two avenues to gaining specialist qualifications in intensive care - either through the FICANZCA or the RACP training programs. It is only since 1996 that the JSAC-IC has overseen both programs.

3. Data on intensive care services are currently not as good as the Working Party would have preferred. This concern also extends to hospital casemix data, which currently does not identify specific intensive care episodes on a universal basis. In turn, this makes incorporation of service trends data for workforce adequacy and future requirements difficult.

4. Classification of ICUs by hospitals as either level 3, 2 or 1 sometimes varied from the national guidelines set out in the National Health Data Dictionary. This was due to different role delineations set by the State/Territory health departments. This complicated the survey of ICUs and the assessment of future workforce requirements, and so the Working Party had to make some judgements on how particular ICUs should be analysed. This was important, given the Working Party=s decision to focus on level 3 and 2 ICUs, which employ the bulk of the specialists in intensive care.

5. Workforce analyses were also made difficult by the significant requirement for services out of normal working hours so critically ill patients can be provided with 24 hour specialist care. This contributes to the comparatively high hours worked per week by most intensive care specialists and also make it difficult to assess the number of full time equivalent (FTE) specialists currently in the workforce and the likely future requirement for specialists.

These difficulties aside, the Working Party concluded that the workforce is currently undersupplied and that trainee intake will need to be boosted to reduce this shortfall.

The Working Party believes the key factor influencing future supply and requirements will

be hospital role delineation and available intensive care infrastructure. Using a supply benchmark of four to five intensive care specialists per 10 to 12 ICU beds in the projection analysis, it was estimated that the current requirement for intensive care specialists ranges between 464 and 500.

To meet this supply benchmark, it is estimated that training program output in the short term will need to be increased to around 24 to 26 trainees per year. However, given that the intensive care training program currently has a significant number of vacancies, no increase in training positions is considered necessary to meet this output.

Intensive Care

- Intensive care is a relatively new medical specialty. Formal ICUs were developed in Australasia in the 1950s and 1960s and in the mid 1970s, specific vocational training programs in intensive care were commenced.

- Intensive care medicine differs from the majority of other medical specialties in that its practice is entirely hospital based and the active workforce is mainly employed in the public sector, although the expansion of intensive care medicine in the private sector has increased in recent years.

Number of Intensive Care Units and Intensive Care Beds

- In 1997, there were 153 adult and paediatric ICUs in Australia, of which 111 (72.5%) were considered level 2 and 3 ICUs. Of the 153 ICUs, 107 are public and 46 private.

- In terms of geographic distribution, 71.9% of ICUs were located in major metropolitan areas, 13.7% in large rural areas and 14.4% in small rural and remote areas. Level 3 ICUs are exclusively located in major population centres. This geographic distribution is entirely consistent with the tertiary role of level 3 ICUs.

- According to the ANZICS Intensive Care Registry, the bed capacity of Australian ICUs is 1,579. In 1997, there was an estimated 1,377 adult and paediatric ICU beds available.

- Of the 1,377 adult and paediatric ICU beds estimated to be currently available, 1,160 (84.2%) were in level 2 and 3 ICUs. Of the estimated 1,160 level 2 and 3 ICUs beds, 843 were in public hospitals

Description of the Current Intensive Care Workforce

Number of Practising Intensive Care Specialists

- In 1998, ANZICS membership included 398 specialists making a contribution to the Australian intensive care workforce in either a full time or part time capacity.

- Intensive care is a small specialty, representing just 2.3% of all specialists in 1996.

Intensive Care Specialists to Population

- According to ANZICS membership records there are 2.1 specialists per 100,000 people (1:46,600) in 1997. States/Territories with specialist per 100,000 population ratios below that for Australia as a whole were Western Australia (1.8), the Australian Capital Territory (1.9) and the Northern Territory (0.5). Victoria, Queensland and South Australia are comparatively better supplied with intensive care specialists.

Geographic Distribution

- AIHW data show that 81.8% of intensive care specialists were located in capital cities and other major urban centres, 13.8% were in large rural centres, and 4.4% were in other rural areas.

Age Profile

- The intensive care workforce is relatively young. The 1995 AIHW survey showed that 88.1% of the workforce were younger than 55 years. Sixty percent of ICU specialists were under 45 years. Only 8 (2.1%) specialists were aged 65 years and over compared to 10.1% of specialists in the workforce as a whole.

- The average age of the intensive care specialists was 45.2 years which is much lower than the medical workforce as a whole.

Gender Profile

- The 1995 AIHW survey indicated that there were 40 female specialists (10.5%) who practised in intensive care. This proportion is below that of all specialists (14.0%) and well below that for the total medical workforce (26.7%). This is consistent with the 1998 ANZICS data which showed that 10.9% of members were female. In 1998, 12 (16.0%) of 75 intensive care trainees were female.

Hours Worked

- The AIHW survey reported that in 1995, intensive care specialists worked on average a total of 57.7 hours per week; 58.6 for males and 52.0 for females. Intensive care specialists work an average of 42.7 hours on call.

- In 1995, a high proportion of the workforce worked long hours. 160 (41.6%) intensive care specialists worked 60 hours per week or more. Only 16 (4.2%) intensive care specialists worked less than 40 hours per week.

Services Provided

- There are no definitive data on the services provided by intensive care specialists. The main difficulties were the data either did not cover the range of work carried out

  by intensive care specialists, or it was not possible to identify the component that represented the work provided by intensive care specialists.

- Medicare data are of little relevance, given the hospital-based nature of intensive care practice. However, the Working Party also had reservations about the usefulness of hospital casemix information as there are currently no AN-DRGs that reliably define intensive care episodes. If a system of specific intensive care- related casemix codes were developed, it might assist future workforce analyses, although it is recognised the variables involved are likely to make this a difficult exercise.

Training Arrangements

- In 1998, there were 120 approved intensive care training positions in Australia, 95 of which were approved for core intensive care training and 25 for elective training. Compared to population shares, South Australia and the Australian Capital Territory had proportionally more training positions and Victoria, Western Australia and Tasmania noticeably less positions than their population share.

- In 1998, there were 75 active intensive care trainees of which 16 were overseas graduates. Currently, the number of training positions far exceeds the number of intensive care trainees.

- From 1999, ICUs will be approved for training rather than individual training positions within ICUs.

Adequacy of the Current Intensive Care Workforce

Specialist to Population Benchmarks

- There are no established SPR benchmarks for intensive care in Australia. Accordingly, the value of SPRs is the comparisons made between States and Territories. The overall intensive care SPR for Australia is 1:46,600. Victoria, Queensland and South Australia are comparatively better supplied with intensive care specialists; Western Australia, Tasmania, the Australian Capital Territory and the Northern Territory have SPRs below the national average.

Health Service Assessment

- The AMWAC 1997 survey of all State/Territory Health Departments reported shortages in four States with eleven (9.6 FTE) specialist intensive care vacancies. This was an estimated vacancy rate of 2.8 %.

- The October 1997 AMWAC survey of ICUs directors also sought information on vacancies. It found that there were 26 staff specialist vacancies, with 24 of these vacancies in the public health system. There were two staff specialist vacancies in the private hospital system.

- The vacancies reported by the State/Territory health departments were lower than the AMWAC survey of ICU Directors as some of the vacancies indicated by Directors may not have been funded positions.

Specialist Workload

- The AMWAC survey of ICUs Directors found that 61% of ICU specialists and 60% of ICU junior medical staff were satisfied with their work. 38.8% of respondents were satisfied with the amount of work they did, 20% were dissatisfied and 41.3% were uncommitted.

- Only 27.1% of respondents were satisfied with the availability of registrars to fill intensive care posts, whereas 38.6% were dissatisfied and 34.3% were uncommitted.

- 57.5% of survey respondents were dissatisfied with their income relative to the hours worked and the stress experienced. 13.8% were satisfied and 28.8% were neither satisfied or dissatisfied.

Conclusions on Adequacy of the Current Workforce

- The Working Party concluded that the overall supply of intensive care specialists was inadequate. For a small workforce, public hospital vacancies were significant, being between 11 and 26. This conclusion is supported by data indicating that intensive care specialists work some of the longest hours of all specialists, including high levels of after hours work. Current shortages may also be exacerbated by insufficient trainees to fill all the available training positions.

- In the short term, shortages are likely to remain a feature of this workforce.

Projections of Requirements and Supply

Requirement Trends

- The Working Party believes that the key factor influencing future intensive care supply and requirements is hospital role delineation and available intensive care infrastructure.

- Population growth, ageing and technical advances will impact on intensive care services in the next ten years. However, this is likely to be variable and be driven, in the main, by local circumstances. In areas where most growth is occurring the demand for specialists is likely to be higher, although it is liable to grow incrementally over the years as workload increases.

- Conversely, the impact of ageing and technical development may be offset, by factors such as public health strategies and preventative measures that influence population health.

- On the basis of the current maximum number of ICU beds it is possible to project a theoretical maximum number of ICU specialists, if an assumption is made about the level of specialist coverage that is appropriate. In addition, given that there is unlikely to be a rapid growth in new ICUs, this maximum can also be used for projection purposes. Over time it may need to be adjusted, but for the next ten years probably only marginally. This approach also assumes that providing intensive care facilities for ongoing care in smaller population centres is unlikely to be justified by the capital investment required and that as such transfer to units in larger centres is likely to remain the preferred method of service delivery to smaller communities.

- The Working Party considers a minimum of four FTE intensive care specialists are needed for a ten bed ICU with usual bed occupancy and casemix. To provide adequate internal cover for annual leave, study leave, sickness etc., the Working Party considers that five FTE intensive care specialists would be desirable. The Working Party also believes that a benchmark of five specialists per ten beds is required to provide adequate staffing and maintain teaching, research, quality assurance activities and participation in hospital management structures.

- A similar model using a benchmark of four to five intensive care specialists for an average level 3 unit, or tertiary ICU of 10 to 12 beds with approximately 800 to 1,000 admissions, was recommended in the 1996 review of intensive care services in Queensland. The Working Party is not aware of any other Australian study that attempted to use a benchmark, but supports this structure as a model for reflecting current provision of intensive care facilities.

- An intensive care facility of 10 to 12 beds also provides a critical mass for training and achieves efficient use of equipment, nursing, paramedical and other staff.

- The Working Party decided to use the four to five intensive care specialists per 10 to 12 ICU beds in the projection analysis. It should be stressed that this is simply a model to give a global picture of ideal specialist staffing in level 2 and 3 ICUs. Individual need will clearly vary with casemix, caseload etc.

- Accordingly, using this approach, the current requirement for intensive care specialists is estimated to range between 464 and 500.

Supply Trends

- In the last four years there were 75 additions to the workforce.

- Women represent about 10.5% of the workforce. The proportion will increase gradually in the short term, given that in 1998 16% of trainees were female.

Balancing Projected Supply with Projected Requirements

- It was estimated that future demand for intensive care services would be about 1.6% (as indicated by trends in population growth and ageing).

- 16 Trainees per year are expected to graduate from the joint training program over the years 1998 to 2001.

- From the projection analysis, supply can match a continued growth rate in requirements of 1.6% per annum by increasing the number of graduates to 18 for 2003 and 2004, building up to 20 graduates per year for the period 2005 to 2008.

- However, to supply adequate graduates to meet requirements, the output of the intensive care training program should ideally average around 24 to 26 trainees per year, given that the Working Party estimates a small number of intensive care trainees are likely to continue to move into related areas of practice such as anaesthesia.

- The Working Party does not believe there needs to be any increase in the number of intensive care training placements. With only 75 of the available 120 positions filled in 1998, the suggested increase in trainee intake can easily be accommodated within the current number of positions, provided that State/Territory Health Department funding for the positions is still available.

- The key challenge for the profession will be to promote intensive care as a career option to junior doctors. As an initial step in this process, a survey of ANZICS members and trainees was undertaken in January 1999 to gain information about their attitudes to alternative working arrangements and ways in which the intensive care training program could be made more attractive to prospective trainees.

- In terms of issues to focus on, survey respondents highlighted the long work hours, comparatively poor remuneration, the nature of intensive care work and the length and nature of the training program. A perceived lack of professional recognition and support for intensive care specialists was also noted.

RECOMMENDATIONS

The following recommendations have been made in the context of the continuance of the existing model of intensive care service delivery.

The Working Party recommends:

1. That, based on current estimates of future intensive care demand and infrastructure, there will be a maximum requirement for a specialist intensive care workforce of approximately 464 to 500 by the year 2008.

This estimate assumes that the trend towards more specialists specifically trained in intensive care will continue and that appropriate specialist staffing ratios are adopted and supported by State/Territory health department funding.

(The current size of the specialist intensive care workforce is estimated to be 398).

2. To achieve this increase in intensive care specialists, the number of graduates from the intensive care training program should be increased from the current level of 16 per year to at least 18 for the years 2003 and 2004 and 20 for the years 2005 to 2008. Thereafter the output of the training program may need to decrease but it is not appropriate to speculate on this possibility at present.

   On the assumption that a small number of intensive care trainees will continue to move into related areas of practice, particularly anaesthesia; actual trainee intake should average 24 to 26 per year.

   This increase in training program intake is necessary both to address the current shortfall in intensive care specialists and to meet a projected growth in requirements estimated at 1.6% per annum.

3. There is no need to increase the current number of accredited intensive care training positions. The increase in trainee intake should be possible by filling positions that are currently vacant or being used as service positions or filled with occupational trainees; provided State/Territory health department funding for these vacant training positions remains available.

4. The JSAC-IC and the Intensive Care Medical Liaison Committee develop short term strategies to attract junior doctors to a career in intensive care to achieve an output from the intensive care training program of 24 to 26 graduates per year.

5. State/Territory health departments continue to support the development of the ANZICS Patient Database. If this database was developed to include all Australian episodes of intensive care it could greatly assist future workforce analyses and planning.

6. That intensive care requirements and supply projections be monitored regularly so that they can be amended if new trends emerge. That this monitoring be co-ordinated by FICANZCA, ANZICS, RACP and AMWAC and the results incorporated into the AMWAC annual report to AHMAC. AMWAC will provide the necessary support.

PART A:

THE SPECIALIST INTENSIVE CARE WORKFORCE IN AUSTRALIA

INTENSIVE CARE MEDICINE

Intensive care is a relatively new medical specialty. Formal ICUs were developed in Australasia in the 1950s and 1960s (Clarke and Harrison 1993) and in the mid 1970s, specific vocational training programs in intensive care were commenced.

Intensive care medicine differs from the majority of other medical specialties in that its practice is entirely hospital based and the active workforce is mainly employed in the public sector, although the expansion of intensive care medicine in the private sector has increased in recent years.

Classification of Intensive Care Units

The following description is a summary from the National Health Data Dictionary, more detail is also provided in Appendix E.

An ICU is a designated ward of a hospital which is specially staffed and equipped to provide observation, care and treatment of patients with actual and life threatening illnesses, injuries or complications, from which recovery is possible. The ICU provides special expertise from specialists and support staff trained and experienced in the management of these problems (AIHW, 1996).

The level and range of services, and role of intensive care departments will vary according to the size, location and role of the hospitals within which they are located. ICUs are defined according to three main criteria: the nature of the facility, the care process and the clinical standards and staffing requirements. The National Health Data Dictionary defines three levels of adult ICU in Australia - level 3, level 2 and level 1 (AIHW, 1996).

Level 3 ICUs are principally located in metropolitan tertiary referral hospitals. Level 3 ICUs provide a comprehensive range of services involving complex multi-system life support for an indefinite period. A level 3 ICU must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring, for an indefinite period. It should have extensive back up laboratory and clinical service facilities to support this tertiary referral role. At all times, level 3 ICUs are staffed by qualified intensive care specialists exclusively rostered and readily available to the ICU as well as experienced medical and nursing staff on site 24 hours.

Level 2 ICUs are located in metropolitan district hospitals and some rural base/regional hospitals. Level 2 ICUs have a separate and self contained facility in the hospital capable of providing complex multi-system life support. They must be capable of providing mechanical ventilation, extracorporeal renal support systems and invasive cardiovascular monitoring for a period of at least several days.

Level 1 ICUs are mainly located in small rural or large remote centres. They generally have a separate and self contained facility in the hospital capable of providing basic, multi-system life support usually for less than a 24 hour period. A level 1 ICU must be capable of providing mechanical ventilation and simple invasive cardiovascular monitoring for a period of at least several hours.

The Medical Director in level 2 and 3 ICUs must be recognised by the Specialist Recognition Advisory Committee (SRAC) in the relevant State/Territory as a consultant physician or as a specialist in intensive care. The Medical Director must have substantial training and experience in intensive care. Level 3 and level 2 ICUs must have at least one other specialist who is recognised by the SRAC in the relevant State/Territory as a specialist or as a consultant physician and who has appropriate experience in intensive care. A level 1 ICU must have at least one registered medical practitioner who is available to the unit at all times.

A variety of staffing models are used throughout ICUs in Australia and this in turn complicates any estimates of the current intensive care workforce. The models include staffing of the ICU by:

- specialists working only in intensive care with no commitments to other services in the same or other hospitals;
- specialists who work predominantly in the ICU but with one or more having additional clinical commitments to other services at the same or different hospitals;
- a 'core' of specialists working only or predominantly in intensive care in that hospital, with out of 'normal' hours cover by an additional number of specialists who may or may not have some minority part time work in the ICU during >normal working hours; or
- a group of specialists who also provide services to one or more private hospital ICUs either outside 'normal' working hours or for both >normal and out of hours services.

Retrieval Services

The considerable capital resources needed to provide an intensive care facility and the associated commitment to running costs for medical and nursing staff, physiotherapy, laboratory, radiological, technical and other services needed 24 hours each day dictate a minimum population base so health administrators can economically provide the service. A minimum throughput of patients is also needed to maintain medical and nursing skills in complex advanced technology and hence achieve optimal patient outcomes. ANZICS estimates this minimum population catchment is between 100,000 and 200,000 people (AMWAC, 1998.7).

Accordingly, where the infrastructure and population catchment is not sufficient to sustain an appropriate ICU, patients need to be transferred to a larger centre. This will generally involve patients in smaller rural and remote communities, but will also be the case in some

large rural centres. Inter-hospital transfer of patients also occurs between higher and lower level ICUs. The transfer of critically ill patients requires skilled staff and facilities to create a 'mobile ICU'. The organisation of retrieval services varies between States/Territories. Where intensivists are involved in retrieval services, this must be factored into assessments of future requirements.

Number of Intensive Care Units

In 1997, there were 153 adult and paediatric ICUs in Australia, of which 111 (72.5%) were considered level 2 and 3 ICUs (Table 1). Of the 153 ICUs, 107 are public and 46 private (Tables 2 and 3). In 1997 there were eight paediatric ICUs and two combined adult/paediatric units. A full list of adult and paediatric ICUs, by State and Territory and level is provided in Appendix B.

In terms of geographic distribution, 71.9% of ICUs were located in major metropolitan areas, 13.7% were located in large rural areas and 14.4% in small rural and remote areas (Table 4).

Level 3 ICUs are exclusively located in major population centres. This geographic distribution is entirely consistent with the tertiary role of level 3 ICUs. The majority (64.4%) of level 1 ICUs were located outside of capital cities and 58% of all rural ICUs are level 1.

Table 1: Adult and paediatric intensive care units, public and private, by level and State/Territory, 1997

Level	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aust	%
3	15	19	12	7	5	2	0	1	60	39.2
2	28	2	12	1	1	2	2	0	51	33.1
1	13	14	6	4	4	2	0	1	42	27.5
Total	**56**	**35**	**30**	**12**	**10**	**6**	**2**	**2**	**153**	**100.0**
% ICU	36.6	22.9	19.6	7.8	6.5	3.9	1.3	1.3	100.0	-
% popn.	33.9	24.8	18.3	8.1	9.7	2.4	1.0	1.7	100.0	-

Source: ANZICS, AMWAC and ABS

Table 2: Adult and paediatric public intensive care units, by level and State/Territory, 1997

Level	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aust	%
3	13	13	9	4	4	2	0	1	45	42.1
2	21	0	6	0	0	1	2	0	31	28.9
1	9	10	5	4	2	0	0	1	31	28.9
Total	**43**	**23**	**20**	**8**	**6**	**3**	**2**	**2**	**107**	**100.0**
%	39.8	21.3	18.5	7.4	5.5	2.8	1.8	1.8	100.0	-

Source: ANZICS and AMWAC

Table 3: Number of private intensive care units, by level and State/Territory, 1997

Level	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aust	%
3	2	6	3	3	1	0	0	0	15	32.6
2	7	2	6	1	1	1	0	0	20	43.5
1	4	4	1	0	2	2	0	0	11	23.9
Total	**13**	**12**	**10**	**4**	**4**	**3**	**0**	**0**	**46**	**100.0**
%	28.3	26.1	21.7	8.7	8.7	6.5	0	0	100.0	-

Source: ANZICS and AMWAC

Table 4: Geographic distribution of adult and paediatric intensive care units, by State/Territory, 1997

State/Terr.	Capital city	Other metro.	Large rural	Small rural/ remote	Total
NSW	35	6	7	8	56
Victoria	22	2	4	7	36
Queensland	15	6	7	2	30
South Aust.	10	. .	1	1	12
West. Aust.	8	. .	. .	2	10
Tasmania	3	. .	2	1	6
North. Terr.	1	. .	. .	1	2
ACT	2	. .	. .	. .	2
Australia	**96**	**14**	**21**	**22**	**153**
%	62.7	9.2	13.7	14.4	100.0

. . - not applicable
Source: ANZICS and AMWAC

Number of Intensive Care Beds

According to the ANZICS Intensive Care Registry, the bed capacity of Australian ICUs in 1997 was 1,579 (ANZICS, 1998). In 1997, there were an estimated 1,377 adult and paediatric ICU beds available, of which 1,004 (72.9%) beds were equipped for intermittent positive pressure ventilation (IPPV beds). This requires the availability of a mechanical ventilator with gas and air supplies, suction and facilities for patient monitoring. Patients needing mechanical ventilation have respiratory or ventilatory failure, and a period of mechanical ventilation is commonly needed after major and prolonged surgery. Patients requiring mechanical ventilation also have higher nurse dependency and require immediate availability of appropriately skilled medical staff.

ANZICS estimates that the total number of available adult and paediatric ICU beds per 100,000 population is 7.5, and ranges from 5.6 in Western Australia to 9.7 in Tasmania.

Table 5: Distribution of adult and paediatric intensive care beds, public and private, levels 3, 2 and 1, available beds and IPPV beds, and beds per 100,000 population, by State/Territory, 1997

State/Terr.	Population 1997 (>000s)	Total ICU beds[a]	Estimated available ICU beds[b]	IPPV beds	Available ICU beds per 100,000 popn. - all levels	IPPV beds per 100,000 popn. - all levels
NSW	6,274.4	585	496	347	7.9	5.5
Victoria	4,605.1	353	302	232	6.6	5.0
Queensland	3,401.2	282	263	198	7.7	5.8
South Aust.	1,479.8	147	132	89	8.9	6.0
West. Aust.	1,798.1	105	101	83	5.6	4.6
Tasmania	473.5	54	46	30	9.7	6.3
ACT	309.8	36	24	15	7.7	4.8
North. Terr.	187.1	17	13	10	6.9	5.3
Australia	**18,532.2**	**1,579**	**1,377**	**1,004**	**7.5**	**5.4**

Notes: a - total ICU beds refer to the total number of physical bed spaces which provide the theoretical maximum patient capacity, that is ICU beds which can be opened where adequate staffing and funding are provided; b - available ICU beds refer to funded beds that are currently open and available for patient use.
Source: ANZICS and AMWAC

Of the 1,377 adult and paediatric ICU beds estimated to be available, 1,160 (84.2%) were in level 2 and 3 ICUs (Table 6). Of the estimated 1,160 level 2 and 3 ICUs beds, 843 were in public hospitals and 317 in private hospitals. Compared to population, Queensland, South Australia and Tasmania had a higher proportion of level 2 and 3 ICU beds. It is estimated there were 6.3 beds per 100,000 for level 2 and 3 ICUs shown in Table 6. This figure is different from the 7.5 beds per 100,000 population reported in Table 5 because the data in

Table 6 excludes level 1 ICUs, in accordance with the Working Party's decision to focus on

level 2 and 3 ICUs.

Table 6: Adult and paediatric available intensive care unit beds, public and private, level 2 and 3 beds per 100,000 population, by State/Territory, 1997

State/ Terr.	Level 3 beds	Level 2 beds	Level 1 beds	Total beds	% of total level 3 & 2 beds	% popn.	Beds per 100,000 popn. - level 3 & 2
NSW	219	163	114	**496**	32.9	33.9	6.1
Victoria	166	103	33	**302**	23.2	24.8	5.8
Qld	95	135	33	**263**	19.8	18.3	6.8
SA	87	41	4	**132**	11.0	8.1	7.1
WA	63	27	11	**101**	7.8	9.7	6.1
Tas	22	14	10	**46**	3.1	2.4	7.6
ACT	12	. .	12	**24**	1.0	1.7	3.9
NT	. .	13	. .	**13**	1.1	1.0	6.9
Total	**664**	**496**	**217**	**1,377**	**100.0**	**100.0**	**6.3**
%	48.2	36.0	15.8	100.0	-	-	-

. . - not applicable
Source: ANZICS, AMWAC and ABS

It is difficult to compare the Australian provision of intensive care beds with overseas experience given the differences that exist in health system, financing arrangements and definitions of an ICU. However, the Working Party has collected some information and this is summarised in Appendix G.

DESCRIPTION OF THE CURRENT INTENSIVE CARE WORKFORCE

As discussed in the Introduction, there is a variety of data sources on the numbers, attributes and distribution of intensive care specialists in Australia. While each of these data collections has some deficiency, it is possible to piece together a reasonably accurate and up-to-date profile of the workforce.

In establishing the profile of the current intensive care workforce the Working Party analysed:

- the number of intensive care specialists;
- their growth, distribution, by State/Territory and geographic location;
- age and gender profiles of the workforce;
- the hours worked;
- the services provided; and
- the training arrangements for intensive care specialists.

Number of Practising Intensive Care Specialists in Australia

There is considerable variation in estimates of the number of practising intensive care specialists.

The FICANZCA and RACP databases record current practising Fellows. In 1997, FICANZCA had 153 non-retired Fellows practising intensive care in Australia. The RACP records 140 non-retired physicians with a subspecialty in intensive care. FICANZCA estimates that in 1997 96% of Fellows were involved in intensive care. The involvement ranged from full time (49%) through most of the time (22%) and part time (15%), to some of the time (9%). Anaesthesia was the most commonly practised other specialty, with 47% of respondents practising some anaesthesia (Harrison et al 1998).

In June 1998, ANZICS membership included 398 specialists making a contribution to the intensive care workforce in Australia in either a full time or part time capacity (Table 7).

The 1995 AIHW Medical Labour Force Survey found there were:

- 385 specialists practising in intensive care, 228 (59.2%) having it as their main specialty of practice;
- 305 specialists with a qualification in intensive care and for 174 (57.0%) of these, intensive care was their main qualification; and
- of those intensive care practitioners not reporting a qualification in intensive care, 16.8% (60) were qualified in anaesthesia, with a further 2.6% (10) qualified in paediatric medicine or general medicine.

Data on the number of intensive care specialists are summarised in Table 7.

Table 7: Estimated number of intensive care specialists, 1998

Specialists	ANZICS (1997-98)[a]	AIHW (1995)[b]
Number	398	385

Notes: a - Australian ANZICS full members. Figures include anaesthetists and physicians practising part-time; b - all specialists practising in intensive care (AIHW figures)
Source: ANZICS and AIHW

One difficulty the Working Party had in examining the number of practising specialists in intensive care was that specialists not holding specific qualifications in intensive care can, and do, practise in intensive care. At the present time, intensive care physicians who hold qualifications in disciplines other than intensive care (FRACP trained through a specialist advisory committee other than intensive care) and anaesthetists (without the FFICANZCA qualification) contribute to the specialist intensive care workforce.

The Working Party had some difficulty separating intensive care specialists working predominantly in intensive care from those spending a small proportion of their time in intensive care.

Converting the contribution of those spending a proportion of their working time into full time equivalents (FTEs) also created some problems because much of intensive care work is outside >normal= working hours. FICANZCA estimated that each specialist in intensive care contributes approximately 0.7 of their working time, on average, to intensive care and 0.3 to another specialty area (Harrison et al 1998). The contribution of those without specific qualifications in intensive care who are contributing at present to the intensive care workforce is likely to be less than 0.7 but there is no firm information on this section of the workforce.

Overall, the Working Party felt that the best estimate of the current workforce was within a range of 385 to 398.

Growth in the Intensive Care Workforce

Between 1992 and 1997 the number of FICANZCA Fellows admitted by examination increased by 28.6%. This increase was mainly due to trainees passing examinations and becoming eligible for Fellowship. This represented an average per annum increase of 7.1%. There were 119 Fellows in 1992-93, 147 in 1994-95 and 153 in 1996-97.

Between 1995 and 1997/98, the number of ANZICS members increased by 18.5%. Population growth between 1992 and 1996 was 4.7%.

Distribution of the Intensive Care Workforce

Table 8 provides information on the current State/Territory distribution of intensive care specialists. Compared to population, Victoria, Queensland and South Australia are

comparatively better supplied with intensive care specialists. The proportions of intensive care specialists in Western Australia, the Australian Capital Territory and Northern Territory are below the national average.

Table 8: Distribution of intensive care specialists, specialists to population and specialists per 100,000 population, by State/Territory, 1998

State/ Territory	Number of ICU specialists	% of specialists	Popn. (>000)	% of popn.	SPR	Specialists per 100,000 popn.
NSW	135	33.9	6,274.4	33.9	1:46,477	2.2
Victoria	103	25.9	4,605.1	24.8	1:44,710	2.2
Queensland	74	18.6	3,401.2	18.4	1:45,962	2.2
South Aust.	37	9.3	1,479.8	8.0	1:39,995	2.5
West. Aust.	32	8.0	1,798.1	9.7	1:56,190	1.8
Tasmania	10	2.5	473.5	2.5	1:47,350	2.1
ACT	6	1.5	309.8	1.7	1:51,633	1.9
North. Terr.	1	0.3	187.1	1.0	1:187,100	0.5
Australia	**398**	**100**	**18,532.2**	**100.0**	**1:46,563**	**2.1**

Source: ANZICS and ABS

The 1995 AIHW survey found that 81.8% of all intensive care specialists worked in major urban centres (81.8%) and 13.8% in large rural centres. Only 4.4% of specialists were working in small rural areas, other rural and remote areas.

This high concentration of specialists in capital cities and other metropolitan areas is understandable, given that practice occurs entirely in hospitals and most ICUs are located in urban centres. Capital infrastructure and complex support services on a 24 hour a day basis are important factors in determining what the community can sustain. Population catchment required for a viable specialist service in intensive care is between 100,000 to 200,000 (AMWAC 1998.7). However, a factor that may decrease population requirements is the inclusion of a coronary care and/or high dependency service with intensive care.

Age Profile

The intensive care workforce is relatively young. The 1995 AIHW survey reported that 88.1% of the workforce were younger than 55 years and 60% of ICU specialists were under 45 years. Only 8 (2.1%) specialists were aged 65 years and over, compared to 10.1% of specialists in the workforce as a whole. The average age of the intensive care workforce 44.5 years, which is also much lower than the medical workforce as a whole.

Table 9: Intensive care specialists, by gender and major age group, 1995

Gender	<35 years	35-44 years	45-54 years	55-64 years	65-69 years	70 + years	Total	% <45 years	% >65 years
Male	24	175	102	37	4	3	345	51.7	1.8
Female	4	28	6	1	1	0	40	8.3	0.3
Total	**28**	**203**	**108**	**38**	**5**	**3**	**385**	**-**	-
% of total	7.3	52.7	28.1	9.9	1.3	0.8	100	-	-

Source: AIHW

Gender Profile

The 1995 AIHW labour force survey data indicated that there were 40 female specialists (10.5%) who reported practising in intensive care. This proportion is below that of all specialists (14.0%) and well below that for the medical workforce as a whole (26.7%). This is consistent with 1998 ANZICS data which revealed that 10.9% of members are female.

In 1998, 12 (16.0%) of the 75 intensive care trainees were female (FICANZCA 1998).

Hours Worked

The AIHW medical labour force survey reported that in 1995, intensive care specialists worked on average a total of 57.7 hours per week, 58.6 hours for males and 52.0 hours for females. There is not a significant difference for total average hours worked for males or females. Intensive care specialists work an average of 42.7 hours on call.

In 1995, a high proportion of the workforce worked very long hours. 160 (41.6%) intensive care specialists worked 60 hours per week or more. Only 16 (4.2%) intensive care specialists worked less than 40 hours per week. Direct patient hours excludes research, administration and travel time. The mean direct patient care hours worked is 47.6 hours with no significant difference between males and females.

Shift work coupled with long, unpredictable and irregular hours places intensive care specialists under the medium to high risk assessment category in the draft national code of practice - hours of work, shiftwork and rostering for hospital doctors. Research has shown that typical hazards associated with shift work and extended hours impact on doctors health, safety, personal life and work performance (AMA 1998).

Table 10: Average hours worked per week by intensive care specialists, by State/Territory, 1995

Hours	NSW	Vic	Qld	SA	WA	Tas	ACT	NT	Aust
Hours worked	58.5	56.2	54.6	58.6	59.4	57.8	63.0	61.4	57.7
Direct patient care hours	49.1	44.1	48.2	49.3	47.6	40.6	44.4	52.0	47.6
Hours on call	49.6	34.0	37.9	40.2	30.3	61.9	27.2	55.0	42.7

Note: hours worked include all hours worked
Source: AIHW

Services Provided

There are no definitive source of data on the total services provided by intensive care specialists. This data either do not cover the full range of work carried out by intensive care specialists, or are not able to identify the work provided by intensive care specialists.

The services provided by intensive care specialists also include work in high dependency units, on medical emergency teams - cardiac arrest, trauma, hospital wards - retrieval services, hyperbaric units and parenteral nutrition services.

As indicated in the Introduction, Medicare data have little relevance, given the hospital based nature of intensive care practice. However, the Working Party also had reservations about the usefulness of hospital casemix data as there are currently no AN-DRGs that reliably define intensive care episodes. If a system of specific intensive care casemix codes were developed it might assist future workforce analyses, although it is recognised the variables involved are likely to make this a difficult exercise. It should be noted that the Working Party is unaware of this having been done anywhere in Australia or internationally.

Training Arrangements

Faculty of Intensive Care, ANZCA

The FICANZCA training program in intensive care can be commenced after a minimum of two years of general hospital appointments. The period of general hospital appointments can include no more than six months in any combination of anaesthesia, intensive care and pain management.

Trainees are required to complete a minimum of 60 months of vocational training in units approved by the Board of FICANZCA. The 60 month training period in intensive care must include 24 months in core intensive care training, 12 months in clinical anaesthesia and 6 months in clinical medicine. The remaining 18 months can be spent in approved elective disciplines related to intensive care, eg. general medicine, specialist medicine, emergency medicine, surgery, research (limited to one year), or anaesthesia.

Unless exemption has been granted, trainees must successfully complete a basic sciences examination (ANZCA Primary Examination) before presenting for the Fellowship Examination in Intensive Care. Exemption from the Primary Examination is given to practitioners who have passed the written and clinical FRACP (Adult or Paediatric) examination. Trainees are also required to undertake a formal project.

Fellowship is awarded after each of these training requirements is successfully completed the final Fellowship Examination has been passed.

Since 1996, a joint training program has been established for the RACP and FICANZCA supervised by the JSAC-IC. Trainees may register with either or both training programs. It is possible for trainees to complete both diplomas seven years after graduation.

In 1996, FICANZCA introduced a specific training program in paediatric intensive care. The basic structure of the program is identical to the adult program, although there are specific requirements for paediatric intensive care and paediatric medicine.

In October 1998 the Faculty developed a pathway to supraspecialty training in intensive care for Fellows of the Royal Australasian College of Surgeons (RACS) and Australian College of Emergency Medicine (ACEM).

Provision exists in the training program for part time training. Part time training cannot begin until two years of vocational training are completed, including one year of core intensive care training, and the Primary Examination has been passed. Part time training must have the same content and total training time as for full time trainees and must be completed within ten years. Trainees must have a commitment within any training block of which is at least 50% of a full time trainee, including pro rata involvement in working out of hours.

RACP Intensive Care Training Program

Advanced training in intensive care is currently supervised as part of a combined training program by the JSAC-IC. The minimum core training requirement is two years full time (or pro rata part-time) supervised clinical training in an advanced capacity in an ICU. At least one continuous year of training must be undertaken in an adult >general ICU. Continuous periods of core training must last at least six months. Core training may also be undertaken in specialty ICUs (paediatric, cardiothoracic) or in part in overseas posts.

Twelve months elective training may be undertaken in any related medical discipline or in full time research. Training in anaesthesia undertaken during elective training may be accredited towards the training requirements for the diploma of FICANZCA if undertaken in

a hospital with Faculty approved training positions. Trainees are required to submit a satisfactory project report, based on a research project during the period of advanced training.

RACP trainees may have their advanced training accredited towards Fellowship of FICANZCA. Fellowship of FICANZCA requires a separate application to the Faculty, two years core training in Faculty approved units, twelve months in clinical anaesthesia and success in the FICANZCA Fellowship examination. Dual Fellowship is not compulsory.

Certification of the completion of the training program and recommendation of Fellowship are not offered until all the training requirements (including the project report) have been completed.

The RACP offers part-time training if the trainee has the approval of their employer and the training is no less than 50 per cent of the full time training program. The College prefers that basic training is completed full time.

Intensive Care Training Placements

Up to and including 1998, FICANZCA has approved training posts in intensive care units that met certain standards (FICANZCA Policy Document IC-3(1994) Guidelines for Hospitals Seeking Faculty Approval of Training Posts in Intensive Care). Posts were approved for either core or elective training. In May 1998, there were 120 approved intensive care training posts in Australia, 95 of which were approved for core intensive training and 25 for elective training. The number of training posts has always exceeded the number of trainees.

In 1998, the accreditation process was reviewed, with the result that from 1999, the focus will be changed to accrediting ICUs rather than posts and, unless otherwise specified, there will be no limitation on the number of training posts in an accredited ICU (FICANZCA Policy Document IC-3, Guidelines for Intensive Care Units seeking Faculty Accreditation for Training in Intensive Care). The categorisation of training posts in ICUs is determined by factors such as caseload, casemix, the variety of procedures performed, the severity of illness treated and the specialist supervision available. This change of emphasis has no resource implications for governments.

The RACP has not traditionally accredited training posts for ICUs, but rather the overall training program of the trainee on an annual basis. Since the formation of JSAC, the RACP is moving to the position of accrediting training posts as recommended by the Faculty. RACP representation is now sought on hospital accreditation visits. Compared to population shares, South Australia and the Australian Capital Territory have proportionally more training positions and Tasmania noticeably fewer positions than their population share.

Table 11: FICANZCA approved intensive care training positions, by State/Territory, 1998

State/Terr.	Core positions	Elective positions	Total	% of total	% popn
NSW	38	3	41	34.2	35.6
Victoria	19	8	27	22.5	24.8
Queensland	13	9	22	18.3	18.4
South Australia	12	2	14	11.7	7.9
Western Australia	11	0	11	9.2	9.7
Tasmania	2	0	2	1.7	2.6
ACT	0	3	3	2.4	1.0
Australia	**95**	**25**	**120**	**100.0**	**100.0**

Source: FICANZCA

In April 1998, there were 75 active intensive care trainees (Table 12). Of these, 16 are overseas graduates. The overseas trainees are mainly from England, Ireland and India. It is anticipated that they will return to their country of origin when their training is finished. In 1998, a large proportion of trainees (52.0%) were located in New South Wales/Australian Capital Territory while there were no trainees in Tasmania or the Northern Territory. New South Wales/Australian Capital Territory and South Australia have a greater proportion of trainees than their respective population shares.

Table 12: Intensive care trainees, by State/Territory and gender, 1998

Gender	NSW/ ACT	Vic	Qld	SA	WA	Tas	NT	Aust.
Male	34	7	11	8	3	0	0	63
Female	5	2	1	2	2	0	0	12
Total	**39**	**9**	**12**	**10**	**5**	**0**	**0**	**75**
% trainees	52.0	12.0	16.0	13.3	6.7	0.0	0.0	100.0
% popn.	35.6	24.8	18.4	7.9	9.7	2.6	1.0	100.0

Source: FICANZCA and ABS

Currently, the number of training opportunities far exceed the number of intensive care trainees. In addition to the services provided by intensive care trainees, other service commitments are currently filled by rotating trainees from other disciplines, eg. emergency medicine and anaesthesia, and overseas graduates. While the latter gain experience and training in intensive care, they are not registered intensive care trainees. There are an unknown number of current anaesthetic trainees who may ultimately register and complete

intensive care training. The reasons for the lack of interest in intensive care from junior doctors are likely to include the nature of the work, the long hours and the comparatively low remuneration compared to the commitment expected.

Table 13 shows that in 1998, 63.0% of the total intensive care trainees are under 35 years old. Across all specialties it is estimated that 82.7% of specialists in training are aged under 35 years, with 15.3% of trainees aged 35 to 44 years (AIHW 1995). The average age of intensive care trainees is greater than other specialties primarily because most Faculty trainees are studying intensive care as a second diploma having undertaken primary specialty training in anaesthesia. This has implications for the potential lifetime workforce contribution of new graduates.

The proportion of female trainees (16.0%) is lower than the total proportion of female specialists in training for all specialties (31.6%) and anaesthesia (27.1%), but similar to general surgery (16.0%).

Table 13: Intensive care trainees, by major age group and gender 1998

Gender	< 30 years	31-35 years	36-40 years	41-45 years	Total	% Total
Male	5	36	15	7	63	84.0
Female	3	4	5	0	12	16.0
Total	**8**	**40**	**20**	**7**	**75**	-
% total	10.9	52.1	27.4	9.6	100.0	100.0

Source: FICANZCA and RACP

Table 14 shows the number and gender of FICANZCA and RACP graduates since the formation of FICANZCA. There have been a total of 57 graduates from both FICANZCA and RACP training programs since 1994. The proportion of female to male graduates has been steadily rising.

Table 14: Intensive care training program graduates, by gender, 1994 to 1997

Year	Male	Female	Total	% female
1994	13	1	14	7.1
1995	9	1	10	10.0
1996	9	2	11	18.2
1997	16	6	22	27.3
Total	**47**	**10**	**57**	**17.5**

Source: FICANZCA and RACP

Table 15 shows the number of trainees expected to graduate from the joint training program over the years 1998-2001. On current estimates this is approximately 16 per year. It is also likely that some current anaesthetic trainees not yet registered may ultimately complete

intensive care training and certification.

Table 15: Expected number of intensive care training program graduates, by gender, 1998 to 2001

Expected year of graduation	Male	Female	Total	Females as a % of total
1998	12	4	16	25.0
1999	10	3	13	23.0
2000	15	3	18	16.7
2001	13	3	16	18.8
Total	**50**	**13**	**63**	**21.0**

Source: JSAC-IC

Summary of the Main Characteristics of the Intensive Care Workforce

Intensive care has a comparatively small specialist workforce. The Working Party estimates that in 1998 there were 398 practising intensive care specialists in Australia. This represents 2.1 intensivists per 100,000 population and an estimated SPR of 1:46,600.

In 1997, there were an estimated 153 ICUs in Australia, 111 (72.5%) of which were level 2 and 3 ICUs. The level 2 and 3 ICUs provide an estimated 1,160 intensive care beds, 843 (72.7%) of which are located in public hospitals.

Intensive care specialists practice mostly in major metropolitan areas, with approximately 18.2% of the workforce located in a rural area. The Working Party estimates that 81.8% of ICUs were located in major urban areas. This distribution pattern is not surprising and reflects the nature of the care that is required in ICUs and the significant infrastructure commitment associated with establishing and maintaining an ICU.

The workforce has a relatively young age profile, with only 11.9% (46) of the workforce aged 55 years and over and 60.0% (231) of the workforce aged under 45 years. Only 10.5% of the current workforce is female, which is below the average for the specialist workforce as a whole (14.0%).

It is estimated that intensive care specialists work an average of 57.7 hours per week and this is one of the highest workloads of any specialty. The Working Party accepts that this reflects the significant out of normal work hours commitment required for 24 hour specialist coverage.

In 1998 there were 120 intensive care training positions but only 75 trainees, 16 of whom are overseas occupational trainees. Accordingly, there are significant vacancies in the intensive care training program.

ADEQUACY OF THE CURRENT INTENSIVE CARE WORKFORCE

There are several indicators of the adequacy of a medical workforce. No single measurement can provide a definitive assessment, however it is possible to gain an indication of whether a workforce is adequately meeting current demand if there is a significant shortfall or oversupply. The indicators chosen by the Working Party for the intensive care workforce were:

- specialist to population ratio (SPR);
- intensive care beds to population; and
- hospital vacancies.

Specialist to Population Ratios

There are no established SPR benchmarks for intensive care in Australia. Accordingly, the current value of SPRs really lies in comparisons between States and Territories. The data in Table 8 indicated that the overall intensive care SPR for Australia is 1:46,600 and that Victoria, Queensland and South Australia are comparatively better supplied with intensive care specialists; Western Australia, Tasmania, the Australian Capital Territory and the Northern Territory have SPRs below the national average. The SPR in New South Wales is close to the national average.

Intensive Care Beds to Population

Current provision of intensive care facilities varies between the States and Territories. Interpretation of these figures is complicated by variations in the mix of level 1, 2 and 3 ICUs, in which there is sometimes no clear distinction between intensive care and coronary care beds, variations in bed occupancy, variations in the number of beds >temporarily= closed because of staff or funding shortages and constraints imposed by population distribution.

The Working Party felt that the number of intensive care beds per 100,000 population may be a useful indicator of adequacy. However, currently there is no established benchmark of this kind, so its value only lies in comparisons between States and Territories. International comparisons of beds to population are irrelevant due to definitional differences in the classification of an intensive care bed (Appendix F).

The ANZICS Intensive Care Registry collected some survey data on the number of public ICU beds per FTE specialist and these data are summarised in Table 16. The data do not provide any benchmarks and therefore their value lies in comparisons between States and Territories. It should also be stressed that the data are self reported survey information where Directors of ICUs used their own definition of an FTE rather than this being defined in the survey. Nevertheless, the survey estimated the number of beds per specialist to average 4.3, ranging from 2.9 in South Australia to 5.6 in the Australian Capital Territory.

Table 16: Public intensive care unit beds per specialist (FTE), level 1, 2 and 3 units, by State/Territory, 1997

State/Terr.	Level 3	Level 2	Level 1	Total
NSW	3.5	7.6	10.0	5.1
Victoria	3.6	7.7	4.0	4.6
Queensland	3.7	2.9	15.0	4.0
South Aust.	2.6	3.2	0.0	2.9
West. Aust.	5.0	2.7	0.0	5.3
Tasmania	5.2	10.0	0.0	5.4
North. Terr.	. .	6.5	. .	5.0
ACT	3.6	. .	12.0	5.6
Australia	**3.3**	**5.1**	**9.8**	**4.3**

Note: . . - not applicable
Source: ANZICS Intensive Care Registry, 1998

Hospital Vacancies

The AMWAC survey of public hospital specialist vacancies conducted in November 1997 reported eleven (9.6 FTE) specialist intensive care vacancies. The public hospital specialist data were obtained from Health Departments using a criterion of positions that were actively being recruited in ICUs. This represents an estimated total (398) ICU specialist vacancy rate of 2.7 % .

There were six (5.4 FTE) vacancies in New South Wales, two (2 FTE) in Queensland, one (1 FTE) in Victoria and two (1.4 FTE) in South Australia. There were two TRDs working in intensive care specialist positions in New South Wales. In the survey, Queensland, Victoria and South Australia reported staff specialist and VMO vacancies, New South Wales only reported staff specialist vacancies.

The AMWAC survey of ICU Directors conducted in October 1997 also sought information on vacancies. Table C11 in Appendix C shows that respondents to the survey indicated that there were 26 staff specialist vacancies and four VMO vacancies, with 24 of these vacancies in the public health system. There were two staff specialists vacancies in private hospitals. This is a higher number of vacancies than the figures provided by the State/Territory Health Departments, however, there is a possibility that some vacant public hospital positions indicated by the Directors of ICUs may not be funded positions. The Working Party felt that the vacancies reported by the State/Territory Health Departments probably indicate the minimum intensive care vacancies and that the vacancies reported by the Directors of ICUs could represent a theoretical maximum.

The Working Party was also told that some hospitals were having difficulties attracting registrars. This has led to a dependence on rotations from other specialties, such as anaesthesia and emergency medicine. There is, however, some merit in having intensive care registrar positions available for trainees from other specialties. It enables these registrars to gain skills in the initial care of critically ill patients, provides an appreciation of appropriate referral for intensive care and gives an initial experience of intensive care for those considering it as a career option without making a full commitment. Trainees in anaesthesia are required to have a rotation to intensive care during their training. Accordingly, this situation only becomes a cause for concern when insufficient intensive care trainees can be attracted to the specialty for future workforce needs to be met.

The Intensive Care Medical Liaison Committee, which includes representatives from FICANZCA, ANZICS and RACP, is currently developing strategies to attract junior doctors to a career in intensive care.

Conclusions on the Adequacy of the Current Intensive Care Workforce

On the whole, the intensive care workforce appears to be currently undersupplied. For a small workforce, public hospital vacancies are significant and are estimated to range between 11 and 26. This conclusion is supported by data indicating that intensive care specialists work some of the longest hours of all specialists, including high levels of after hours work. Current shortages may also be exacerbated by the lack of sufficient trainees to fill all the available training positions.

Currently, there are no established SPR or specialist to ICU bed ratio benchmarks.

The Working Party believes the shortage of specialists can be reduced in the medium term if there is an increase in trainee numbers; however in the short term, until this occurs, shortages are likely to remain a feature of this workforce.

PROJECTION OF SUPPLY AND REQUIREMENTS

The Working Party believes that the key factor influencing future intensive care supply and requirements is hospital role delineation and available intensive care infrastructure.

Like emergency medicine, the delivery of intensive care services, and therefore the practice of intensive care medicine, occurs within a clearly defined infrastructure, that is an ICU. As a result, future workforce numbers will be constrained by the available infrastructure. Other factors may be relevant to the demand for services, such as the ageing of the population and the prevalence of particular diseases or medical conditions. However, there is no point in having an intensive care workforce greater than the available places where the workforce can practise.

Accordingly, whilst the future is difficult to predict, the Working Party decided to constrain its projections to the current known physical availability of ICU bed spaces and to link this to an estimated intensive care specialist to ICU beds benchmark. In doing so, it is acknowledged that the available infrastructure may change as health departments and private hospital operators respond to other demand factors. Hence, it will be important to keep the projected scenario under regular review. The projections work also assume that the trend towards specialists trained in intensive care practising in ICUs will continue.

Factors Influencing Requirements

The overall demand for public health services has increased over the past decade with an escalating trend in admissions to hospitals. As the population ages and as co-morbidity increases so will the critical acuity in hospitals. As a result, core critical care services will become more vital.

Certain geographic areas in Australia have a faster growing population than others, so demand for intensive care services will be uneven across the country. In the outer urban areas, where most population growth is occurring, new hospitals with intensive care departments will create a demand for specialists, but it is most likely that the specialist workforce in these hospitals will grow incrementally with the caseload over a number of years, rather than dramatically.

Population growth, ageing and technical advances are expected to impact on intensive care services in the next ten years. However, this is likely to be variable and be driven, in the main, by local circumstances. In areas where most growth is occurring the demand for specialists is likely to be higher, although the demand is liable to grow incrementally over the years as workloads increase.

Conversely, the impact of ageing and technical development may be offset to some extent by other factors. Public health strategies and preventative measures that influence population health, community awareness of health and the development of minimally invasive procedures are likely to lessen the impact.

Technological advances are unlikely to reduce staffing requirements significantly in ICUs. The evolution of these advances and changing interventional practices require staff to continually learn and develop new practices to provide quality care.

Demands on intensive care specialists and units may also increase due to changing trends in practice. One such example is the development of Medical Emergency Teams (MET). Evidence is emerging that early intervention by a MET based on specific disease processes and physiological derangements can reduce the number of hospital cardiac arrests and potentially improve patient outcome. The development of MET is an extension of the role of intensive care specialists. If this trend becomes widespread it will impact on intensive care workload and specialist requirements.

It is apparent from feedback received from the States and Territories that common difficulties are experienced on a national basis. These include increasing activity and demands within constrained resources; increasing acuity and complexity of the patient caseload; a shortfall of qualified and experienced medical staff, particularly in regional and rural centres; and a shortage of trainees to fill vocational training positions.

Population is growing at about 1.2% per annum and ageing is increasing demand for health services by approximately 0.4% per annum.

In particular, the ageing of the population is likely to increase the workload of intensive care specialists, as elderly patients are likely to consume more doctor time and other resources in intensive care than younger patients. Older patients also tend to have more serious illnesses.

In the AMWAC survey of ICUs, the ICU Directors were asked to indicate which factors would increase workforce requirements, decrease workforce requirements or maintain requirements (Table C13). Among the important issues that respondents considered would increase requirements were: ageing of the population, patient expectations and knowledge, requirements for safer procedural practice, advances in medical technology, the need for a better geographic distribution of specialists, more defensive medicine and increasing ICU resources/infrastructure. Factors most likely to decrease workforce requirements were decreasing ICU resources/infrastructure and cost containment strategies.

State/Territory Health Department Reviews of Intensive Care

The New South Wales, Queensland and Victoria Health Departments have all recently conducted studies on the provision of intensive care services. Statewide guidelines and recommendations were developed as a result of these studies and are summarised in Appendix F.

Estimating the Requirement for ICU Specialists

On the basis of the current maximum number of ICU beds, it is possible to project a theoretical maximum number of ICU specialists, if an assumption is made about the level of specialist coverage that is appropriate. In addition, given that there is unlikely to be a rapid growth in new ICUs, this maximum can also be used for projection purposes. Over time it may need to be adjusted, but for the next ten years probably only marginally. This approach also assumes that providing intensive care facilities for ongoing care in smaller population centres is unlikely to be justified by the capital investment required. Also, medical and nursing staff in smaller centres would have difficulty maintaining the necessary skills. Transfer to units in larger centres is likely to remain the preferred method of service delivery to smaller communities.

The level of specialist staffing needed in an ICU is affected by the need to provide 24 hour specialist cover, leading to an unusually heavy out of normal working hours commitment. To bring working hours in line with what might be considered community standards, the Working Party considers a minimum of four FTE intensive care specialists are needed for a ten bed unit with usual bed occupancy and casemix. To provide adequate internal cover for annual leave, study leave, sickness etc., the Working Party considers that five FTE intensive care specialists would be desirable. The Working Party also believes that a benchmark of five specialists per ten beds is required to provide adequate staffing and maintain teaching, research, quality assurance activities and participation in hospital management structures.

A similar model using a benchmark of four to five intensive care specialists for an average level 3 unit, or tertiary ICU of 10 to 12 beds with approximately 800 to 1,000 admissions, was recommended in the 1996 review of intensive care services in Queensland (McKay and Associates, 1996). The Working Party is not aware of any other Australian study that attempted to use a benchmark, but supports this structure as a model for reflecting current provision of intensive care facilities. An intensive care facility of 10 to 12 beds also provides a critical mass for training and achieves efficient use of equipment, nursing, paramedical and other staff.

Mathematical modelling using probability theory also shows that variations in bed occupancy decrease with increasing size for an ICU. A working party of the British Medical Association suggested that more than 10 beds in an ICU becomes unwieldy, and in North America the Society of Critical Care Medicine Guidelines suggest a maximum of 12 intensive care beds per intensive care module. At one end of the scale, the Intensive Care Association of Great Britain and Ireland concluded that less than four intensive care beds or 200 admissions per year is uneconomic. At the other end of the scale it is suggested that units with 20 to 25 beds, or even more, may be appropriate in larger institutions. They can operate effectively provided they are adequately staffed and working practices are adapted to cope with the increased workload (Hines and Watson 1996).

The Working Party decided to use the four to five intensive care specialists per 10 to 12 ICU beds in the projection analysis. It should be stressed that this is simply a model to give a global picture of ideal specialist staffing in level 2 and 3 ICUs. Individual need will clearly vary with casemix, caseload etc. and it can be expected that there could be some economies by using part-time staff in some ICUs or by sharing arrangements between ICUs (eg. private and public).

Based on 1998 estimates there were 1,160 level 2 and 3 ICU adult and paediatric beds in Australia (Table 6). On broad estimation, this would equate to a minimum requirement for an intensive care workforce of 464 (116 ten bed units x 4 specialists). However, this calculation does not take into account differences in the size of individual hospital ICUs. When this is done, using five specialists per 10 to 12 bed unit, with pro-rata adjustments for different size units, the maximum requirement is likely to be approximately 500 specialists. The Working Party believes this number provides a best estimate of the actual persons required, taking into account variations in staffing arrangements and the proportion of professional time individuals contribute to intensive care and intensive care activities. It therefore provides a basis for calculating the numbers needed to graduate from training to sustain the intensive care workforce.

Accordingly, the current requirement for intensive care specialists is estimated to range between 464 and 500. Table 17 shows the estimated required number of specialists for level 2 and 3 ICUs by State/Territory.

Table 17: Estimated maximum intensive care specialist requirements, public and private, level 2 and 3 units, by State/Territory

Beds	**No. spec.**	**Number of intensive care units**								
		NSW	**Vic**	**Qld**	**SA**	**WA**	**Tas**	**NT**	**ACT**	**Aust**
9 & less	4	31	14	19	5	4	3	2	0	79
10-12	5	8	4	2	0	2	0	0	1	17
13-15	6	0	2	1	2	0	1	0	0	6
16 +	7	4	1	2	1	1	0	0	0	9
Total no. of units	-	43	21	24	8	8	4	2	1	111
Total no. of spec.	**-**	**192**	**95**	**106**	**39**	**37**	**18**	**8**	**5**	**500**

Source: AMWAC

Expected Changes in Supply

An average of 21 trainees per year commence with the joint FICANZCA/RACP program and the program currently graduates approximately 16 trainees per year. Additions to the workforce from overseas doctors are expected to be negligible.

The intensive care workforce is relatively young. As a consequence it is difficult to calculate an average annual loss as very few specialists have reached the retirement age. However, some assumptions can be made from the age of specialists in the current workforce. The Working Party estimated a small loss with a considerable variability from year to year. On average the loss to ANZICS is between two to five members per annum due to retirements. In general, most specialists would consider retiring from active intensive care practice around the age of 60 years.

The AIHW in 1995 estimated 17 persons aged 60 years and over. Losses under the age of 50 years due to burnout are believed to be small. Anecdotally, attrition rates for intensive care specialists not due to retirement are quite small. Generally, intensive care specialists tend to remain practising in the specialty.

Some intensive care specialists may change to part-time work due to personal reasons or may supplement their income with work in other specialties. This trend may increase due to the greater flexibility in dual qualifications or some may choose to practice in the area of anaesthesia or other related intensive care specialties.

Using past experience as a guide, the Working Party decided to assume an attrition rate for retirement from active service of 1.8% per annum for the next five years given the age and structure of the intensive care workforce. This figure has been applied to the supply projection analysis. In adopting this figure the Working Party cautions that it will require careful monitoring from year to year. The increase in entrants to the workforce in recent and forthcoming years, coupled with the increasing demands on intensive care specialists could see a higher >burn out rate than historical experience.

It is expected that the proportion of women in intensive care will increase given the greater number of female trainees and the fact that there are only eight women aged over 45 years in the workforce. Currently, women represent 10.5% of the workforce and 16.0% of Australian trainees. However, it should be noted that intensive care medicine is not considered to be one of the specialties attractive to women because of the high out of hours commitment and unpredictable work schedules. There are greater difficulties for female doctors with family obligations as they have problems achieving a balance between family and work life.

In conducting the projection analysis, the expected supply was adjusted to account for increasing female participation, and for the lower workforce contribution of female specialists, based on hours worked (AIHW 1995). Female participation is estimated to average 82% of male intensive care specialists lifetime hours worked contribution.

Finally, substitution is a feature of the current workforce, which is partly due to the development history of the specialty and its relative recency compared to other specialities. However, it is not a current 'best practice' working solution and is likely to become progressively less acceptable in the future. Many of those specialists currently 'substituting' have evolved with the specialty. Replacement of their knowledge and experience will need specific training and it is expected that the trend towards specialists trained in intensive care practising in ICUs will continue and expand.

BALANCING SUPPLY AGAINST REQUIREMENTS

Future growth in the intensive care medicine workforce will be limited by ICU role delineation and infrastructure, therefore the growth should not be allowed to significantly exceed the estimated maximum requirement of 500 specialists by 2008. Accordingly, once the current shortfall in specialists is removed and the maximum requirement achieved, the number of doctors taken into training will have to be tailored to match replacement requirements. To develop a training scenario to fit within the estimated maximum size of the specialist intensive care workforce, the Working Party decided to use the standard AMWAC specialist medical workforce projection model.

On the supply side, the model takes into account expected entrants to the workforce and those leaving, converts the number of specialists to an FTE figure using the average hours worked by age and gender, and factors in the expected average lower lifetime workforce contribution of female specialists.

On the requirements side, a likely expansion in demand for intensive care services is included. In the absence of reliable intensive care service trend data, the expected annual growth in population adjusted for the impact of ageing was used; that is it has been assumed that requirements could grow by approximately 1.6% per annum.

In addition, the Working Party estimated that the current specialist workforce is undersupplied by a minimum of 13 and a maximum of 26. Accordingly, these two estimates were also incorporated into the projection analysis.

The model shows that if training program graduations remain unchanged at the current average of 16 new graduates per year, there will be little progress made towards meeting the estimated maximum requirement for specialists. Better progress is achieved if training program output is increased to at least an average of 20 new graduates per year. Given that intensive care involves four years of training, the earliest any increase in trainee intake could impact on the workforce is 2003 to 2004.

Boosting training program output to 20 per annum may still prove to be too conservative in the short term. Indeed, the Working Party estimates that to provide an adequate number of intensive care specialists, the output of the intensive care training program should ideally average around 24 to 26 trainees per year, particularly given that a small number of intensive care trainees are likely to continue to move into related areas of practice such as anaesthesia.

In this respect, it will be important to keep progress under review and make further adjustments to training program intake if necessary. Regular review is also necessary because the projection scenario is clearly sensitive to factors such as female participation, trainee success and workforce attrition. Care must also be taken to ensure that training program output does not exceed the estimated maximum requirement of between 464 and 500 specialists.

A conservative increase in trainee intake is considered preferable however for several reasons:

1. In intensive care training there is always the possibility of a small additional inflow from other specialist disciplines who rotate their trainees through the intensive care program, even though it is recognised that there will be outflows of intensive care trainees.

2. The pace at which trained intensive care specialists will displace other specialists currently working in ICUs is largely unknown, as is the willingness of hospital administrators to ensure this displacement occurs.

3. Hospital and Health Department reaction to the proposed benchmark of four intensive care specialists per 10 to 12 bed Level 3 and 2 ICU is uncertain.

4. The specialty is still in a major growth phase and has a comparatively young workforce. The attrition rate and the take-up of part time work in ten years time may vary from the projections currently made.

The outcomes of the two projection scenarios are summarised in Tables 18 and 19. Both are based on requirements growth of 1.6% per year and present minimum and maximum scenarios using the two extremes of the estimated shortage range. Table 18 shows the effect of maintaining training program graduations at 16 per year. Table 19 presents a scenario of 18 graduations by 2003 and 2004 and 20 for the years 2005 to 2008.

Table 18 shows baseline undersupply of 3.3% or 13 specialists for a minimum vacancy level of 13 and 6.5% or 26 specialists for the maximum vacancy level of 26 for the current number of graduating trainees using population growth and ageing projections. By 2008, there is expected to be an undersupply of 5.1% or 23 specialists for a minimum vacancy level of 13 and 8.4% or 38 specialists for the maximum vacancy level of 26 for the current number of graduating trainees. Clearly, maintaining the current level of training program output is likely to produce significant shortages.

Table 18: Projected requirements for intensive care services for population growth and ageing, maintaining current training program output, 1998 to 2008

Year	1998	2000	2002	2004	2006	2008
			Minimum number of current vacancies			
Estimated specialist requirements	404	417	430	444	458	473
Estimated specialist supply	391	407	424	436	445	450
Shortfall	13	10	6	8	13	23
% shortfall	3.3	2.5	1.4	1.8	3.0	5.1
			Maximum number of current vacancies			
Estimated specialist requirements	417	430	444	458	473	488
Estimated specialist supply	391	407	424	436	445	450
Shortfall	26	23	20	22	28	38
% shortfall	6.5	5.7	4.6	5.0	6.3	8.4

Source: AMWAC

Scenario 2 in Table 19 shows baseline undersupply of 3.3% or 13 specialists for the minimum vacancy level of 13 and a undersupply of 6.5% or 26 specialists for a maximum vacancy level of 26 with an increase in the number of graduating trainees to 2008 using population growth and ageing projections. By 2008, it is projected to have an undersupply of 1.7% or 8 specialists for a minimum vacancy level of 13 and 5% or 23 specialists for the maximum vacancy level of 26 for the current number of graduating trainees.

Table 19: Projected requirements for intensive care services, population growth and ageing, increased training program output, 1998 to 2008

Year	1998	2000	2002	2004	2006	2008
			Minimum number of current vacancies			
Estimated specialist requirements	404	417	430	444	458	473
Estimated specialist supply	391	407	424	440	452	465
Shortfall	13	10	6	6	6	8
% shortfall	3.3	2.5	1.4	1.3	1.4	1.7
			Maximum number of current vacancies			
Estimated specialist requirements	417	430	444	458	473	488
Estimated specialist supply	391	407	424	438	452	465
Shortfall	26	23	20	20	21	23
% shortfall	6.5	5.7	4.6	4.5	4.6	5.0

Source: AMWAC

The Working Party does not believe there needs to be any increase in the number of intensive care training positions. Given only 75 of the available 120 positions were filled in 1997, the suggested increase in trainee intake can easily be accommodated within the current number of positions, provided State/Territory Health Department funding for the positions is still available.

In fact, in common with rehabilitation medicine and geriatric medicine, reviewed previously by AMWAC, the key challenge for the profession will be to promote intensive care as a career option to junior doctors.

Finally, the Working Party would like to stress the importance of the profession, State/Territory Health Departments and private hospitals working together to improve intensive care data collection. The Working Party was continually frustrated by the absence of reliable and robust data. In recent years the ANZICS Intensive Care Registry and some Health Departments have worked to ensure there are improved data on the number and classification of ICUs and the number of ICU beds, however beyond this, the data remain patchy and in particular information on specific intensive care service trends is virtually non existent.

It should also be noted, that on the suggestion of AMWAC, and as an initial step in the process of improving the image of intensive care, a survey of ANZICS members and intensive care trainees was undertaken in January 1999. The purpose of the survey was to gain information about their attitudes to alternative working arrangements and ways in which intensive care practice and intensive care training program could be made more attractive to prospective trainees. The survey had a 45.0% response rate from specialists and only a 21.4% response rate from trainees. The full results of this survey are detailed in Appendix D.

Overall, 67.2% of specialists and 63.7% of trainees indicated satisfaction with current rostering arrangements, and whilst the arrangements can be complex they generally (70.7% of respondents) consisted of working a 10 to 12 hour day or night shift combined with being on call at nights and/or weekends. A majority of male specialists (69.5%) were satisfied with their current arrangements, but only 46.7% (7) females were satisfied. There were no observable differences between States/Territories.

As well as data on current working arrangements, the survey also sought views on working defined shifts within a 24 hour period. The majority of specialist respondents (78.8%) were not interested in this type of arrangement. Reasons given for this were lack of continuity of care, potential rostering problems and inability to attend to non-clinical activities such as administration and research. Working defined shifts was also contended to be inappropriate for smaller metropolitan and rural locations due to a lack of trained staff and reduced clinical need. More trainees (63.6%) were interested in working defined shifts.

In terms of issues which made intensive care unattractive to trainees, the main concerns focused on long work hours, comparatively poor remuneration, the nature of intensive care work and the length and nature of the training program. A perceived lack of professional recognition and support for intensive care specialists was also highlighted.

RECOMMENDATIONS

The following recommendations have been made in the context of the continuance of the existing model of delivery of intensive care service delivery.

The Working Party recommends:

1. That, based on current estimates of future intensive care demand and infrastructure, there will be a maximum requirement for a specialist intensive care workforce of approximately 464 to 500 by the year 2008.

   This estimate assumes that the trend towards more specialists specifically trained in intensive care will continue and that appropriate specialist staffing ratios are adopted and supported by State/Territory health department funding.

   (The current size of the specialist intensive care workforce is estimated to be 398).

2. To achieve this increase in intensive care specialists, the number of graduates from the intensive care training program should be increased from the current level of 16 per year to at least 18 for the years 2003 and 2004 and 20 for the years 2005 to 2008. Thereafter the output of the training program may need to decrease but it is not appropriate to speculate on this possibility at present.

   On the assumption that a small number of intensive care trainees will continue to move into related areas of practice, particularly anaesthesia, it is estimated actual trainee intake should average 24 to 26 per year.

   This increase in training program intake is necessary both to address the current shortfall in intensive care specialists and to meet a projected growth in requirements estimated at 1.6% per annum.

3. There is no need to increase the current number of accredited intensive care training positions. The increase in trainee intake should be possible by filling positions that are currently vacant or being used as service positions or filled with occupational trainees; provided State/Territory health department funding for these vacant training positions remains available.

4. The JSAC-IC and the Intensive Care Medical Liaison Committee develop short term strategies to attract junior doctors to a career in intensive care to achieve an output from the intensive care training program of 24 to 26 graduates per year.

5. State/Territory health departments continue to support the development of the ANZICS Patient Database. If this database were developed to include all Australian episodes of intensive care it could greatly assist future workforce analyses and planning.

6. That intensive care requirements and supply projections be monitored regularly so that they can be amended if new trends emerge. That this monitoring be co-ordinated by FICANZCA, ANZICS, RACP and AMWAC and the results incorporated into the AMWAC annual report to AHMAC. AMWAC will provide the necessary support.

PART B:

THE PAEDIATRIC INTENSIVE CARE SPECIALIST WORKFORCE IN AUSTRALIA

PAEDIATRIC INTENSIVE CARE

Paediatric Intensive Care

Specialist paediatric ICUs are only located in tertiary referral hospitals and provide complex multi-system life support for an indefinite period for children needing intensive care and have extensive back up laboratory and clinical service facilities to support this tertiary role. A paediatric ICU must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring, for an indefinite period to infants and children less than 16 years of age.

Number of Paediatric Intensive Care Units

Paediatric intensive care services in Australia are highly regionalised. The vast majority of critically ill children are cared for in tertiary paediatric ICUs in the major capital cities. In most instances, critically ill children are transferred to these units by specialised retrieval units. A small number of critically ill children are cared for in large regional, adult ICUs. When prolonged care of such children is required, most are transferred to the specialised tertiary paediatric ICUs. Such practices are consistent with the recommendations of the National Health and Medical Research Council (1981, 1983).

In 1997, there were eight paediatric and two combined adult/paediatric ICU facilities in Australia. There are no paediatric ICU services in level 1 public hospital intensive care facilities or private hospitals. Level 2 ICU facilities operate in Queensland and Northern Territory, and stand alone specialist paediatric ICUs are available in each State except Tasmania.

Table 20 shows the distribution of specialist paediatric ICUs beds. In 1997, it was estimated that there were 116 paediatric (only) ICU beds in Australia. It is also estimated that 93 of these beds are equipped for IPPV (AUSPIC News, 1998). However, at the time of the ANZICS survey only 74 of these paediatric ICU beds were available for patient care. All States, other than South Australia and Western Australia, have the capacity to increase their number of ventilated paediatric beds during times of increased demand.

The estimated number of paediatric beds per consultant (FTE) ranged from 3.2 in Queensland to 5.0 in Western Australia and New South Wales. The ratio is lowest in Queensland because paediatric intensive care services are split between these units,

Table 20: Paediatric intensive care beds and paediatric intermittent positive pressure ventilator beds, by State/Territory, 1997

State	Total beds	Open beds	IPPV beds	No. of specialist FTE	Beds per specialist FTE
NSW	48	29	29	9.4	5.0
Victoria	26	14	26	5.5	4.7
Queensland	20	13	20	6.2	3.2
South Aust.	12	8	8	3.0	4.0
West. Aust.	10	10	10	2.0	5.0
Australia	**116**	**74**	**93**	**26.1**	**4.4**

Note: Open beds refer to beds currently open and available for patient use.
Source: ANZICS

DESCRIPTION OF THE CURRENT PAEDIATRIC INTENSIVE CARE WORKFORCE

Number of Paediatric Intensive Care Specialists

In 1998, there were 22 specialists practising full time in paediatric intensive care. There were a further seven specialists who work 50% or more of their time in paediatric intensive care. The intensive care workforce is further supplemented by approximately 12 specialists (anaesthetists and paediatricians) who contribute predominantly to out of hours cover. This arrangement occurs in the smaller paediatric ICUs. Of the 29 specialists working 50% or more of their time in paediatric intensive care, 22 are from a paediatric background and seven are from an anaesthetic background.

Age and Gender Profile

The age range of paediatric intensive care specialists is from 37 to 56 years. Only three of the 29 specialists were aged over 50 years. There is only one female specialist practising paediatric intensive care.

Training in Paediatric Intensive Care

In 1996, a separate training program in paediatric intensive care was commenced by FICANZCA. This program culminates in the diploma FFICANZCA, endorsed in paediatric intensive care.

Prior to 1996, some specialists, both anaesthetists and paediatricians, trained in paediatric intensive care by serving an apprenticeship in Australian units or by undertaking Fellowships in Canada or the United States. A small number also trained through the Faculty of Anaesthetists, RACS, gaining endorsement in intensive care. Although these specialists trained predominantly in paediatric units, the certification obtained was the adult diploma FFARACS, endorsed in intensive care.

Staff Vacancies
Currently there are no vacancies for specialists in paediatric intensive care in Australia.

ADEQUACY OF THE CURRENT INTENSIVE CARE WORKFORCE

There is evidence that Australia needs approximately ten ventilator capable paediatric intensive care beds on a given day for a population of one million children (Shann et al 1997). Approximately two thirds of patients requiring paediatric intensive care are mechanically ventilated.

In Australia there are 3.92 million children aged between 0 to 14 years. Currently there are between 105 to 116 paediatric intensive care bed spaces in Australia and on average 60-65 are occupied on a given day. Applying a model of four to five specialists to cover the average ten occupied bed paediatric ICU (predominately to provide cover for the out of hours work load), then Australia needs 24 to 30 paediatric intensive care specialists.

Such modelling supports the fact that the current paediatric intensive care specialist workforce of 29 specialists (22 full time and 7 practising 50% or more) is meeting the current demand. For economic reasons, the short fall of specialists in smaller units is managed by part time involvement of other specialists (anaesthetists and paediatricians).

It is widely accepted that job opportunities in Australia in the specialty are very limited for paediatric intensive care trainees. Currently, there are four registered paediatric intensive care trainees with the FICANZCA. It is likely that all four will have completed their training and certification by the year 2001. One is an overseas trained doctor. In addition, there are two or three Australian graduates, who are undertaking or have completed Fellowships in paediatric intensive care overseas.

Paediatric Intensive Care Workload
There is mounting evidence that the clinical outcome for children cared for in tertiary paediatric ICUs is better in larger, busier units (Pearson et al, Pollack et. al). It is important that the current practice of regionalisation supported by retrieval services is maintained. It is unlikely that population growth in the next ten years will be sufficient to warrant the creation of additional tertiary units.

A number of factors will increase the demands on paediatric intensive care services. These include population growth, surgical initiatives, family expectations and technological advances. Surgical initiatives include those associated in particular with cardiac surgery for congenital heart disease, craniofacial surgery, transplantation and epilepsy surgery. The cohort of children who have had palliative procedures for complex congenital heart disease will require additional surgical procedures. Expanding oncological services also places

demands on paediatric ICUs. Changing expectations of parents and caregivers in certain groups of children with chronic disabilities are already impacting on paediatric intensive care services. Particular examples relate to the care of children with end stage neuromuscular diseases and children who are severely intellectually and physically handicapped.

Downward trends for some intensive care services have occurred as a result of immunisation programs, eg. haemophilus immunisation, and safety measures such as car restraints, the use of bicycle helmets and swimming pool fencing. It is anticipated that some of these trends will continue, particularly in the area of immunisation.

FUTURE REQUIREMENTS AND SUPPLY

The demand for new specialists will be driven by a combination of factors including the overall workload, out of hours commitments and industrial considerations, ie. the opportunity for paediatric intensive care specialists to discontinue out of hours work beyond a certain age. The technical demands involved in the care of critically ill children will continue to require high level input from paediatric intensive care specialists and advanced technologies may compound this situation. Provided that regionalisation is maintained and some rationalisation of services occurs, the expansion of the workforce in terms of numbers will be modest. There are economies of scale in some of the smaller units that will allow growth to be absorbed with minimum staffing increases.

In the last ten years, the paediatric intensive care specialist workforce has grown by about ten. It is the opinion of several specialists in the field that similar growth i.e. ten new specialists, can be anticipated in the next ten years. These increases will be mainly in the smaller units as they develop a critical mass that justifies stand alone staffing without reliance on out of hours cover by other specialists.

The attrition rate of the current workforce is likely to be minimal. There is one fully trained paediatric intensive care specialist working overseas, who has been unable to secure a position in Australia.

Therefore it would seem that paediatric intensive care services are adequately catered for by the current paediatric intensive care workforce.

Applying the factors that are likely to increase the demand for paediatric intensive care services and assuming continued regionalisation, it would appear that the next ten years will see a requirement for an additional ten specialists working wholly or predominantly in paediatric intensive care. The number of specialists currently in training and those likely to enter training programs would appear adequate to meet these demands.

RECOMMENDATIONS

The following recommendation is made in the context of the continuance of the existing model of delivery of intensive care delivery.

The Working Party recommends:

1. The current output of paediatric intensive care specialists be maintained to ensure that supply continues to match demand

APPENDIX A: RURAL, REMOTE AND METROPOLITAN AREAS CLASSIFICATION

The Commonwealth Departments of Health and Family Services and Primary Industries and Energy, Rural, Remote and Metropolitan Areas classification, has been used to classify the geographic location of the job of responding medical practitioners in the following seven categories.

Metropolitan areas:

1. *Capital cities* consist of the State and Territory capital cities of Sydney, Melbourne, Brisbane, Perth, Adelaide, Hobart, Darwin and Canberra.

2. *Other metropolitan centres* consist of one or more statistical subdivisions which have an urban centre of population of 100,000 or more in size. These centres are: Newcastle, Wollongong, Queanbeyan (part of Canberra-Queanbeyan), Geelong, Gold Coast-Tweed Heads, Townsville-Thuringowa.

Rural zones:

3. *Large rural centres* are statistical local areas where most of the population reside in urban centres of population of 25,000 to 99,999. These centres are: Albury-Wodonga, Dubbo, Lismore, Orange, Port Macquarie, Tamworth, Wagga Wagga (NSW); Ballarat, Bendigo, Shepparton-Mooroopna (Vic); Bundaberg, Cairns, Mackay, Maroochydore-Mooloolaba, Rockhampton, Toowoomba (Qld), Whyalla (SA); and Launceston (Tas).

4. *Small rural centres* are statistical local areas in rural zones containing urban centres of population between 10,000 and 24,999. These centres are: Armidale, Ballina, Bathurst, Broken Hill, Casino, Coffs Harbour, Forster-Tuncurry, Goulburn, Grafton, Griffith, Lithgow, Moree Plains, Muswellbrook, Nowra-Bombaderry, Singleton, Taree (NSW); Bairnsdale, Colac, Echuca-Moama, Horsham, Mildura, Moe-Yallourn, Morwell, Ocean Grove-Barwon Heads, Portland, Sale, Traralgon, Wangaratta, Warrnambool (Vic); Caloundra, Gladstone, Gympie, Hervey Bay, Maryborough, Tewantin-Noosa, Warwick (Qld); Mount Gambier, Murray Bridge, Port Augusta, Port Lincoln, Port Pirie (SA); Albany, Bunbury, Geraldton, Mandurah (WA); Burnie-Somerset, Devonport (Tas).

5. *Other rural areas* are the remaining statistical areas within the rural zone. Examples are Cowra Shire, Temora Shire, Guyra Shire (NSW); Ararat Shire, Cobram Shire (Vic); Cardwell Shire, Whitsunday Shire (Qld); Barossa, Pinnaroo (SA); Moora Shire, York Shire (WA); George Town, Ross (Tas); Coomalie, Litchfield (NT).

Remote zones:
These are generally less densely populated than rural statistical local areas and hundreds of kilometres from a major urban centre.

6. *Remote centres* are statistical local areas in the remote zone containing urban centres of population of 5,000 or more. These centres are: Blackwater, Bowen, Emerald, Mareeba, Moranbah, Mount Isa, Roma (Qld); Broome, Carnarvon, East Pilbara, Esperance, Kalgoorlie/Boulder, Port Hedland, Karratha (WA); Alice Springs, Katherine (NT).

7. *Other remote areas* are the remaining areas within the remote zone. Examples are: Balranald, Bourke, Cobar, Lord Howe Island (NSW); French Island, Orbost, Walpeup (Vic); Aurukun, Longreach, Quilpie (Qld); Coober Pedy, Murat Bay, Roxby Downs (SA); Coolgardie, Exmouth, Laverton, Shark Bay (WA); King Island, Strahan (Tas); Daly, Jabiru, Nhulunbuy (NT).

APPENDIX B: HOSPITALS WITH INTENSIVE CARE FACILITIES, ADULT AND PAEDIATRIC, 1997

Note: * indicates a hospital with a paediatric ICU.

PUBLIC HOSPITALS

New South Wales

Level 3	Level 2	Level 1
Concord	Albury Base	Armidale
John Hunter, Newcastle*	Auburn	Bankstown
Liverpool	Bathurst Base	Griffith Base
Nepean	Blacktown	Macleay Valley, Kempsey
New Children's, Westmead*	Campbelltown	Manning Base, Taree
Prince of Wales	Canterbury	Mt. Druitt
Royal North Shore	Coffs Harbour Base	Newcastle Mater
Royal Prince Alfred	Dubbo Base	Port Macquarie Base
St. George	Fairfield	Tweed Heads
St. Vincents	Gosford	
Sydney Childrens, Randwick*	Goulburn Base	
Westmead	Hornsby Ku-ring-gai	
Wollongong	Lismore Base	
	Manly	
	Mona Vale	
	Orange Base	
	Ryde	
	Shoalhaven	
	Sutherland	
	Tamworth Base	
	Wagga Wagga Base	

Public hospitals with intensive care facilities, adult and paediatric, 1997 continued

Victoria

Level 3	Level 2	Level 1
Austin and Repatriation		Gippsland Base, Sale
Alfred		Goulbourn Valley, Shepparton
Ballarat Base		Hamilton Base
Box Hill		Latrobe Regional, Traralgon West
Dandenong		Maroondah
Frankston		Mildura Base
Geelong		The Bendigo
Monash Medical Centre*		Wangaratta District
Royal Children's*		Warrnambool Base
Royal Melbourne		Wimmera Base, Horsham
St. Vincents		
The Northern (formerly Preston and Northcote)		
Western		

Queensland

Level 3	Level 2	Level 1
Cairns Base	Ipswich	Bundaberg
Gold Coast	Logan	Mackay Base
Mater Adults	Nambour General	Maryborough Base
Mater Children's*	Redcliffe	Mt. Isa
Prince Charles*	Rockhampton	Queen Elizabeth II
Princess Alexandra	Toowoomba Base	
Royal Brisbane		
Royal Children's*		
Townsville General		

Public hospitals with intensive care facilities, adult and paediatric, 1997 continued

South Australia

Level 3	Level 2	Level 1
Flinders Medical Centre		Modbury
Queen Elizabeth		Port Augusta
Royal Adelaide		Repatriation, Daw Park
Women's and Children's*		Whyalla

Western Australia

Level 3	Level 2	Level 1
Fremantle		Albany Regional
Princess Margaret*		Bunbury Regional
Royal Perth		
Sir Charles Gardiner		

Tasmania

Level 3	Level 2	Level 1
Launceston General	North West Regional, Burnie	
Royal Hobart		

Northern Territory

Level 3	Level 2	Level 1
	Alice Springs	
	Royal Darwin	

Australian Capital Territory

Level 3	Level 2	Level 1
Woden Valley		Calvary

PRIVATE HOSPITALS

New South Wales

Level 3	Level 2	Level 1
St. Lukes Private	Hills Private	Brisbane Waters Private
St. Vincents Private	Illawarra Private	Lake Macquarie Private
	Masonic Private, Ashfield	North Gosford Private
	Mater Misericordiae	Peninsula Private, Harbord
	St. George Private	
	Strathfield Private	
	Sydney Adventist	

Victoria

Level 3	Level 2	Level 1
Epworth	Knox Private	John Fawkner Private
Jessie MacPherson Private	South Eastern Private	St. John of God, Ballarat
Melbourne Private		St. John of God, Geelong
St. Francis Xavier Private		The Valley Private
St. Vincents Cabrini Private		
Warringal Private		

Queensland

Level 3	Level 2	Level 1
Greenslopes Private	Allamanda, Southport	St. Andrews War Memorial
Mater Private, Townsville	Calvary Private, Cairns	
Wesley	Holy Spirit	
	John Flynn, Tugun	
	Mater Private	
	Pindara, Bundall	

Private hospitals with intensive care facilities, 1997 continued

South Australia

Level 3	Level 2	Level 1
Ashford Community	Memorial	
St. Andrews Private		
Wakefield Private		

Western Australia

Level 3	Level 2	Level 1
The Mount	Hollywood Private	
	St. John of God, Murdoch	
	St. John of God, Subiaco	

Tasmania

Level 3	Level 2	Level 1
	Calvary, Hobart	Mersey Private Community
		St. Helens Private

APPENDIX C: SUMMARY OF THE RESULTS OF THE AMWAC SURVEY OF LEVEL 2 AND LEVEL 3 INTENSIVE CARE UNITS

METHODOLOGY

To assist with the establishment of a profile of the intensive care workforce in Australia, a survey of all level 2 and 3 public and private ICUs was conducted in November 1997. On the basis of data held by ANZICS, 157 survey questionnaires were sent to the Directors of all level 2 and level 3 ICUs in Australia. Due to the differences in ICU classifications in States/Territories, respondents were requested to refer to the intensive care definitions contained in the National Health Data Dictionary, version 5 (see Appendix E).

RESULTS

Of the 157 ICUs that were sent survey questionnaires, 100 responses were received which represented a response rate of 63.7%. However, upon analysis of the returns by the Working Party, data from 18 ICUs were excluded as they belonged more to the level 1 classification. This gave a survey response size of 82 or 75.2% of the total number of level 2 and 3 ICUs. The results should be read with a degree of caution as the sample sizes are small in some States/Territories, although comparisons of the survey responses with the total number of ICUs, ICU beds and their distribution show that the survey could be considered representative of ICUs as a whole (see Tables C1 to C4).

Distribution of Respondents

Table C1 shows the distribution of respondents by State/Territory. Overall, the response rate for level 2 and 3 ICUs for State/Territories was quite high at 75.2%.

Table C1: Level 2 and 3 intensive care unit survey respondents, by State/Territory, 1997

State/Terr.	Responses (total no. of ICUs)	% response rate for State/Terr	% of total responses	% of total number of level 2 and 3 ICUs
NSW	31 (42)	56.4	37.8	73.8
Victoria	16 (22)	45.7	19.5	72.7
Queensland	21 (24)	70.0	25.6	87.5
South Aust.	5 (8)	41.7	6.1	62.5
West. Aust.	4 (6)	50.0	4.9	66.7
Tasmania	2 (4)	33.3	2.4	50.0
North. Terr.	2 (2)	100.0	2.4	100.0
ACT	1 (1)	50.0	1.2	100.0
Australia	**82 (109)**	**53.9**	**100.0**	**75.2**

Source: ANZICS and AMWAC Survey 1997

Table C2 shows the geographic distribution of respondents, the majority (78.1%) of which are located in the capital cities. 15.9% of respondents were located in a rural or remote area.

Table C2: Level 2 and 3 intensive care unit survey respondents, by geographic distribution, 1997

Level ICU	Capital city	Other metropolitan	Provincial city	Small rural city	Large remote town	Total
Level 2	15	3	7	2	1	28
Level 3	49	2	3	0	0	54
Total	**64**	**5**	**10**	**2**	**1**	**82**
%	78.1	6.1	12.2	2.4	1.2	100.0

Source: AMWAC Survey, 1997

Table C3 shows the distribution of respondent ICUs by type of hospital and type of ICU. Overall, 80.5% of responding ICUs were located in a public hospital. The majority of respondents reported being medical/surgical ICUs (67.1%). Seven paediatric ICUs responded to the survey.

Table C3: Level 2 and 3 intensive care unit survey respondents, by type of hospital and unit and State/Territory, 1997

Type of unit	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total	%
Public hospital	27	13	14	4	3	2	2	1	66	80.5
Private hospital	4	3	7	1	1	0	0	0	16	19.5
Coronary[a]	8	1	6	0	0	2	0	0	9	20.7
Medical/surgical	21	14	11	4	3	0	1	1	33	67.1
Paediatric	2	1	2	1	1	0	0	0	5	8.5
Combined[b]	0	0	2	0	0	0	1	0	3	3.7
Total	**31**	**16**	**21**	**5**	**4**	**2**	**2**	**1**	**82**	**100.0**

Note: a - stand alone CCU, b - combined coronary, medical, surgical and paediatric
Source: AMWAC Survey, 1997

Number of Intensive Care Unit Beds

Respondents to the survey indicated 835 open or available beds. An open or available bed was defined as a bed that is available for patient use. A physical bedspace refers to the theoretical maximum bed capacity. The number of open beds can vary from the number of funded beds in public hospitals. In private hospitals however, the number of funded beds is equal to the physical beds.

Table C4: Level 2 and 3 intensive care unit survey respondents, total and average number of beds, by State/Territory, 1997

Bed type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aust
				Total number of ICU beds					
Open[a]	322	154	204	52	51	21	11	20	835
Physical spaces[b]	409	197	220	60	58	26	7	24	1,001
Funded[c]	285	125	189	50	45	20	10	10	734
				Average number of ICU beds					
Open[a]	10.4	9.6	9.7	10.5	12.8	10.5	5.5	20.0	10.2
Physical spaces[b]	13.2	12.3	10.5	12.0	14.5	13.0	7.0	24.0	12.2
Funded[c]	9.2	7.8	9.0	10.0	11.3	10.0	5.0	10.0	9.0

Notes: a - currently open, number of beds available for patient use; b - physical bed spaces, physical theoretical maximum patient capacity; c - number of physical bed spaces currently funded for use (may be the same as available beds). Source: AMWAC Survey, 1997

Number of Patients

Level 2 and 3 ICUs were asked to report the total number of patients admitted for 1996. This is shown in Table C5. Level 3 ICUs who responded have mostly between 501 to 1000 patients and between 201 to 500 patients for level 2 ICUs. Table C6 summarises the same information by State/Territory.

Table C5: Level 2 and 3 intensive care unit survey respondents, by annual number of patients, 1997

Level of ICUs	<200 patients	201-500 patients	501-1000 patients	1000-1500 patients	1501+ patients	Total
Level 2	1	16	6	3	1	28
Level 3	0	9	28	13	4	54
Total	**1**	**25**	**34**	**16**	**5**	**82**

Source: AMWAC Survey, 1997

Table C6: Level 2 and 3 intensive care unit survey respondents, annual number of patients, by State/Territory, 1996

State/Terr.	<200 patients	201-500 patients	501-1000 patients	1000-1500 patients	1501+ patients	Total
NSW	0	11	12	5	2	30
Victoria	0	3	9	4	0	16
Qld	1	8	6	4	2	21
SA	0	1	2	2	0	5
WA	0	0	2	1	1	4
Tas	0	0	2	0	0	2
ACT	0	0	1	0	0	1
NT	0	2	0	0	0	2
Total	**1**	**25**	**34**	**16**	**5**	**82**

Source: AMWAC Survey, 1997

Table C7 shows the total number of ventilated patients by State/Territory for the 1996 year. The largest group was between 101 to 500 ventilated patients followed by 501 to 1000 ventilated patients.

Table C7: Level 2 and 3 intensive care unit survey respondents, annual number of ventilated patients, by State/Territory, 1996

State/Terr.	0-50 patients	51-100 patients	101-500 patients	501-1000 patients	1001-2000 patients	2001 + patients
NSW	2	5	14	8	2	0
Victoria	0	0	7	8	0	0
Qld	1	3	10	5	0	1
SA	0	0	3	2	0	0
WA	0	0	2	1	1	0
Tas	0	0	2	0	0	0
ACT	0	0	1	0	0	0
NT	0	1	1	0	0	0
Total	**3**	**9**	**40**	**24**	**3**	**1**

Source: AMWAC Survey, 1997

Number of Practising Specialists

The total number of practising specialists in the ICUs that were included in the survey responses were 353, 32 (9.1%) of whom were female.

Qualifications

There were 329 survey respondents to the section on post graduate qualifications. Table C8. demonstrated some of qualifications of ICU staff provided by the directors of intensive care. It illustrates the diverse range of backgrounds from which the intensive care workforce is currently drawn. For example, whilst, 141 specialists indicated they were FFICANZCA or FANZCA and 73 indicated they were FRACP-IC, 39 specialists were FRACP with qualifications in another specialist area and 66 specialists had no direct intensive care qualifications. Those with no specific intensive care qualifications had a mix of qualifications including Fellows of the Australasian College for Emergency Medicine (FACEM) and Fellows of the Royal Australasian College of Surgeons (FRACS). It should be noted however, that there are limitations in the data and double counting may have occurred in some cases due to some specialists working in both the public and private sector. The data is provided only as information in order to display a profile of ICU medical staff qualifications.

Table C8: Level 2 and 3 intensive care unit survey respondents, postgraduate qualifications of unit specialist medical staff, 1997

Postgraduate Qualifications	Total	%
FFICANZCA, FANZCA, ±MD/ PhD.	141	42.9
FRACP-IC, ±MD/ PhD	60	18.2
FRACP- IC and other, ±MD/ PhD	13	3.9
FRACP- other, ±MD/ PhD	39	11.9
FANZCA , ±MD/ PhD.	10	3.0
Others - FACEM, MRCP, FRACS	66	20.1
Total	**329**	**100.0**

Source: AMWAC Survey, 1997

Hours Worked

Table C9 summarises the hours per week the 80 respondents reported their ICU directors and staff specialists worked.

Table C9: Level 2 and 3 intensive care units, hours worked per week, by number of units with directors and staff specialists working particular hours, 1997

	Directors				Staff specialists			
Hours	**In[a]**	**Out[b]**	**Rsrch[c]**	**On call[d]**	**In[a]**	**Out[b]**	**Rsrch[c]**	**On call[d]**
1-10	9	53	20	11	10	38	23	9
11-20	11	14	2	12	9	15	0	9
21-30	10	1	1	15	5	2	2	10
31-40	16	0	0	11	21	1	0	9
41-50	23	0	0	8	15	0	0	10
51-60	6	0	0	4	2	0	0	2
>61	0	0	0	6	1	0	0	8

Notes: a - in hours are 0800 - 1800 hrs Monday to Friday and includes time spent on clinical, administration and teaching. Hours presented as average hours for a typical week (averaged over the roster cycle and averaged over the roster period); b - out hours are hours worked not during hours 0800 - 1800 Monday to Friday; c - research hours applies to all research activities by the individual; d - on call hours are hours actually worked in ICU whilst on call.
Source: AMWAC Survey, 1997

Plans to Change Hours Worked

Respondents were asked to indicate whether they anticipated any change in hours worked in their ICU within the next five years. Table C10 shows that 62.7% of the respondents anticipated an increase in hours worked and 33.3% of respondents indicated that the hours worked would remain the same. Some of the reasons given for increases in workload included; changes in infrastructure due to the construction of new hospitals and ICUs, opening of more ICU beds, opening of a high dependency unit run by ICU staff, increased demand for clinical services as a result of population growth. The reason given for a decrease in working hours was due to the anticipated downgrading of a unit.

Table C10: Level 2 and 3 intensive care unit survey respondents, anticipated change in hours worked within the next five years

Change	**Number**	**Anticipated Change**
Increase	47	62.7%
Decrease	3	4.0%
Remain the same	25	33.3%
Total	**75**	**100.0%**

Source: AMWAC Survey, 1997

Intensive Care Unit Staff Vacancies

Respondents were asked to indicate the number of funded vacancies (headcounts) in their ICU. The question asked in the survey was "Please indicate any funded vacancies your Unit has". Responses were collated by staffing group and by State/Territory and the results are shown in Table C11. New South Wales had the highest number of vacancies (27) with no vacancies in Tasmania and the Australian Capital Territory. There was a total of 44 ICU vacancies identified. There were 26 director and staff specialist vacancies. This was the figure used in the maximum number of vacancies for the projection modelling exercise, as these were the categories that contributed to the specialist workforce numbers. The Working Party was concerned that this may underestimate the number of vacancies given as not all level 2 and 3 ICUs responded to the survey. Telephone contact to the outstanding level 3 and regional level 2 ICUs revealed no additional vacancies than those summarised in Table C11.

Table C11: Level 2 and 3 intensive care unit survey respondents, number of funded vacancies (headcounts), by State/Territory, 1997

Position	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Director	4	0	2	0	0	0	0	0	6
Staff Spec	12	2	3	0	1	2	0	0	20
Senior Registrar	1	1	1	0	0	0	0	0	3
Registrar	3	1	1	2	0	0	0	0	7
HMO	1	1	0	0	0	0	0	0	2
Others[a]	6	0	0	0	0	0	0	0	6
Total	**27**	**5**	**7**	**2**	**1**	**2**	**0**	**0**	**44**

Note: a - refers to four VMOs and two RMOs
Source: AMWAC survey, 1997

Work Satisfaction

Table C12 summarises respondents views on the adequacy of the workforce and their satisfaction with their job. Overall, 61.6% of ICU specialists and 60.6% of ICU junior medical staff were satisfied with their work. 78.8% of respondents felt that they had opportunities to use their abilities and 73.8 % of respondents had sufficient workloads to maintain competence. 38.8% of respondents were satisfied with the amount of work they did, 20% were dissatisfied and 41.3% were neither satisfied nor dissatisfied. However, 48.1% of respondents were dissatisfied with the on-call hours, 52.6% of respondents were dissatisfied with their income relative to other specialists and 57.5% of respondents were dissatisfied with their income relative to the hours worked and the stress experienced on the job. 38.6% of respondents were dissatisfied with the availability of registrars to fill training posts.

Table C12: Level 2 and 3 intensive care unit survey respondents= work satisfaction (%), 1997

Indicator	Satisfied	Uncommitted	Dissatisfied
Overall satisfaction of specialist staff	61.6	26.0	12.3
Overall satisfaction of junior staff	60.0	30.7	9.3
Work environment			
- physical working conditions	57.5	18.8	23.8
- industrial relations	36.8	30.3	32.9
The work itself			
- opportunity to use your abilities	78.8	16.3	5.0
- workload sufficient to maintain competence	73.8	23.8	2.5
Workload			
-clinical and non-clinical hours	36.7	30.4	32.9
- on-call hours	34.2	17.7	48.1
- amount of work	38.8	41.3	20.0
Level of income			
- workload sufficient to maintain income	60.5	27.6	11.8
- remuneration for the hours worked	42.5	15.0	42.5
- income relative to other specialties	28.2	19.2	52.6
- income relative to hours worked and stress	13.8	28.8	57.5
Support from other providers in your area			
- availability of IC specialists	40.5	22.8	36.7
- availability of other specialists	57.5	25.5	17.5
- availability of registrars to fill IC training positions	27.1	34.3	38.6
- support from primary care practitioners	31.6	42.1	26.3
- availability of skilled nursing staff	35.0	17.5	47.5
- availability of skilled allied health personnel	50.6	35.4	13.9

Source: AMWAC Survey, 1997

Perception of Factors Affecting Workforce Requirements

Respondents were also asked to indicate whether they believed particular factors would increase workforce requirements, decrease workforce requirements or whether requirements would stay the same (Table C13). Among the important issues that respondents considered would increase requirements were: ageing of the population,

patients expectations and knowledge, requirements for safer procedural practice, advances in medical technology, need for improved geographic distribution of specialists, more defensive medicine and increasing ICU resources/infrastructure. Factors most likely to decrease workforce requirements were cost containment strategies and decreasing ICU resources.

Table C13: Level 2 and 3 intensive care unit survey respondents= perceptions of the factors that could affect the size of the intensive care workforce over the next ten years (%), 1997

Factors affecting the size of the workforce	Increase	Decrease	Stay the same
Population trends			
Ageing of the population	88.6	2.5	8.9
Changing disease patterns	43.8	3.7	52.5
Lifestyle changes that improve population health	7.6	14.0	78.5
Patients expectations/knowledge	80.0	1.2	18.8
Clinical practice trends			
Requirements for safer procedural practice	77.5	1.2	21.3
Advances in medical technology	76.9	0.0	23.1
Multi-disciplinary team provision	45.0	1.2	53.8
More defensive medicine	62.5	0.0	36.2
Workforce trends			
Need for improved geographic distribution of specialists	70.9	0.0	29.1
Increasing doctor specialisation	62.0	2.5	35.4
Substitution of specialist services by other providers	23.4	9.1	67.5
Health care system trends			
Cost containment strategies	46.2	16.3	37.5
Reforms to increase efficiency	45.6	5.0	49.4
Increasing ICU resources/infrastructure	68.4	2.5	29.1
Decreasing ICU resources/infrastructure	18.6	34.7	46.7
The introduction of coordinated care processes	32.4	5.4	62.2
Evidence-based medicine	41.2	7.5	51.3

Source: AMWAC Survey, 1997

APPENDIX D: SUMMARY OF THE RESULTS OF THE AMWAC SURVEY OF MEMBERS OF AUSTRALIAN AND NEW ZEALAND INTENSIVE CARE SOCIETY AND INTENSIVE CARE TRAINEES

METHODOLOGY

A survey of all members of ANZICS and intensive care trainees was conducted to determine members= and trainees= views on the possibility of implementing alternative working arrangements and on ways in which the intensive care specialty could be made more attractive to prospective trainees.

A total of 502 survey forms were distributed in January 1999 which consisted of 399 forms to specialists and 103 forms to intensive care trainees.

RESULTS

Of the 502 survey forms that were distributed, 225 responses were received and 24 forms were deleted from the data analyses as they were either not applicable or returned blank. Therefore, 201 responses were processed giving a response rate of 45% from specialists and 21.4% trainees. The results should be read with a degree of caution, as sample sizes are small in some States/Territories, although information on working patterns and comments on alternative working arrangements are still valuable. Some of the results in the tables differ slightly as some of the questions in survey forms were not completed by all respondents.

Specialist Responses

A total of 179 responses were received from specialists. The majority of the specialists (75.4%) that responded to the survey were intensive care specialists, 23.5% were other specialists working in intensive care and 1.1% were non specialists.

Total specialist respondents comprised 164 (91.6%) males and 15 (8.4%) females.

Table D1: Specialist respondents, by gender and work category, 1999

Gender	Specialists	Other specialists	Non Specialists	Total	% Gender
Males	125	37	2	164	91.6
Females	10	5	0	15	8.4
Total	**135**	**42**	**2**	**179**	**-**
%	75.4	23.5	1.1	100.0	100.0

Source: ANZICS Survey

Table D2 shows the distribution of respondents by gender, full-time/part-time and occasional practice. 55.3% of the respondents worked full-time, 43.0% worked part-time and 1.7% worked on an occasional or locum basis.

Table 2: Specialist respondents, by gender and full-time/ part-time and occasional practice, 1999

Gender	Full-time	Part-time	Occasional	Total
Males	92	69	3	164
Females	7	8	0	15
Total	**99**	**77**	**3**	**179**
%	55.3	43.0	1.7	100.0

Source: ANZICS Survey

In terms of current working arrangements, the majority of respondents (70.7%) indicated they were working a 10 to 12 hour day or night shift combined with being on call at nights and/or weekends. Table D3 summarises respondents= level of satisfaction with their current roster and shows that 67.2% of respondents were satisfied with their current roster compared to 32.8% who were dissatisfied.

Negative responses were mainly related to unfavourable working hours and the inability to obtain appropriate leave. The unfavourable working hours included having to work long and onerous hours, frequent weekend work, working long shifts and frequently being on call. Leave problems included not having sufficient time to for holidays, and lack of leave cover for attendance at conferences, meetings, participation in research and teaching activities. A number of respondents indicated that they would like to have time-in-lieu for the onerous hours worked. Another main reason why respondents were dissatisfied with their rosters was the lack of suitably trained staff to provide an adequate coverage of patients.

Table D3: Specialist respondents opinion about the current roster, by State/Territory, 1999

State/Terr.	Satisfied	Dissatisfied	Total Number of responses	% Dissatisfied
NSW	39	22	61	36.1
Victoria	32	8	40	20.0
Queensland	26	9	35	25.7
West. Aust.	7	6	13	46.1
South Aust.	11	5	16	31.3
Tasmania	3	4	7	57.1
ACT	0	3	3	100.0
North. Terr.	*	*	*	-
Total	**119**	**58**	**177**	**-**
% response	67.2	32.8	-	-

* numbers less than three
Source: ANZICS Survey

Table D4 shows 86 specialists, 33 other specialists working in intensive care and 2 non-specialists respondents were satisfied with their current roster. Of these, 69.5% were males and 46.7% were females.

Table D4: Specialist respondents satisfied with their current roster, by gender, 1999

Gender	Specialists	Other Specialists	Non Specialists	Total	% of respondents
Males	83	29	2	114	69.5
Females	3	4	0	7	46.7
Total	**86**	**33**	**2**	**121**	**-**

Source: ANZICS Survey

Table D5 shows that of the respondents that were dissatisfied with their current roster, 46 were intensive care specialists and 10 were other specialists working in intensive care. Of these, 29.3% were males and 53.3% were females.

Table D5: Specialist respondents dissatisfied with their current roster, by gender, 1999

Gender	Specialists	Other Specialists	Non Specialists	Total	% Dissatisfied
Males	39	9	0	48	29.3
Females	7	1	0	8	53.3
Total	**46**	**10**	**0**	**56**	**-**

Source: ANZICS Survey

Table D6 shows that more specialist respondents were satisfied with their rosters (68.2%) regardless of their work contributions.

Table D6: Specialist respondents opinion on satisfaction with their current roster, by full-time/ part-time and occasional practice, 1999

Opinion about roster	Full-Time	Part-Time	Occasional	Total	% of total respondents
Satisfied with roster	64	54	2	120	68.2
Unsatisfied with roster	33	22	1	56	31.8
Total	**97**	**76**	**3**	**176**	**100.0**
% satisfied with roster	65.5	71.1	66.7	-	-

Source: ANZICS Survey

Table D7 shows that the majority of respondents (171/76.0%) indicated that they would not be interested in working defined shifts within a 24 hour period. There were no trends associated with State/Territory where they work.

Table D7: Specialist respondents opinion on working defined shifts, by State/Territory, 1999

State/Terr.	Interested	Disinterested	Total	% disinterested
NSW	8	53	61	86.9
Victoria	14	26	40	65.0
Queensland	8	28	36	77.8
West. Aust.	4	6	10	60.0
South Aust.	4	11	15	73.3
Tasmania	*	3	4	75.0
ACT	*	*	*	66.7
North. Terr.	*	*	*	50.0
Total	**41**	**130**	**171**	**76.0**

* number less than three
Source: ANZICS Survey

Table D8 shows that a total of 38 specialist respondent (22.5%) were interested in working defined shifts within a 24 hour period. The reasons given were better rostering, better coverage of patients and more money for part-time staff.

Table D8: Specialist respondents interested in working defined shifts within a 24 hour period, by gender, 1999

Gender	Specialists	Other specialists	Non specialists	Total	% of total respondents
Males	24	10	*	35	21.3
Females	*	*	0	3	20.0
Total	**26**	**11**	*****	**38**	**-**

* number less than three
Source: ANZICS Survey

Table D9 shows the majority of specialist respondents (131/77.5%), were not interested in working defined shifts within a 24 hour period. The lack of continuity of patient care, lower quality of lifestyle, rostering problems, inability to attend hospital meetings and participation in non-clinical activities such as administration and research were the main reasons cited for not being in favour of working defined shifts. Working defined shifts was also considered inappropriate for smaller metropolitan and rural locations due to less qualified medical staff and reduced patient need.

Table D9: Specialist respondents not interested in working defined shifts within a 24 hour period, by gender, 1999

Gender	Specialists	Other specialists	Non specialists	Total	% of total respondents
Males	93	26	*	120	72.6
Females	7	4	0	11	73.3
Total	**100**	**30**	*****	**131**	**-**

* number less than three
Source: ANZICS Survey

Table D10 shows that the majority of specialist respondents (78.8%) were disinterested in working defined shifts within a 24 hour period regardless on whether they were working full-time/part-time or occasional practice.

Table D10: Specialist respondents opinion about working defined shifts within a 24 hour period, by full time/part time and occassional practice, 1999

Opinion on working shifts	Full-time	Part-time	Occasional	Total	% of respondents
Interested	14	21	1	36	21.2
Disinterested	75	55	0	130	78.8
Total	**89**	**76**	**1**	**166**	**100.0**

Source: ANZICS Survey

Trainees

A total of only 22 responses were received from trainees. The majority of the trainee respondents (95.5%) were working full-time. Only one female trainee responded.

Table D11 shows that the majority of trainee respondents (63.6%) were satisfied with their rosters.

Table D11: Trainee respondents satisfaction with their current roster, by gender, 1999

Gender	Satisfied	Dissatisfied	Total
Male	13	8	21
Female	1	0	1
Total	**14**	**8**	**22**
% of total respondents	63.6	36.4	100.0

Source: ANZICS Survey

Table D12 shows that the majority of trainee respondents were interested in working defined shifts within a 24 hour period. Indeed some trainees indicated that they were currently working in this manner. The main reason given was that shift work is more suitable for registrar 24-hour cover of an ICU, which is generally how the service needs around the clock are met. However, it was considered unnecessary for specialists to work shifts, as they could be available for consultation as required.

Table D12: Trainee respondents opinion on working defined shifts within a 24 hour period, 1999

Gender	Interested	Not interested	Total
Male	13	8	21
Female	1	0	1
Total	**14**	**8**	**22**
% of total respondents	63.6	36.4	100.0

Source: ANZICS Survey

Summary of Comments

Satisfaction with rostering arrangements

The three highest variables in the order of importance were work hours, leave problems, need for recruitment of appropriated trained and skilled staff and concerns on the continuity of patient care.

Interested in working defined shifts within a 24 hour period

Issues raised related to better rostering and coverage of the ICU. The continuity of patient care was considered to be very important especially in the hand-over phase.

Disinterested in working defined shifts within a 24 hour period

The three highest variables in the order of importance were continuity of patient care, lifestyle issues and rostering problems. Concerns on continuity of patient care were due to the perceived inability to provide satisfactory continuity of care due to the constant changes in staff, transfer of responsibility, lowered quality of lifestyle, disruption to family life due to night work and continued disruptions in sleep patterns. Specialists preferred to work a high intensity workload for four to five days with a two to three days break to recover, work at a private facility or undertake other activities. Working defined shifts was felt to not allow the flexibility to participate in non-clinical activities such as administration, hospital meetings, conduct research and to attend conferences. Poor remuneration as a result of working defined shifts was not considered attractive for specialists.

Respondents generally indicated that shift work would make intensive care work less meaningful and relevant and expressed concern that it would be reduced to mechanical interventions as a service and leads to reduced work satisfaction. Shift work was considered appropriate for trainees and registrars as a 24-hour service is required and not suitable for specialists who preferred to be on call.

Shifts were not considered suitable for smaller non-metropolitan and rural hospitals where there was neither the clinical need or the staffing to implement the shift arrangements.

Factors making the specialty unattractive to potential trainees

The four most important issues were work hours, remuneration, nature of the work and training issues.

The unattractive rosters were considered a deterrent for trainees considering a career in intensive care. The excessive hours worked, excessive night duty, frequent weekend work, poor rostering, out of hours work, frequent being on call and callbacks were unattractive to prospective trainees. The nature of the work was also considered unattractive due to the stressful workload, high intensity workload, high responsibility for patients, lack of job satisfaction, palliative/counselling work with relatives and the high mortality rate of patients.

Remuneration was considered poor compared to other specialties given the hours worked. Lack of paid overtime and the level of pay did not compensate for the stressful nature of the job and the long hours worked.

A perceived lack of support both professionally and from the hospital system were factors contributing to the unattractiveness of the ICU as a place to work. There was a perceived lack of awareness of the role of the intensive care specialist in the hospital. The lack of exposure of junior medical staff to the intensive care setting did not provide them with opportunities to consider intensive care as a future career. The apparent lack of defined career path and job opportunities was a factor frequently cited by respondents.

Suggestions to make intensive care more attractive to trainees
The three most important issues raised were working conditions, rostering and system support.

Comments were made on the length and the nature of training. FICANZCA has indicated an interest in following them up.

Flexible work arrangements and better rostering were suggested to improve working conditions.

System support was regarded as important for the intensive care specialists and trainees to ensure that they are able to take annual leave and undertake non-clinical activities. This was particularly relevant to rural and regional centres as there are fewer specialists. Other system support issues included rotations of medical and anaesthetic registrars to the ICU, mentoring of trainees and rotations to intensive care units that vary in size and casemix.

Suggestions to make the practice of intensive care more attractive
The four most important issues were professional recognition and support, working conditions, system support and pay.

There was a perceived lack of professional recognition and support for the intensive care specialist and related to this a need for greater autonomy for the intensive care specialists over all decisions and the freedom to consult with other specialists. Currently many specialists do not have admitting rights.

The profile of intensive care practice needs to be improved so that there is greater medical and public awareness of the role of intensive care. It was suggested that intensive care specialists need to play a more proactive role in the wider hospital and the community with emergency teams, pain teams, and involvement with high dependency units.

Working conditions were highlighted for improvemet to allow the intensive care specialists to work reasonable hours. This included suggestions for more flexibility of rostering and better opportunities for job sharing. Co-operation between the public and private hospitals to have a better mix of public and private workload with salaries comparable with other disciplines was also supported.

System support issues included rotations to rural and regional units to provide relief for intensive care specialists and to obtain experience in different settings. Other suggestions included the integration of intensive care and anaesthesia work for the benefit of specialists and the two disciplines.

APPENDIX E: INTENSIVE CARE UNIT DEFINITIONS

The definitions are from the National Health Data Dictionary (version 5.0).

Intensive Care Unit
An ICU is a designated ward of a hospital which is specially staffed and equipped to provide observation, care, and treatment to patients with actual and life threatening illnesses, injuries or complications, from which recovery is possible. The ICU provides special expertise and trained and experienced in the management of these problems.

ICUs are defined according to three main criteria: the nature of the facility, the care process and the clinical standards and staffing requirements.

Level 3 Adult Intensive Care Unit
A level 3 adult ICU must be a separate and self contained facility in the hospital capable of providing complex, multi-system life support for an indefinite period. It must be a tertiary referral centre for intensive care patients and have extensive back up laboratory and clinical service facilities to support this tertiary referral role.

Care Process
A level 3 ICU must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring, for an indefinite period. These types of service are illustrative of the nature of care provided in a level 3 intensive care unit but not exhaustive of all the possibilities.

Nature of Staff

- The Medical Director must be recognised by the Specialist Recognition Advisory Committee (SRAC) in the relevant state/territory as a specialist in intensive care or as a consultant physician in intensive care.

- A majority of the specialists in the unit must be recognised by the SRAC in the relevant State/Territory as specialists in intensive care or as consultant physicians in intensive care

- During normal working hours, there must be at least one specialist (who may be the Medical Director) who is predominantly present in the unit and exclusively rostered to it. At all other times, there must be a specialist (who may be the Medical Director) who is able to proceed immediately to the unit and is exclusively rostered to the unit.

- In addition to the attending specialist, the unit must have at least one registered medical practitioner who is in the hospital predominantly present in the unit and exclusively rostered to the unit at all times.

Level 2 Adult Intensive Care Unit
A level 2 adult ICU must be a separate and self contained facility in the hospital capable of providing complex, multi-system life support.

Care Process
A level 2 adult ICU must be capable of providing mechanical ventilation, extracorporeal renal support systems and invasive cardiovascular monitoring for a period of at least several days. These types of service are illustrative of the nature of care provided in a level 2 adult ICU but are not exhaustive of the possibilities.

Nature of Staff
- The Medical Director must be recognised by the SRAC in the relevant state/territory as a consultant physician or as a specialist in intensive care either in intensive care medicine or in a specialty appropriate to the nature of the work of the unit (anaesthesia or medicine). The Medical Director must have substantial training and experience in intensive care.

- The unit must have at least one other specialist who is recognised by the SRAC in the relevant State/Territory as a specialist or as a consultant physician and who has appropriate experience in intensive care.

- During normal working hours, there must be at least one specialist substantially present in the unit. At other times there must be a specialist (who may be the Medical Director) who is able to proceed immediately to the unit.

- In addition to the attending specialist(s), the unit must have at least one registered medical practitioner who is in the hospital, primarily rostered to the unit and immediately available to the unit at all other times.

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Level 1 Adult Intensive Care Unit
A level 1 ICU must be a separate and self contained facility in the hospital capable of providing basic, multi-system life support usually for less than a 24 hour period.

Care Process
A level 1 ICU must be capable of providing mechanical ventilation, and simple invasive cardiovascular monitoring for a period of at least several hours. These types of service are illustrative of the nature of care provided in a level 1 adult ICU but are not exhaustive of the possibilities.

Nature of Staff
- The Medical Director must be recognised by the SRAC in the relevant State/Territory as a specialist in intensive care or as a consultant physician and have experience in intensive care.

- In addition to the attending specialist(s), the unit must have at least one registered medical practitioner who is available to the unit at all times.

Paediatric Intensive Care Unit

A paediatric ICU must be a separate and self contained facility in the hospital capable of providing complex, multi-system life support for an indefinite period. It must be a tertiary referral centre for children needing intensive care and have extensive back up laboratory and clinical service facilities to support this tertiary role.

Care Process

A paediatric ICU must be capable of providing mechanical ventilation, extra-corporeal renal support services and invasive cardiovascular monitoring, for an indefinite period to infants and children less than 16 years of age. These types of service are illustrative of the nature of care provided in a level paediatric ICU but not exhaustive of all the possibilities.

Nature of Staff

- The Medical Director must be recognised by the SRAC in the relevant State/Territory as a specialist in intensive care or as a consultant physician in intensive care.

- A majority of the specialists in the unit must be recognised by the SRAC in the relevant state/territory as specialists in intensive care and have appropriate experience in paediatric intensive care

- The unit must have at least one attending specialist who is predominantly present during working hours and who is exclusively rostered and able to proceed immediately to the unit at all times.

- In addition to the attending specialist, the unit must have at least one registered medical practitioner who is in the hospital predominantly present in the unit and exclusively rostered to the unit at all times.

APPENDIX F: SUMMARY OF RECENT STATE/TERRITORY HEALTH DEPARTMENT REVIEWS OF INTENSIVE CARE SERVICES

New South Wales

A report called New South Wales Intensive Care Services Survey - A Basis for Review was prepared in May 1998 by a committee of intensive care advisors which was part of the New South Wales Health Department Critical Care Advisory Committee. The results reported intensive care capacity and utilisation undertaken in NSW in November 1996. The response rate was 97%. The survey was intended to form the strategic basis for future service delivery for New South Wales Health.

At this stage, New South Wales Health does not have explicit guidelines to assist with determining planning requirements on an area or statewide basis. The survey reported that 92% of the commissioned intensive care beds across New South Wales were available for service. The occupancy rate was 80% with an estimated average length of stay of 3.3 days. Since 1995, intensive care activity had increased 9%. The survey highlighted difficulties in meeting service requirements for experienced medical staff. The distribution of adult commissioned general purpose beds reflected some geographical disparity with the greatest variance in the rural areas.

Some of the main survey recommendations were:

Intensive care bed numbers

- Develop a set of guidelines and recommendations to assist with determining service requirements on a Statewide and regional basis. The guidelines will be based on population growth, age utilisation, health status, recognised superspecialty services, established referral networks and linkages, and international standards. It should be part of a regular review of ICU services.

- The classification of intensive care bed types be aligned with the National Data Dictionary, ANZICS and FICANZCA, to allow comparative assessment and planning.

Staffing, equipment and support services

- The FICANZCA minimum standards be applied to all ICUs.

- All ICUs have appropriately qualified and experienced nursing and medical staff. These numbers should allow flexibility for further education, leave and protected non clinical time for nursing and medical managers.

- Current strategies to increase the recruitment and retention of critical care nursing and medical staff be continued and further innovations be explored.

- Determination of adequate staffing numbers taking into consideration the variable and unpredictable activity of ICUs and requirement for flexibility.

Intensive care activity and data collection

- All ICUs submit data to ANZICS for confidential reports of unit performance as part of their audit and review process.

Medical workforce

- From the available data in the survey, it appeared that medical staff vacancies were low, with three vacant specialist consultant positions out of 50 allocated positions and four registrar positions out of 22 accredited vocational ICU training positions.

Victoria

The Department of Human Services commenced a review of intensive care in Victoria in December 1995 due to concerns about the funding model for intensive care services and the ability of the intensive care system to meet demand. A report from phase 1 (July 1997) focused on distribution and availability of public intensive care beds, system integration, funding, service management and analysis of available data.

The Intensive Care Advisory Group found that the provision of beds across the metropolitan area was insufficient to meet demand and in response to this finding, the Victorian Department of Human Services allocated funding to enable a ten percent increase in public beds during 1996-97.

The funding of ICU care was a fundamental issue of the Review as casemix payments did not reflect the severity of patient illness in ICU. A revised mechanism of casemix payments was introduced during 1996-97 recognising additional costs in treating patients in ICUs and adequately compensating hospitals for the ICU services.

Phase 2 of the review will include data collection and the development of best practice principles and processes in the intensive care field. Phase 2 will also examine the medical and nursing workforce.

Key findings and strategies included:

Service distribution and system integration

- The distribution of ICUs across metropolitan and rural areas provides reasonable geographic access to care.

- The Department to continue to support the Office of the Co-ordinator of Emergency and Critical Care Services which facilitates an integrated delivery system in co-ordinating the use of ICU beds across Victoria.

Best practice in intensive care

- There is currently no process for guiding best practice or agreed system for monitoring performance. A Best Practice Working Party is developing a discussion paper.

Data, service monitoring and planning

- A data set for public hospitals, designed to assist service monitoring and planning will be developed in conjunction with ANZICS. Data will be collected in 1997-98.

Workforce

- The higher level public ICUs are predominantly situated in Melbourne, whereas regional Victoria has a greater number of units providing less complex care. In regional Victoria (and rural and remote Australia) shortages of qualified and trained medical staff are an ongoing problem.

Queensland

Queensland Health engaged McKay and Associates in 1995 to identify gaps in the provision of intensive care services and develop a plan for future provision of intensive care services in Queensland to the year 2003. Information was collected by survey, direct consultation with key stakeholders and research of available data on ICU services. A draft was presented in 1996. Some of the recommendations included:

- An Intensive Care Specialist Advisory Committee be established to oversee the development of intensive care services in Queensland.

- Statewide networks should be established to optimise efficiency in coordinating staff, beds, patients and quality of services.

- A single paediatric intensive care service should be developed as an interim step with a future goal of a single unit to service the entire State.

Medical workforce

- Active recruitment of medical intensivists from interstate and overseas to meet comparative interstate staffing levels. Due to problems in medical staffing of ICUs, it was estimated that an additional 18 intensivists would be required to meet the expansion of intensive care services. Future training initiatives and programs should be designed to obtain a steady supply of intensivists.

Data collection

- A minimum data set should be established by the Intensive Care Specialist Advisory Committee to monitor and assess the activities and report on ICUs in Queensland public hospitals.

Benchmarks

- A benchmark of four intensivists for a standard level 3 ICU (10 to 12 beds with approximately 800-1,000 admissions) is recommended. A fifth intensivist would if available, be justified. The required numbers of intensivists are largely determined by the out of hours workload.

- A target ratio of 1.8 level 3 beds per 100,000 population is recommended which involves an increase of 27 beds across the State.

- A target ratio of 3.0 non-referral beds (level 1 and 2) per 100,000 is recommended which requires an increase of 16 beds across the State.

APPENDIX G: INTERNATIONAL COMPARISONS

Health practices differ between Australia, the United States, United Kingdom and Europe and in some countries the services provided vary greatly. This can render exact comparisons between countries difficult. Comparisons of facilities are difficult because different definitions and intensive care admission practices are used.

Internationally, the provision of intensive care beds per capita varies widely. The Australian average for available beds is approximately 7.5 beds per 100,000 population (ANZICS 1998).

Data gathered by the New South Wales Health Department in 1998 found that:

- Massachusetts in the United States had 24 adult beds per 100,000;
- Alberta in Canada had 16 beds per 100,000;
- Figures varied widely throughout Europe - France 25 beds per 100,000 population; Germany 24 beds, Sweden 18 beds, Switzerland 11 beds and Italy 9 beds;
- in the United Kingdom bed numbers ranged from 1.8 per 100,000 in Oxford and East Anglia region to 3.0 per 100,000 in South East Thames; and
- Japan had 8.3 adult intensive care beds per 100,000 population.

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