

**Australian Medical Workforce Advisory Committee
Australian Institute of Health and Welfare**

Medical Workforce Supply and Demand in Australia: A Discussion Paper

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Foreword

In the three years since the first *Australian Medical Workforce Benchmarks* report was finalised, substantial changes have occurred in the Australian health sector which impact on the medical workforce. The Commonwealth Government has taken a number of decisions impacting directly on the size and structure of the medical workforce. Coordinated care trials are suggesting new models for health care delivery. Graduate entry medical courses have been established in three universities. Recently *General Practice: Changing The Future Through Partnerships*, the report of the General Practice Strategy Review Group, and *General Practice Education: The Way Forward*, the Review of General Practice Education and Training, were released and the Government has accepted nearly all of the recommendations of these reviews.

It is timely therefore to review the benchmark work. To do this, a broad ranging discussion paper has been prepared by a working group of the Australian Workforce Advisory Committee (AMWAC) and reviewed by AMWAC members. It does not put forward firm views but aims to stimulate an informal discussion on the need for medical workforce planning and possible approaches to estimation of future workforce needs.

Because of the detailed work that has now been completed, or is underway, on various segments of the medical workforce, AMWAC's current view is to base future estimates on an aggregate of estimates for the various workforce segments, as well as to consider an overarching approach as was adopted in the previous benchmarking exercise. The workforce requirements for the key general practitioner segment have not yet been examined by AMWAC, but this will now be commenced in the light of the recent changes and policy decisions.

Comments on the discussion paper and suggestions will be welcome, and should be addressed to the AMWAC Secretariat at Level 10, 73 Miller St, North Sydney NSW 2060.

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AMWAC Benchmark Working Group

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Chair
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Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AHMAC	Australian Health Ministers Advisory Council
AHMC	Australian Health Ministers Conference
AIHW	Australian Institute of Health and Welfare
AMA	Australian Medical Association
AMWAC	Australian Medical Workforce Advisory Committee
BMJ	British Medical Journal
CME	Continuing medical education
DHFS	Department of Health and Family Services
DPR	Doctor to patient ratio
FMRU	Family Medicine Research Unit
FTE	Full-time-equivalent
GDP	Gross domestic product
GP	General practitioner
HIC	Health Insurance Commission
HMO	Health maintenance organisation
JAMA	Journal of the American Medical Association
MBS	Medical Benefits Schedule
MDC	Major diagnosis category
MJA	Medical Journal of Australia
NCEPH	National Centre for Epidemiology and Population Health
NHS	National Health Service, United Kingdom
NSW	New South Wales
OECD	Organisation for Economic Co-operation and Development
OMP	Other medical practitioner
OTD	Overseas-trained doctor
RACGP	Royal Australian College of General Practitioners
RMO	Resident Medical Officer
RRMA	Rural Remote and Metropolitan Areas Classification
SEIFA	Socioeconomic Indicators for Areas, Australian Bureau of Statistics
SID	Supplier-induced demand
TRD	Temporary-resident doctor
UK	United Kingdom
USA	United States of America
VRGP	Vocationally registered general practitioner

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Terms of reference of AMWAC and the benchmark working group

The Australian Health Ministers' Advisory Council (AHMAC) established the Australian Medical Workforce Advisory Committee (AMWAC) to advise on 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.

Benchmark Working Group Terms of Reference

In 1997 AMWAC established a benchmark working group to update the 1995 Australian medical workforce benchmarks study.

The terms of reference are:

1. Review and critically assess relevant world literature since the 1995 study.
2. Identify the major measurable factors that determine need and demand for medical workforce in Australia and those that determine the contribution of individual doctors to meeting this need and demand. In particular, identify policy and administrative changes developed since 1995 which will affect need and demand for medical workforce in Australia.
3. Propose one or more options for determining an appropriate benchmark for supply of general practitioners, hospital non-specialists and specialist medical practitioners in Australia.
4. Recommend supply targets for the years 1998, 2000, 2005, 2010, 2015 and 2020, based on these benchmarks, making reasonable assumptions about trends in the factors which influence the benchmarks.

Membership of AMWAC

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Executive summary

1. The Australian medical workforce more than doubled between 1976 and 1996, from 21,150 to 44,000 practising clinicians, compared with population growth of 30%. Despite such a rapid increase in the workforce in just 20 years, significant shortages have remained in important segments of the workforce. AMWAC has identified reduction of maldistribution as a key medical workforce issue.
2. Growth in patient demand for medical services has also been much faster than population growth. Factors contributing to this have included ageing of the population, lower up-front prices under Medicare, research and technology increasing diagnosis and treatment methods, increased access to services, rising real household incomes and increased consumer education and awareness.
3. Evidence of the strong growth in demand can be seen in a 47.1% increase in hospital patients treated from 1985–86 to 1995–96 and rising average numbers of Medicare services per person.
4. Labour market forces have not operated to produce evenly distributed matching of strong workforce growth with patient needs. In Australia's health system, an over-supplied medical workforce in a given geographic area does not result in unemployed doctors; Medicare data indicate that in these areas patient use of medical services has expanded, maintaining employment and medical incomes. In under-supplied areas, financial and other incentives have had limited success in attracting doctors. Furthermore the economic incentives of medical practice operate in a complex broader environment with strong influences on the decisions of individual doctors about where to practise. These include the personal influences of family, social and professional ties, commitments and ambitions; geographic location of upbringing; and lifestyle preferences. In the health system, regional and local health service management often includes administrative and structural impediments to improvements in the distribution of the medical workforce.
5. Workforce shortages have undesirable outcomes including poor access, unmet need, potentially poorer health outcomes for patients, overworked doctors and expensive strategy responses to the shortages by government.
6. Medical workforce supply well in excess of need has undesirable outcomes including large unnecessary training costs, the costs of servicing above levels where it is likely that improvements in health status are effected, poorer health outcomes in some fields of over-servicing, and reduction in quality of care to the consumer if consultation time is reduced too much or if all medical problems cannot be considered in the one consultation.
7. From 1976 to 1996, real annual gross domestic product (GDP) per person increased by 40.4%, creating growth in government and private capacity to fund additional health services expenditure, including medical services expenditure. However, from 1976 to 1996, real growth in health expenditure per person and medical expenditure per person was 56.3% and 81.5% respectively, faster than GDP growth per person. Government decisions have been made on medical supply which will have the effect of constraining growth in medical and health expenditure.
8. Growth in medical services expenditure has been higher than growth in health expenditure. Reasons for this include a shift in care from institutional care to community care, increased medical knowledge and workforce sub-specialisation, the rate of growth in the number of medical practitioners and consumer and supplier-induced demand.

9. Growth in demand has exceeded the willingness of governments to pay, and led to attempts to constrain growth in health expenditure. These have included measures to reduce the level of growth of the medical workforce in Australia.
10. While illness and injury are the main factors contributing to patient demand for medical services, there are many other influences on levels of illness and injury and demand for these services in a particular geographic area. These include the socioeconomic and demographic characteristics of the population and environment characteristics of the locality.
11. Historically, the major improvements in health outcomes in populations around the world have been achieved by advances in public health infrastructure, lifestyle changes, increasing community wealth and socioeconomic status, rising levels of education, new drugs, developments in medical interventions and improved access to higher quality medical services. Because there are many influences on population health outcomes in addition to the contribution of doctors, there is a lack of research studies to demonstrate the gains, if any, of increasing the medical workforce in a given geographic area. However, health outcome measures include quality of life as well as morbidity and mortality, and it can be hypothesised that increasing medical workforce supply in circumstances of unmet need and excessive waiting times will improve health outcomes. It has been suggested in the literature that increasing supply to the point where significant over-servicing occurs, or where there are insufficient patients for doctors to maintain skills in certain specialist fields, will result in poorer health outcomes.
12. The international literature indicates that medical workforce maldistribution is a common problem around the world. Canada is similar to Australia in health system, high concentrations of doctors in metropolitan areas and shortages in rural areas. The United States and United Kingdom have shortages of primary care practitioners, and the United States suffers from an over-supply of specialists. Several European countries have over-supply of doctors to the extent of significant practitioner unemployment.
13. The international literature provides some useful additional tools for Australia to consider for measuring surplus supply and shortages – use of lean but adequate supply benchmarks, use of premature mortality as an indicator of need, and use of sustainable practice measures.
14. Possible indicators of a medical workforce shortage include:
doctor provision well below the national norm; prices significantly above the average; under-servicing and unmet need; higher waiting times; over worked practitioners; high levels of dissatisfaction with the stresses of overwork and inability to meet population need; substitution by alternative providers; and employment of temporary-resident doctors to fill unmet need.
15. Possible indicators of medical workforce supply in excess of need include:
doctor provision well above the national norm; growth of the workforce well in excess of population growth from a starting point of adequate supply; prices significantly below the average, or high adherence to a floor price; declining average practitioner incomes; supplier-induced demand and over-servicing; under-employment; certain forms of market restructuring; and growth in marketing effort.
16. Possible indicators of a medical workforce in balance include:
a 'lean' but adequate workforce with waiting times generally accepted by the community as reasonable; pricing of services neither at the floor price nor at a level which discourages patient attendances; long hours or short hours are worked by choice and not necessity; workforce growth in line with need indicators.

17. Surpluses can be masked by elasticity of medical practice. This elasticity involves expansion of the patient workload to compensate for declining numbers of patients per doctor in an over-supplied area.
18. Geographically, the highest concentrations of doctors in Australia are in inner suburbs of capital cities. Market forces (economic, lifestyle and family) act to attract new entrants to the workforce to these areas and act as a disincentive to new entrants and existing practitioners to move to under-supplied rural areas.
19. Historical reasons for excess supply of general practitioners in Australia include too many medical graduates, too many medical immigrants, a slow-down in population growth since the 1970s, productivity growth through new technology, and changes in care patterns with shorter average patient stays in hospital and rising use of day surgery.
20. There are many incentive schemes in place by the three tiers of government to attract and retain doctors to work in rural areas. These have had limited success in countering the market forces attracting and retaining doctors in the capital cities.
21. A large range of additional data is now available to support another analysis of Australian medical workforce benchmarks. These are data which were not available in 1995 for the analysis published in *Australian Medical Workforce Benchmarks* (1996). However, there are still gaps in data and some of these will be filled during the next few years.
22. The AMWAC working party on medical workforce benchmarks has found that the methodology in *Australian Medical Workforce Benchmarks* (1996) was fundamentally sound, but can be strengthened in several areas. These include:
 - taking into account government medical workforce policy changes which have been implemented or accepted since 1995;
 - improved modelling of the effect of rising participation in the workforce by female doctors;
 - disaggregating workforce projections into segments of the workforce;
 - examining under-representation of Aboriginal and Torres Strait Islanders in the medical workforce and under-representation of medical services delivered to Aboriginal and Torres Strait Islander people in Medicare data;
 - use of fully and partially completed AMWAC studies on medical specialties to assess benchmarks for medical specialists;
 - modelling the effect of shorter working hours on the numbers of hospital non-specialists required.

In particular, AMWAC considers that, before setting new benchmarks, it is important to review the general practice workforce, using a similar approach to the methodology in each AMWAC review of the medical specialty workforces.
23. Feedback on this issues paper is being sought from interested readers as input to undertaking future Australian medical workforce benchmarks studies.

1. Preface

Australian Medical Workforce Benchmarks (AMWAC, 1996), using 1994 data, established empirically derived benchmarks for the Australian medical workforce and found considerable maldistribution of the workforce. The Australian Health Ministers Advisory Council (AHMAC) accepted the recommendations of the report, including the final recommendation that 'the Australian Medical Workforce Advisory Committee periodically examine and review the assumptions and report to AHMAC on the implications of changes in supply of medical practitioners to different sections of the Australian population'. Subsequently the General Practice Strategy Review Report (DHFS, 1998) has recommended that 'AMWAC and the proposed General Practice Partnership Advisory Council collaborate to keep the number of general practice training places under review in the light of emerging workforce trends and provide joint advice to the Commonwealth Health Minister on the number of training places required annually for General Practice'.

This discussion paper represents the first step in the process of examination and review of medical workforce benchmark assumptions. It attempts to explain the supply and demand mismatches that have arisen in the Australian medical care system as it is today and to seek agreement from stakeholders on indicators of segments of the workforce in shortage, in balance and in excess of need. An understanding of the indicators of workforce surplus and shortage, and the evidence presented by those indicators, will provide a firm basis for repeating the Australian medical workforce benchmark analysis, using updated data sources and improvements in methodology, and taking into account changes in government policies and programs since 1995 which impact on the distribution of the workforce.

Potential improvements in methodology are explored in this paper. These take into account responses to *Australian Medical Workforce Benchmarks* (1996), methodology used in other countries, and assessments of refinements to analysis which have been made possible by additional data.

2. Introduction

During the last 20 years the Australian medical workforce has increased much more rapidly than the population. Between 1976 and 1996 the medical workforce more than doubled, from 21,150 to 44,000 practising clinicians, compared with a 30.0% increase in population from 14.0 million to 18.2 million. The population per practising clinician declined by 37.4% from 660.3 to 413.5.

In comparison, with the exception of the nursing workforce (which increased by 32.3% from 1976 to 1996), the numbers of persons employed in other health professions also increased much more rapidly than the population.

Table 1: Health employment and population growth, 1976 to 1996

Health occupation	1976	1986	1996	% increase 1976 to 1996
	(number)			
Medical practitioners	21,150	32,790	44,000	108.0
Dental practitioners	4,550	6,310	7,600	67.0
Other health practitioners	21,080	32,640	45,130	114.1
Nurses	136,000	182,240	179,990	32.3
Total health occupations	182,600	253,970	276,880	51.6
Health industry	363,200	451,870	537,200	47.9
Population (millions)	13.9657	15.9009	18.1920	30.0
	(no. per 100,000 population)			
Medical practitioners	151.4	206.2	241.9	59.7
Dental practitioners	32.6	39.7	41.8	28.2
Other health practitioners	150.9	205.3	248.1	64.4
Nurses	973.8	1,146.1	989.4	1.6
Total health occupations	1,307.5	1,597.2	1,522.0	16.4
Health industry	2,600.7	2,841.8	2,952.9	13.5
	(population per practitioner)			
Medical practitioners	660.3	484.9	413.5	-37.4
Dental practitioners	3,069.4	2,520.0	2,393.7	-22.0
Other health practitioners	662.5	487.2	403.1	-39.2
Nurses	102.7	87.3	101.1	-1.6
Total health occupations	76.5	62.6	65.7	-14.1
Health industry	38.5	35.2	33.9	-11.9

Note: Health industry employment estimated for 1976 from community services employment.

Source: National population census. ABS.

Despite this more than doubling of the medical workforce in just 20 years, significant shortages have remained in important segments of the workforce. These may be partially attributed to growth in patient demand for medical services. This has also been much greater than would be expected just from population growth, due to factors including:

- ageing of the population, as population in the age groups from 55 years and older are the heaviest consumers of medical services – the population aged 55 or more increased by 50.3% from 1976 to 1996, compared with a 26.2% increase for the population under 55 years of age;

- rising real household incomes – the 40.4% increase in average real GDP income per person in Australia from 1976 to 1996 (table 13, appendix) has significantly increased expectations of access to, and the standard of, consumer products and services, including medical services;
- improved access to services – doubling of the medical workforce in only 20 years has on its own significantly improved access to doctors, while 24 hour and other extended hour practice has moved outside the hospital setting, and shortening of hospital stay has freed up hospital beds to permit increased patient access;
- widening of the range of treatable conditions. Examples are joint replacements and organ transplants which have become common rather than infrequent procedures;
- advances in pharmacology, with drug companies continually working to develop new and more effective drugs;
- improvements in diagnosis and treatment methods – patients expect optimum reliability in the medical diagnosis and, in an increasingly litigious society, doctors have increased their use of sophisticated pathology and imaging technology to achieve this. An example of the improvement in treatment methods has been the large reduction in the average length of stay in hospital (from 6.9 days in 1985–86 to 4.3 days in 1995–96), partly due to many major surgical interventions of past years becoming minor procedures through new technology;
- increased consumer education, awareness and expectations – the volume of health information in the media has greatly increased during the last 20 years, disseminating information on medical conditions and encouraging visits to the doctor for both check-ups and treatment;
- lowering of the prices of medical services over time with a rising proportion of private services bulk-billed and accessibility to bulk-billed services greatly increased; and
- demand induced by suppliers (Richardson, 1998).

Evidence of the growth in demand can be seen in the following broad utilisation statistics:

- during the decade from 1985–86 to 1995–96, the number of patients treated in public hospitals other than psychiatric hospitals increased by 47.1% from 2.5 million to 3.6 million; and
- since the introduction of Medicare in 1984–85, there has been a steady increase in the average number of Medicare services per person for males and females in all age groups. The average number of services per person increased from 7.9 in 1986–87 to 10.72 in 1996–97, although part of the increase was due to changes in the Medical Benefits Schedule. Average general practice attendances per person increased by 16.2% during the eight years from 4.76 in 1988–89 to 5.53 in 1996–97.

Geographic matching of the high growth in workforce supply with the strong increase in population demand during the 20-year period was largely left to market forces, both economic and social. Interventions to provide medical services in rural and remote areas have included incentive schemes and support services by government, recruitment of temporary resident doctors to fill area of need positions, outreach programs, use of technology, rural training programs and changes in recruitment of medical students.

The international literature shows that strong interest has developed in medical workforce planning since the 1980s because economic and social market forces, left to themselves, have

created macro and micro mismatches between medical workforce supply and demand. High workforce growth, rather than filling gaps in services, may have worsened maldistribution of the medical workforce. Certainly serious workforce shortages, predominantly geographic, remain in Australia despite rapid workforce growth over a 20-year period.

Furthermore there are unresolved tensions between macro and micro workforce priorities in the various sectors of the workforce. In primary care, there is disagreement, firstly, about the evidence of general practitioner (GP) over-supply in highly supplied areas, and, secondly, in rural areas, about the level of under-supply and whether sufficient doctors are being trained to address workforce shortages. The medical practitioner labour market features low capacity for mobility between jobs in different geographic areas, and there is no such thing as a significant pool of unemployed doctors waiting to apply for vacant positions.

Geographic areas with high workforce supply may be just as likely to experience recruitment difficulties as under-supplied areas. Tension then develops for the former between macro concerns that further adding to supply may exacerbate adverse effects of over-supply, and frustration at the individual practice level at difficulty in recruitment.

In rural areas, there is pressure from overwork and inability to overcome workforce shortages, and worry that action to constrain capital city supply will exacerbate shortages and difficulties in recruitment. Later in this report it will be shown that to a large extent these tensions are a function of the health care financing system which does not provide the price signals which would facilitate remedial action in many other market settings. For example, in an over-supplied GP market in a capital city, the Medicare rebate stops the price of consultations dropping to the point where practices become uneconomic and some practitioners are forced out to less competitive and more remunerative locations. The universality of the rebate across Australia provides no financial weighting for the additional financial and social costs of practice in many geographic or socioeconomically disadvantaged locations, or for higher skill levels and longer consultations which may be necessary.

In the hospital system, there is pressure to follow international trends to reduce working hours to safer levels for doctors and patients, but concern about the future impact of an increase in the non-specialist hospital workforce on the overall medical workforce. In the medical specialties, there is a constant tension between population demands from patients on waiting lists to receive services and the availability of those services across geographic regions, and between the public and private sectors. Macro funding constraints have led to national and State decisions about cost-effective allocation of specialist services, and these conflict with local area desires for improved access. Falling private health insurance coverage has exacerbated imbalances between public and private hospital services.

In this paper's discussion of economic and social market forces, supply adequacy indicators and workforce tensions, there are underlying important planning reasons for assessing and projecting the numbers of doctors required to match the projected patient workload.

First, health services expenditure is a major component of the Australian economy, and in 1995-96 represented 8.5% of GDP. Medical services expenditure has been increasing at a faster rate in real terms than both GDP and health services expenditure. This has been in part a result of a significant shifting of delivery of health services from institutional to community settings. However, workforce supply in excess of numbers needed to improve health outcomes has the potential to lead to medical services being applied that would not otherwise be demanded, with consequent escalation of total health costs.

Second, the distribution of the workforce becomes distorted in circumstances:

- where consumers lack the knowledge in many cases to determine their own demand for services, and suppliers therefore determine to some degree the demand for their services; and
- where consumer demand is high, because pricing of health services to the consumer for an episode of care is either low or nil.

Later in this paper, it will be shown that these circumstances arise in metropolitan areas as a result of competition among GPs that has driven down the price of services to the floor price – the Medicare rebate – for more than 80% of patients. Because the rebate prevents the price falling further with increasing workforce supply, and because volume of services can be expanded by both patients and suppliers at zero cost to the patient, supplier incomes can be maintained in an over-supplied workforce. There is little incentive for suppliers to move to under-supplied areas of significantly higher pricing, particularly when such a move may involve social and professional dislocation.

Third, supply which is assessed as significantly inadequate in a geographic region, or in a health service, has undesirable outcomes, including:

- poor access, unmet need and potentially poorer health outcomes for patients;
- overworked and stressed doctors. The long hours and stress tend to perpetuate the shortage by providing a disincentive to other doctors to move to the under-supplied areas, or, in the case of the public hospital system, to stay in the non-specialist hospital workforce;
- expensive solutions for rural populations when patients are transferred by air ambulance to services, doctors are flown in to deliver an outreach service, rural communities have to provide large subsidies to attract a resident doctor, a higher proportion of patients have to pay out-of-pocket fees than their metropolitan counterparts, and those patients paying may have to pay higher fees; and
- considerable additional expense for the taxpayer when large numbers of overseas-trained doctors per year (1,597 in 1996–97) come to Australia on short-term employment contracts to fill gaps in Australian medical supply provision, although it is acknowledged that use of part of this temporary workforce in the public hospital system is likely to have management and cost advantages.

Fourth, supply which is significantly in excess of levels assessed as adequately meeting community need for similar populations has undesirable outcomes:

- large unnecessary costs in training of the doctor surplus;
- increases in consultations above levels where there is an improvement in health outcomes or where any improvement in outcomes is not justified on cost-benefit grounds. Such increases in consultations may be induced by doctors in over-supplied areas when the average number of patients per doctor falls and competition drives down the price of medical services. Medicare funding which finances unnecessary consultations in over-supplied areas could be better spent elsewhere;
- poorer health outcomes may result from certain types of significant over-servicing such as over-prescribing of antibiotics, discretionary surgical interventions and radiation from unnecessary imaging; and
- consumers disadvantaged when quality falls as patient through-put per hour in doctors' surgeries is increased and less time is spent on average in each consultation. It has been reported that doctors themselves experience rising levels of dissatisfaction with spending less time on average with patients than they would like because of competition and the economics of practice.

Fifth, medical workforce supply has been an area where government has traditionally been involved, usually for public interest or financial reasons. Government is able to exert significant influence on inputs to supply, whereas its capacity to influence demand is very limited. Examples of Commonwealth government intervention in supply include:

- restrictions on medical school intakes and on overseas-trained doctor entry;
- incentives to practise in particular geographic areas;
- requirements for commencement or completion of approved vocational training before doctors can render services under Medicare; and
- funding of selected salaried positions in the Commonwealth medical service, Aboriginal health services, and the defence department.

At the State government level, influences on supply include:

- funding of hospital-based training and employment of medical practitioners, and the infrastructure to support them;
- funding of some salaried community-based medical practitioners in general practice, Aboriginal health, public health and occupational health; and
- subsidies for indemnity insurance in some States for some fields of practice, such as obstetrics.

As a result there is a clear role for workforce planning, and particularly for planning to minimise the divergence between supply and requirements. Medical workforce benchmarks can assist policy makers and planners in addressing the macro and micro planning issues, and can assist medical entrepreneurs and individual practitioners, especially new entrants to the workforce, to make informed choices about options for practice locations. Incorporation of these improvements does however depend on the availability of robust data collections; this issue is discussed in more detail in chapter 10.

To be most useful at the local planning level, these benchmarks must be adjusted for:

- standards for sustainable general and specialist practice, and for sustainable infrastructure including hospitals and community health facilities. 'Sustainable' means at or above minimum standards for quality and financially viable medical care for the type of medical practice. Minimum standards indicators include patient catchment population, numbers of practitioners for seven days per week, 24 hours per day patient care, and medical facilities and support staff required;
- differences in need for medical services associated with differences in population morbidity and mortality arising from the age and sex structure, socioeconomic, ethnic and Aboriginal composition of the population, and exposure to environmental risk factors;
- differences in health service delivery arrangements between institutional and community care; salaried, contracted and private care practitioners; general practitioners, hospital non-specialists and specialists; and doctors and substitute providers including nurse practitioners and allied health professionals including Aboriginal health workers; and
- how much government authorities are willing to pay in subsidies and non-monetary inducements to attract doctors to work in areas of community and professional isolation.

Because of the many years of training needed before full general or specialist practice qualifications are attained, and because of the dynamics of health care change through

research and development and health system management, it is difficult to achieve a lasting balance between supply and demand. However, minimising over- and under-supply is an important goal if scarce resources are to be well used, and essential services provided. Macro decisions, such as the desire for fewer graduates, and micro decisions, such as more doctors in rural areas, must be able to be reconciled.

3. Medical services expenditure in Australia

Barer and Stoddart (1992) offered the following general principle of medical practitioner resource policy for Canada:

The overriding objective of physician resource policy should be to satisfy the health needs of the population that can most efficiently be met by people trained as physicians [doctors], subject to decisions by the population about the resources it is willing to commit to meeting those needs.

In Australia, commentators on medical workforce planning have regularly expressed similar sentiments about the 'right' number of doctors being the number the community is willing to support financially (Brand, 1996a). Kilham (1995) explained the historical perspective, from the 1980s onwards, for government and private outlays on health:

In the 1960s and 1970s, health expenditure expanded rapidly as a proportion of gross domestic product (GDP). Advances in medical science meant that medicine could do more. Patient expectations rose. The 1973 Karmel report recommended an expansion in medical education in Australia and that report was written, of course, in that overall expansionary context. But the expansion in health spending did not continue. In the 1980s, health spending in Australia stabilised at 8 to 9% of GDP.

Tables 12 to 14 in appendix 1 quantify national GDP and health expenditure trends in real terms (expenditure in 1989-90 dollars for all years) from 1976 to 1996. They demonstrate that real growth in GDP provides some growth in government and private capacity to fund additional health services expenditure, including medical services expenditure, although this is affected by changes in taxation, in the share of taxation allocated to health expenditure, and in consumer real disposable income. Over the 20 years, real annual GDP expenditure per person increased by 40.4%, from \$16,886 per person to \$23,838. However, this growth in capacity to pay was insufficient to fully absorb increases due to population growth, the ageing of the population, research and technology creating new treatments, increased service provision by providers and rising expectations from the community. Hence, health expenditure increased from 7.5% of GDP in 1976 to 8.5% in 1996.

The composition of health services expenditure changed significantly over that time, with hospital services expenditure increasing in real terms per person by 50.8%, significantly lower than health expenditure as a whole (56.3%), medical services expenditure (81.5%) and pharmaceutical expenditure (109.2%).

Reasons for this relatively faster growth in medical services expenditure include:

- a significant shift in health service delivery from institutional to community care:
 - shorter average lengths of stay in hospitals, with less invasive treatments, and increased community care in fields including day surgery, hospital-in-the-home, and domiciliary nursing care;
 - a large reduction in psychiatric hospital beds and transfer of patients to community settings;
 - developments in research and technology which have enabled much more diagnostic and treatment work to take place outside hospitals;

- the emergence of 24 hour and other extended hour, private practice, medical clinics as an alternative to hospital accident and emergency departments for many conditions;
- increased medical knowledge which has led to a large increase in medical sub-specialisation, and been a significant contributing factor to the 108.0% increase in medical workforce during the 20-year period;
- an expansion in pharmaceuticals through which GPs can manage patient care in community settings and reduce hospitalisation;
- a degree of consumer-induced demand arising from greater access, greater knowledge of health, higher real incomes and desire to benefit from advances in medicine; and
- a degree of supplier-induced demand from the large increase in medical workforce compared with the 30.0% increase in population during the same period. This is discussed in more detail in chapter 6.

AIHW has analysed growth of health services expenditure in selected OECD countries and found that factors contributing to this growth fall into two categories: i. inflation (both general inflation and excess health inflation); and ii. changes in the level of use of services, from population growth and from more intensive use per person of services. Excess health inflation occurs when health prices are rising faster than the general rate of inflation. In the same way, excess medical services inflation would occur if medical services prices rose faster than the general inflation rate.

The AIHW analysis found that between 1975-76 and 1995-96 average annual health services inflation for Australia was 6.2% per annum, the same as the general inflation increase, so that Australia had no excess health inflation. The country with the highest excess health inflation was the United States, averaging 2.0% per year, while the lowest was France with minus 0.7% per year, ie. health prices were rising at a slower rate than general inflation (AIHW, *Australia's Health 1998*, pp. 169-171).

AIHW has also found that Australia does not have excess medical services inflation. From 1989-90 to 1995-96, the CPI increased by 18.7%, total health prices by 15.6% and the deflator for private final consumption expenditure for doctors by 16.0% (AIHW, *Health Expenditure Bulletin 13*, July 1997).

In providing input to this discussion paper, the Australian Medical Association (AMA) emphasised the importance of the role of technology in changing the composition of health services, to a system with 'much more pharmaceuticals, more medical services, and less hospital services. This trend will continue, resulting in an improvement in the value of the health dollar, achieving better health outcomes and improving the health status of the population'. The AMA also considered that 'increased real expenditure on medical services is an inevitable consequence of the growth in real incomes – complex services including health services will continue to take a larger share of the "basket" of spending by consumers'. The reasons for these trends were discussed earlier in chapter 2.

The AMA believes that, for the reasons given, health services expenditure will continue to rise as a percentage of GDP, as will medical services and pharmaceuticals expenditures. The Retirement Income Modelling Taskforce in 1996 published a scenario that total health expenditure as a proportion of GDP could rise to about 17% by 2041, with health expenditure on the aged fuelling much of this increase (National Commission of Audit, 1996). In 1998, George Rothman of the Retirement Income Modelling Unit in The Treasury analysed several scenarios to 2041 of total health expenditure as a proportion of GDP, based on assumptions ranging from a 1% to a 1.5% per annum productivity gain and health costs

being held at 1% or 2% per annum above inflation. The projections based on these assumptions ranged from 9.3% to 19.1% of total health expenditure as a proportion of GDP (Rothman, 1998). The National Commission of Audit (1996) considered it unlikely that governments and the community would allow health to become a disproportionate burden on national income. Hence it recommended that measures be taken to contain expenditure growth and to increase the contribution to future health and care of those currently working, and those who have retired, who should have financial capacity to do so.

Gibson and Goss (1997), while discussing the scenarios put forward by the National Commission of Audit, note also that 'in the 20 years, 1975-76 to 1995-96, real GDP growth per person was 1.7% per year and real health expenditure growth per person was 2.3% per year. If these growth rates are applied to the period 1995 to 2031, the health expenditure to GDP ratio in 2031 would be 10.4%.'

In this economic context, and with governments examining all options to constrain expenditure, medical workforce supply and demand has emerged as a high profile policy issue. There is a hypothesis that high workforce growth leading to surplus workforce capacity generates supplier-induced demand and unnecessary expenditure. This hypothesis is discussed in detail later in this paper. The greater policy interest lies in why there are significant shortages in some sectors of the medical workforce despite the workforce more than doubling during the past 20 years, and what mechanisms should be used to more fairly distribute the workforce.

In Australia, decisions have been made during the last two years to reduce both medical school intakes and net additions to the workforce from immigration in order to dampen medical workforce growth, while it is also planned to reduce the level of dependence on the use of temporary resident overseas-trained doctors. The annual intake to the GP training program has been approximately halved to 400, and access to Medicare provider numbers for new graduates has been denied until they enter a recognised general or specialist training program. All of these decisions will have the effect of constraining growth in both medical and health expenditure.

4. Patient demand for medical services

4.1 Overview

Illness and injury are the major factors determining patient demand for medical services. These include antenatal and postnatal care and preventive consultations such as periodic screening of persons in apparent good health to identify latent or developing disease, vaccinations, family planning, and planning for overseas travel.

For populations, levels and types of illness and injury are related to:

- age and sex structure. Females have different morbidity patterns to males. Elderly people have the highest levels of ill-health and are a rising proportion of the population;
- ethnicity and Aboriginality. Recent migrants have better health than the community at large, while the Aboriginal population has much poorer health;
- socioeconomic status. Lower levels of morbidity are experienced by populations with high socioeconomic status, and increased morbidity by populations with low socioeconomic status, ie. populations with above average numbers of persons with indicators including income below the poverty line, unemployment, and low educational attainment; and
- lifestyle, occupational and environmental risk factors.

However, patient demand is also influenced by:

- advances in medicine creating new treatments. For example, many sports people who would have retired twenty years ago with a serious knee injury now have a knee reconstruction and are able to compete again;
- what the doctor recommends in terms of self-management, treatments, follow-up visits, referrals to other doctors and other health professionals, hospitalisation and other care;
- public health campaigns;
- media and personal contact dissemination of information on new drugs, new technology, new treatment methods, and access to services;
- marketing, pricing, location, trading hours, perceived quality of service, consultation waiting times and other consumer aspects of medical services;
- changing patient expectations about access to services; and
- employer rules and workplace philosophy on use of sick leave, carer leave and emergency leave that determine whether a medical certificate is required for approval of this leave as paid leave.

It follows from these indicators that patient need and demand are dynamic.

4.2 Changes in society

The 108% increase in the medical workforce between 1976 and 1996 was accompanied by major change in the demographic and social fabric of the population. In chapter 3 of *Australia's Welfare 1997* (AIHW, 1997b), Dr Peter McDonald presents a detailed analysis of socio-demographic change in Australia, projects trends and assesses the effect on future demand for welfare services. These changes in society impact on demand for medical services because of the relationships between health status and the demographic and socioeconomic features of the population, and because medical practice as a services

industry has to adapt to changes in society expectations of all service industries in respect of access and performance.

The changes in society include the following:

- a much more highly educated society than previously. This is correlated with better health status and with higher expectations of access to the benefits of improvements in diagnostic and curative medicine.
- a large increase in the percentages of people who are unemployed or do not have stable employment, elderly and single parents, all correlated with low socioeconomic status and increased morbidity.
- significant change in employment patterns with considerable increases in the female participation rate, the proportion of married women in the labour force and the proportion of mothers in the labour force with children in all age groups. The two parent working household has changed the delivery of service industries to extended hours and seven day a week trading, and produced the consumer environment for seven days a week, extended hours medical centres to flourish. Increased female participation and a sharp rise in part-time jobs have been accompanied by changes in the way society perceives the role of men and women, and led to more 'family-friendly' views of working arrangements that are reducing average hours worked by both men and women, including medical practitioners.

In general, changing demographics, rising national wealth and advances in medicine have changed society's views on health maintenance. There are higher expectations and greater reliance on medical technology. The higher expectations include the beliefs that:

- preventive action such as regular checkups will enable life-threatening and other serious illnesses to be identified early in their development and treatment provided.
- advances in surgery can greatly improve quality of life, such as for the elderly person after hip replacement, the sports person after knee arthroscopy, the factory worker after repair of an industrial injury, and so on.
- advances in drug treatment mean medications can do a lot more.
- advances in vaccination mean common illnesses such as influenza can be avoided for high at risk populations.
- high technology equipment can diagnose and treat many more conditions.

Other fundamental changes in society have included:

- changes in the ethnic composition of Australia through migration. Because migrant applicants with health problems are mostly excluded from migrating to Australia, the health status of the migrant population is higher than that of the population as a whole, while the broader ethnic composition has had positive benefits in such areas as diet where the 'steak and potatoes' diet of earlier generations is now much more cosmopolitan and diverse. At the 1996 population census, 26.1% of the persons counted were overseas-born.
- population change in many rural areas that has affected the viability of many service businesses, including medical practices and pharmacies.

4.3 Changes in population use of health practitioners

The Australian Bureau of Statistics conducted national health surveys in 1995 and 1989-90.

The results show a significantly higher use of consultations with doctors in 1995, despite the number per 1,000 population reporting a recent medical condition (697.3) being nearly the same as the rate of 707.9 in 1989-90.

Table 2: Persons consulting with health professionals during the last 2 weeks: sex, Australia, 1995 and 1989-90

Health professional consulted	(rate per 1,000 population of same sex)					
	1995			1989-90		
	Males	Females	Persons	Males	Females	Persons
Doctor	204.0	261.5	232.9	168.4	231.8	200.1
Dentist	52.7	58.9	55.8	46.5	56.6	51.6
Chiropractor	13.8	17.5	15.7	12.0	13.8	12.9
Chemist	17.3	28.3	22.8	24.7	34.9	29.8
Podiatrist	3.3	7.6	5.5	3.5	7.3	5.4
Nurse	10.0	12.7	11.4	11.0	12.8	11.9
Optician/optometrist	7.1	7.7	7.4	13.8	18.4	16.1
Physiotherapist/hydrotherapist	13.6	12.4	13.0	11.8	15.1	13.4
Other health professional	18.6	28.6	23.6	10.4	15.7	13.0
	(per cent increase to 1995)					
Doctor	21.1	12.8	16.4			
Dentist	13.3	4.1	8.1			
Chiropractor	15.0	26.8	21.7			
Chemist	-30.0	-18.9	-23.5			
Podiatrist	-5.7	4.1	1.9			
Nurse	-9.1	-0.8	-4.2			
Optician/optometrist	-48.6	-58.2	-54.0			
Physiotherapist/hydrotherapist	15.3	-17.9	-3.0			
Other health professional	78.8	82.2	81.5			

Note: Although there appears to have been a large decrease in the rate for persons consulting with opticians and optometrists, 7.1 million persons were estimated to have long-term sight conditions in 1995, compared with 5.4 million in 1989-90. The apparent reduction in the rate of consultations with opticians and optometrists is therefore puzzling.

Source: ABS Cat. No. 4392.0.

The doctor consultation rate increased by 21.1% for males, by 12.8% for females and by 16.4% for persons. However, there was also a 21.7% increase for chiropractors and a 23.6% increase for 'other health professionals', which included audiologists, dieticians, herbalists, hypnotherapists, naturopaths, osteopaths, occupational therapists, psychologists, social workers and speech pathologists.

The National Health Survey estimates are subject to sample error, and to error which may be created by changes between survey periods in perceptions by respondents to question wording. The 16.4% increase in the doctor consultation rate measured by the survey compares with a 10.5% increase in per capita Medicare utilisation of GP services during the same period. However, there is a problem in comparing consultations over time because of changes in medical practice. Both the AMA and RACGP, in submissions to the working group, have indicated their belief that the proportion of short consultations has increased, thereby promoting more frequent consultations, and increasing the proportion of persons enumerated in a two-week survey period. Hence it may be incorrect to conclude that there was a real increase in the rate per 1,000 population of persons consulting a doctor. However, the proportion of the population aged 65 or more increased from 10.9% in 1989 to 11.9% in 1995, and this alone would have led to an increase in the rate per 1,000 population consulting a doctor.

Changes in the consultation profile between the 1989–90 and 1995 national health surveys may be seen in table 15, appendix 1. In 1995, of the 4,206,600 persons who consulted a doctor during the two-week period, 3,792,800 (82.4%) consulted a GP and 739,200 (17.6%) a specialist. By far the most popular reasons for a consultation by both men and women were a respiratory problem (846,000 persons) and a checkup/examination (826,000 persons). The next most common reason was for diseases of the musculoskeletal system and connective tissue (375,000 persons).

The age distribution of persons consulting a doctor shows that 19.7% were aged 65 years and over, the fastest increasing age group in the population. In the 65–74 year age group, 36.3% consulted a doctor in a two-week period, while for the 75 and over age group, the proportion was 42.1%, the highest for any age group.

Table 3: Persons consulting a doctor during the last 2 weeks: age, 1995

Consultation status	Age (years)								Total
	0–14	15–24	25–34	35–44	45–54	55–64	65–74	75+	
	('000)								
Consulting a doctor	730.7	507.4	640.0	551.8	509.0	438.6	489.2	339.8	4,206.6
Not consulting a doctor	3,142.0	2,202.9	2,201.7	2,190.0	1,723.2	1,068.8	858.8	467.2	13,854.5
Total	3,872.7	2,710.3	2,841.7	2,741.8	2,232.2	1,507.4	1,348.0	807.0	18,061.1
	(per cent)								
Consulting a doctor	18.9	18.7	22.5	20.1	22.8	29.1	36.3	42.1	23.3
Not consulting a doctor	81.1	81.3	77.5	79.9	77.2	70.9	63.7	57.9	76.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: ABS Cat. No. 4364.0.

4.4 Health differentials between urban, rural and remote areas

In the 1997 AIHW report, *Rural, Remote and Metropolitan Health Differentials: A Summary of Preliminary Findings*, measures of health status show disparities which suggest a relatively greater need for medical services in the under-serviced rural and remote areas. These disparities are discussed in some detail in the report and are not repeated here.

Feedback from participants at the General Practice Research Workshop in Adelaide on 16 October 1997 was that large rural centres generally have an adequate supply of GPs, and it is in rural areas outside of these that workforce shortages are a significant problem. If this is true, then GP workforce provision in these towns provides a good benchmark against which to measure relative shortage and surplus capacity in other geographic areas, as long as there is no evidence of adverse effects on health outcomes (Schroeder, 1996).

To evaluate this, one first has to consider the non-medical influences on health outcomes for large rural centres. These include the following.

- Because of immigration rules, new migrants have better health than the rest of the population (*Australia's Health 1994*). Migrants are more concentrated in metropolitan areas, and this lifts the health status of metropolitan areas compared with rural and remote areas.
- According to the ABS index of socioeconomic disadvantage, large country towns have lower socioeconomic status than capital cities, with large country towns falling in the 3rd, 4th and 5th quintiles (*Australian Medical Workforce Benchmarks, 1996*). This is associated with poorer health status.
- Large rural centres have, on average, a 3.1% Aboriginal population compared with 1.0% in capital cities and 1.7% in other metropolitan areas. Because Aboriginal health is so

poor, if all else was equal, large rural centres may be expected to have slightly higher morbidity than metropolitan areas, similar health status to small rural centres and other rural areas (with 2.8% and 2.6% Aboriginal population respectively), but somewhat better health status than remote areas centres (12.6% Aboriginal population) and other remote areas (25.9%) (table 16, appendix 1).

These influences suggest that age-standardised morbidity and mortality statistics would show poorer health status for large country towns than for metropolitan areas, and similar health status with small towns, but significantly lower morbidity and mortality than for remote areas.

The role of medical practice in improving health outcomes is discussed in section 4.7. In 1995–96, there were 6,133 GP consultations per 1,000 persons in capital cities compared with 4,853 consultations per 1,000 persons in large country towns, a difference of 26.4% (table 18, appendix 1). If such a high differential in medical servicing was to have a positive effect on health outcomes in capital cities, one would expect to see a positive effect over and above that which would be expected on the basis of advantages in socioeconomic status, Aboriginality and the proportion of migrants. This is not readily apparent from tables 19 to 21, appendix 1, where:

- age-standardised mortality for large rural centres is 7.7% higher for males and 6.0% higher for females than for capital cities, with the difference for males largely because of increased road accidents and injuries, and for females mainly because of increased coronary heart disease. The medical influences on mortality from road accidents and injuries and on coronary heart disease are far less than the environment, lifestyle and diet influences which cause these;
- age-standardised hospitalisations for large rural centres for males are about the same as for capital cities, but are 5.6% higher for females because of higher rates of childbirth; and
- in respect of risk factors, the proportions of persons in large country towns who are overweight, smoke and have not had a pap smear test during the last three years are on a par with capital cities. They have relatively more persons at risk for high alcohol consumption, hypertension and diabetes, but relatively fewer persons with hypertension and not using sun protection (AIHW, 1997).

4.5 Self-assessed health status by geographic area

The Australian Bureau of Statistics says that 'self-assessed health status is considered a major factor in the usage of health services and other health-related actions, and a determinant of health-related lifestyle behaviours such as smoking, diet and exercise. As such, perceived health status complements measures of ill-health in the analysis of health-related actions and needs for health services, and is an important consideration in the development and targetting of preventive health programs' (ABS, Cat. No. 4363.0). The Bureau found that how people rated their health was strongly related to their illness experience (ABS, Cat. No. 4364.0).

In the 1995 National Health Survey, respondents were asked directly how they rated their health in general, from excellent to poor. The results across geographic areas for Australia are remarkably similar, with 16.4% of metropolitan residents rating their health fair or poor, compared with 17.1% of residents of rural centres, and 16.9% of residents of other rural and remote areas (table 22, appendix 1).

Australian Medical Workforce Benchmarks (1996) noted significant variation in the average number of GP consultations per person among State capital cities, with Sydney the highest

with 7.2 and Hobart the lowest with 5.8. Next highest were Melbourne and Brisbane with 6.6, and next lowest Adelaide and Perth with 6.2 and 5.9. The similarity in health self-assessment levels across cities, with the exception of a three percentage points poorer assessment for Hobart, suggests that the higher GP consultation levels in the larger capitals may not be associated with better perceived health status. This can be explored further using analysis of additional health status measures collected in the National Health Survey.

4.6 Population dispersion

In 1995, the population concentration in Australia's capital cities averaged 339.4 persons per sq. km. Large country towns had 59.0 per sq. km., small country towns 18.4, other rural areas 2.6, remote centres 0.3, and other remote areas 0.1 persons per sq. km. (table 16, appendix 1). The implications on medical workforce need of very low population concentrations are discussed in the following.

In table 4, Medicare consultations for vocationally registered GPs in 1995-96 are collated with average weekly hours worked in direct patient care for these doctors, as reported in the December 1995 national medical labour force survey. The final two columns show that consultations per unit of time drop significantly for geographic areas outside the metropolitan centres.

Table 4: Vocationally registered general practitioners: Medicare consultations and direct patient care hours worked, 1995-96

Locality	Providers	Consultations ^(a)	Consults. per provider	Av. weekly hrs. worked in direct patient care	Hours worked per year ^(b)	Average consultations per hour	% of capital city rate
Capital city	12,076	62,008,050	5,135	40.7	22,608,687	2.74	100.0
Other metropolitan	1,293	7,144,840	5,526	43.2	2,569,450	2.78	101.4
Large rural centre	1,068	5,247,420	4,913	42.0	2,063,376	2.54	92.7
Small rural centre	1,080	5,347,360	4,951	44.1	2,190,888	2.44	89.0
Other rural	1,874	8,436,360	4,502	45.6	3,930,902	2.15	78.3
Remote centre	158	640,020	4,051	45.4	329,967	1.94	70.7
Other remote	162	601,800	3,715	49.9	371,855	1.62	59.0
Total	17,711	89,425,850	5,049	41.7	34,065,125	2.63	95.7

(a) by location of provider.

(b) assuming an average of 44 weeks per year, taking into account leave, commencements and withdrawals. However, assumptions of fewer or more weeks worked per year for all GPs do not change the ratio in the final column.

Sources: DHFS, AIHW.

This increasing differential with remoteness may be due to a number of factors:

- higher through-put rates, on average, for fully bulk-billing practices in metropolitan areas.
- increased patient travel requirements for rural doctors for outreach services in particular. In 1994, the Australian Bureau of Statistics found that most Aboriginal people living in rural areas received services from a visiting doctor, not a resident doctor.
- significantly higher numbers of emergency after hours and hospital visits for rural GPs (DHFS, 1997b).
- differences in health service delivery arrangements in rural areas. To avoid delays in provision of emergency care to rural residents, patients are more likely to be admitted to

hospital. Once admitted, they are more likely to have a longer stay in hospital for a course of treatment than a city dweller with readily accessible hospital-in-the-home, domiciliary nursing and outpatient services. In rural areas, a GP is more likely to have a contract with a hospital to provide care to patients. In 1993, two-thirds of teaching hospitals had GP involvement, 87.0% of base hospitals and 90.0% of district hospitals (DHFS, 1997a).

- increased population morbidity in rural and remote areas that may be expected to increase the length of a consultation. Despite higher population morbidity, much lower consultation rates with GPs, most notably for males, also suggest that country people are less likely than city people to attend a GP for minor illnesses and injuries, and therefore rural GPs may expect to have a lower proportion of short consultations.

Population dispersion has three further important effects on medical workforce requirements.

- The economics of GP practice makes it desirable that practices achieve economies of scale by employing around four or more practitioners. The Australian Bureau of Statistics found that large GP practices (6 or more practitioners) had an operating profit margin of 43.1% and return of assets of 75.1% in 1994–95, compared with an operating profit margin of 23.9% and return of assets of 30.6% for small practices (1 or 2 practitioners) and an operating profit margin of 28.3% and return of assets of 67.7% for medium practices (3–5 practitioners) (ABS, 1997). This suggests a minimum catchment population of 4,000 to 5,000 people, depending on the working hours of the practitioners. However, every rural centre with 1,000 or more people wants its own doctor. This is not unreasonable for the large tracts of Australia where rural centres are widely dispersed and population densities in between the centres are low. Hence, rural and remote areas have a much higher proportion of solo and small practices than metropolitan areas (DHFS, 1997a).

In reality, the large tracts of dispersed rural centres in mainly inland Australia are likely to always need a significant proportion of solo practitioners. However, for such solo doctor practices to be viable, financially and otherwise, under current remuneration arrangements, they will continue to need annual recurrent government subsidies to attract and retain practitioners. A partial alternative policy option being considered by some State health departments, and discussed by Newbery (1997), is to enhance the primary care role of registered nurse practitioners in specified areas of inland Australia to reduce the demand for a doctor in every small town. Unlike other health occupations, nurses are currently well-distributed across metropolitan, rural and remote regions of Australia (AIHW, 1997). An indication of the number of nurses being considered was provided by the announcement by the New South Wales Government in August 1998 that it intended to seek legislation to establish up to 40 nurse practitioner positions in selected areas of the State where there is demonstrated local need, local agreement and local support for them.

- Solo and small-practice GPs in dispersed population areas need locum support for annual leave. In metropolitan areas, large group practices can use internal rostering to cover leave arrangements and small practices can choose to simply close doors for annual recreation leave, with patients re-directed to other GPs in the local area.
- Specialist practices need much larger catchment populations for viable practice than GPs, and, for much of rural and remote Australia, this implies greater responsibility for GPs for basic specialist services. A number of State Governments provide rural GPs with subsidies for professional indemnity insurance to ensure adequate obstetrics services are provided.

4.7 The role of medical practice in improving health outcomes

The preceding discussion in this chapter poses fundamental questions. What role has increasing doctor supply had in improving actual health outcomes? Will adding more doctors to the workforce improve health outcomes?

This issue was examined in some detail in *Making It Better*, the National Health Strategy Background Paper No. 8 (1991).

It describes health as a product of:

- biology;
- lifestyle, eg. smoking accounts for 20% of all deaths in Australia;
- health care services;
- environment; and
- the economy of the country: richer countries can greatly reduce environmental risk factors influencing health, and spend more on other public health measures and on clinical health care.

It drew heavily on analyses of mortality and data from other sources in the books by Thomas McKeown, *The Role of Medicine* (1979) and *The Origins of Human Disease* (1988). Registration of cause of death began in Sweden in 1751, in France in 1801, in England and Wales in 1838, and in Ireland in 1871. McKeown calculated declining mortality in these countries by type of disease and noted the years in which immunisations and other major medical interventions were introduced.

He found that most of the advances in health outcomes during the last 200 years can be attributed to:

- improvements in lifestyle and living conditions (mainly improved nutrition, better housing and clean water supplies) which have greatly reduced disease by elimination or reduction of the origins of disease. In Europe, in the period of 100 to 200 years ago, and where people live in third world conditions today, infectious diseases predominate as causes of sickness and death because of defective hygiene and crowding, insufficient food lowering resistance to communicable diseases, close contact with domesticated and other animals which are the probable causes of many micro-organisms, and human populations large enough to establish and amplify some human infections.
- immunisation campaigns which have almost completely eliminated some of the infectious diseases.
- many of the drugs introduced this century.

With the exception of some Aboriginal populations living in third world conditions, these are not particularly relevant to Australia today. Modern day improvements in health outcomes include:

- a rapid decline in deaths from cardiovascular disease, the main cause of death in Australia. This decline has been mainly attributed by epidemiologists to a reduction in two risk factors: smoking and blood pressure – the latter, a combination of better diet and increased medication to lower high levels. A smaller but significant contribution has been made by medical and ambulance services.
- the significant contribution of medical and other health services to saving lives through
 - immunisation and screening programs;
 - public education, eg. HIV infection contained in Australia;

- treatment of trauma;
- successful treatment of some cancers and increasing length of survival from cancer;
- and
- reduction in cardiovascular deaths.
- contributions by medical services in improvement of quality of life through hip replacements and other interventions, and improved care of people with chronic and terminal conditions.
- falling motor vehicle mortality rates because of better roads, better traffic management, compulsory seat belts, random breath testing and speed cameras, and improved accident and emergency services.
- reduced numbers of births with genetic defects and other abnormalities through prenatal screening and increased use of termination of pregnancy.

Dr Ian Ring, Director of the Epidemiology and Health Information Branch of the Queensland Health Department, has compared Australian Aboriginal morbidity and mortality with US and Canadian Indians and New Zealand Maoris. He found that in the 1980s the three overseas indigenous peoples had an expectation of life 10 years or more greater than Australian Aboriginal people, whose life expectancy was at the same level of the others 30 to 40 years earlier. Ring's recommendations to improve Aboriginal health outcomes highlight the complex range of determinants of health. These recommendations were:

1. 'A whole of government approach to the fundamentals – land, housing, water, jobs, law and order, education'.
2. In terms of health services, to 'tackle cardiovascular disease, respiratory disease, diabetes, hypertension etc from a health and a social point of view'.
3. Improve the workforce skills to address the issues through increasing the numbers of Aboriginal and Torres Strait Islander doctors and health professionals ('the US Indian Health Service has hundreds of Indian doctors and health professionals to draw on') and by forging partnerships between health services and national bodies such as the Aboriginal and Torres Strait Islander Commission (Ring, 1992).

In 1995, the Australasian Cochrane Centre was established at Flinders Medical Centre in Adelaide as part of the International Cochrane Collaboration to prepare, maintain and promote evidence-based medicine. It is expected that, over time, this will reduce variation in practice, unnecessary treatment and under-use of some treatments, leading to improvements in the efficiency and effectiveness of the medical workforce.

On the basis of the historical analyses, some hypotheses on the relationship between doctor supply and health outcomes include:

- Adding to doctor supply should improve health outcomes in areas of significant medical workforce shortage, as this would increase access for medical emergencies and for screening for conditions where early intervention results in improved outcomes.
- Adding to supply should improve outcomes in medical specialty and sub-specialty fields where technology and drug treatment advances are creating net additional new treatment options which can be demonstrated to advance health outcomes in morbidity, mortality or quality of life.
- There are diminishing returns in adding to doctor supply from a position of shortage. In apparently adequately to well-supplied areas, historical evidence is lacking that increasing supply will improve health outcomes.

- Increased use of evidence-based medicine suggests potential for existing workforce to be used more efficiently and effectively in achieving population health outcomes.

A further hypothesis advanced later in this paper is:

- Increasing supply beyond certain levels in at least some medical fields will create adverse outcomes, for example, increasing the numbers of surgeons beyond the point where they have sufficient patients to maintain skills.

It is likely that the greatest advances in health outcomes during the next 20 years will arise from increased national wealth improving socioeconomic status and health-related lifestyle of the population and improving national and local public health infrastructure, improved social infrastructure for disadvantaged Aboriginal and non-Aboriginal populations, new drugs, new vaccines, increased immunisation, and technological advances in medical equipment which will extend treatment boundaries. The medical workforce will have a strong role in facilitating these advances.

However, the role of the doctor and the way medicine is practised will also change over the next 20 years. For example, Internet, other computer, and popular media access to evidence-based medicine will strengthen consumer knowledge and empowerment and change the doctor-patient relationship and the way medicine is practised. The Internet is already being used by health consumers for international dialogue on best treatments for medical conditions. In the United States, consumer demand has led to Internet sites becoming available for local and international medical consultations, where money is paid by credit card and advice given is referenced to the medical literature (personal communication, Ray Rogers, former head of the UK NHS Information Management Service, and currently leader of an international G7 committee on health informatics).

There is concern about the regulatory aspects of this form of medical practice. Nevertheless, with legislative safeguards on the bona fides of practitioners, and on advice given without in-person examination, it would seem inevitable that Internet and telemedicine sites linked to evidence-based medicine databases will become available in Australia during the next 10 to 20 years, with the potential to transform the practice of medicine and workforce allocation, given the scope for such sites to market themselves internationally.

5. The international experience and lessons for Australia

In 1995, the international literature on benchmarking was sparse and generally unhelpful in developing Australian medical workforce benchmarks. This has changed considerably since then, with the literature expansive on methodologies and the successes and failures of medical workforce policy implementation.

The literature review in appendix 2 highlights a number of issues relevant to analysis of medical workforce demand and supply in Australia:

- Canada is the country most similar to Australia in its demographic structure and proportions of GPs and specialists in the medical workforce. Other similarities include:
 - a) GP over-supply in metropolitan areas;
 - b) shortages of physicians in rural areas, and use of nurses as partial substitute providers in remote communities;
 - c) concentration of specialists in metropolitan areas;
 - d) significant differences in medical workforce provision among provinces; and
 - e) reductions in medical school intakes.
- The United States has shortages of GPs and significant specialist workforce over-supply. Managed care organisations employ much lower numbers of doctors per 100,000 population than are employed in non-managed care arrangements. Increasing coverage of the population by managed care organisations is therefore reducing the projected workforce requirement.
- The United Kingdom has a low doctor-to-population ratio and is increasing medical school intakes to address shortages of GPs. The United Kingdom has found that the length of the economic working life of a doctor is declining.
- Some European countries have an over-supplied medical workforce to the point of significant unemployment. The most notable, and their unemployment rates for doctors, are Italy (24.5%), Austria (8.9%), Germany (5.2%), Spain (4.7%), and Netherlands (4.6%).
- European countries have placed upper limits on the working hours of junior hospital doctors, and this has created pressure to increase hospital staff numbers.
- There has been very little useful analysis yet in assessing physician supply against patient treatment outcomes. Hence it is not known whether increasing or decreasing GP and specialist supply in most circumstances will have a positive effect, negative effect or no effect on health outcomes.

The literature review suggests a number of areas where improvements could be considered for Australian medical workforce supply and demand analysis:

- an expansion in the list of indicators internationally recognised as flagging surplus supply and medical workforce shortages;
- principles for determining a region or model-of-care benchmark where supply appears to meet standards of adequacy, then use of that benchmark as a comparative tool to measure surplus or inadequate workforce in other areas;
- a Canadian model for benchmarking general practice which calculates standardised consultation workloads in a geographic area using premature mortality as a fourth indicator in addition to the three used in *Australian Medical Workforce Benchmarks* (1996) – age, sex and socioeconomic disadvantage;

- in individual medical specialties, using sustainable practice indicators of specialist numbers, population catchment area and infrastructure to identify under-served regional populations. In this respect the recently completed AMWAC report on sustainable specialist services will assist (AMWAC 1998.7);
- use of peak workload (in hours worked at age 50) for male and female doctors as the benchmark for calculating full-time-equivalents;
- estimation of the length of the economic working lives of male and female doctors to calculate annual wastage rates in workforce modelling; and
- the desirability of moving towards incorporating health outcomes measures in planning workforce requirements.

6. Indicators of workforce supply in excess of need

Indicators of workforce surpluses in particular regions or health services may include:

- Numbers of doctors per 100,000 population well above the national norm in a particular region or subset of the country, with no evidence of significantly better measures of health outcome.
- Over a long period, growth of the workforce well in excess of population growth, assuming adequate, or near-adequate, supply at the starting point.
- Pricing of medical services significantly below the average, or high adherence to a floor price.
- Declining average incomes.
- Supplier-induced demand and over-servicing.
- Under-employment.
- Market restructuring and the failure of recruitment to traditional models of practice.
- Growth in marketing effort.

Each of these is discussed in turn.

6.1 Provision well above the national average

Medical supply well above the national average in a State, or region within a State, is regarded in international benchmark methodology as evidence of a workforce surplus.

In Australia in December 1995 there were 253.8 practising clinicians per 100,000 population. States well above this average were South Australia with 303.5 per 100,000 population (19.6% above) and the ACT with 321.3 per 100,000 population (26.6% above). New South Wales with 268.7 per 100,000 population was 5.9% above the average. Queensland and Western Australia were well below with 88.8% and 86.6% of the national norm. South Australia had a 38.1% higher provision than its neighbour, Western Australia. However, the rural areas of South Australia have 122.4 clinicians per 100,000 population, below the national rural provision of 136.6 per 100,000 population, indicating both that the South Australian surplus is in Adelaide and that a large apparent surplus in a capital city does not flow into improved provision for under-served rural areas.

As discussed earlier, feedback from participants at the General Practice Research Workshop in Adelaide on 16 October 1997 suggested that large rural centres (population from 25,000 to 99,999) generally have an adequate supply of GPs, and it is in rural areas outside of these that workforce shortages are a significant problem. The 1994 statistical data in *Australian Medical Workforce Benchmarks* (1996) supported this proposition. These centres are: Albury-Wodonga, Dubbo, Lismore, Orange, Port Macquarie, Tamworth, Wagga Wagga (NSW); Ballarat, Bendigo, Shepparton-Mooroopna (Victoria); Bundaberg, Cairns, Mackay, Maroochydoore-Mooloolaba, Rockhampton, Toowoomba (Queensland); Whyalla (South Australia); and Launceston (Tasmania).

In 1995 these centres had an average of 106.5 GPs per 100,000 population. One centre well below this provision was Whyalla with 57.8. If Whyalla is excluded, the average becomes 107.6 per 100,000 population. It can be argued that if this provision is accepted as representing a lean but adequate GP supply for large rural centres, then the 128.6 GPs per 100,000 population in metropolitan areas represents a surplus of around 20%, even after adjusting for the higher proportion of female GPs in metropolitan areas (33.3% compared with 29.6% for large rural centres) which marginally compresses the full-time-equivalent

differential. This 20% represents 3,300 GPs, excluding from consideration a further few thousand doctors working as hospital non-specialists, mainly in metropolitan areas, whom the Health Insurance Commission classifies as non-vocationally registered GPs or Other Medical Practitioners (OMPs) on the basis of their private practice billing activity.

Such a calculation is what Schroeder (1996) would describe as a common sense calculation of workforce surplus supply. It gives a valuable 'ball-park' feel for the level of surplus capacity. However, it ignores demographic and socioeconomic population differences. A more refined result can be produced by aggregating upwards from smaller areas where adjustments to workforce requirements can be made by taking into account differences in patient need that would be expected from these population differences. This will be undertaken for the planned update of *Australian Medical Workforce Benchmarks*.

In the interim, the validity of the assumption that large rural centres in Australia have a lean but adequate GP supply is open for discussion.

Table 5: Employed medical practitioners per 100,000 population: occupation and States and Territories, 1995

Occupation	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
<i>Clinician:</i>	268.7	246.5	225.5	219.7	303.5	256.7	321.3	254.2	253.8
Primary care practitioner	121.1	107.8	107.6	103.3	137.2	137.1	151.0	117.9	115.8
Hospital non-specialist	36.2	24.1	27.2	17.7	31.0	25.1	37.8	38.7	29.1
Specialist	86.7	85.6	70.4	79.9	104.9	76.2	112.0	75.3	84.3
Specialist-in-training	24.7	29.0	20.3	18.8	30.3	18.3	20.5	22.3	24.6
<i>Non-clinician:</i>	16.0	21.4	11.4	7.5	12.7	11.5	30.0	20.0	15.6
Administrator	3.7	6.0	3.0	2.4	3.8	2.1	10.3	7.9	4.2
Teacher/educator	1.2	1.1	0.9	0.6	0.8	0.8	0.6	0.0	1.0
Researcher	1.8	1.9	0.8	1.2	1.9	1.1	4.6	4.8	1.6
Public health physician	2.6	3.3	2.3	1.8	1.9	1.9	3.6	4.6	2.6
Occupational health physician	1.6	1.6	0.7	1.0	0.9	2.7	3.1	0.0	1.3
Other	5.2	7.5	3.7	0.6	3.5	2.8	7.9	2.8	4.9
Total	284.7	267.8	236.9	227.2	316.3	268.2	351.3	274.2	269.4

(per cent—relative to total)

<i>Clinician:</i>	105.9	97.1	88.8	86.6	119.6	101.2	126.6	100.2	100.0
Primary care practitioner	104.6	93.1	92.9	89.2	118.5	118.4	130.4	101.8	100.0
Hospital non-specialist	124.3	82.8	93.5	60.9	106.7	86.3	129.9	133.1	100.0
Specialist	102.9	101.5	83.5	94.7	124.5	90.3	132.9	89.3	100.0
Specialist-in-training	100.4	117.9	82.7	76.6	123.3	74.5	83.2	90.5	100.0
<i>Non-clinician:</i>	102.9	137.1	73.4	48.0	81.6	73.5	192.5	128.5	100.0
Administrator	90.1	144.5	72.3	58.0	92.0	49.4	247.9	189.1	100.0
Teacher/educator	119.6	111.1	92.2	56.5	78.4	83.4	62.1	0.0	100.0
Researcher	107.9	114.5	50.6	74.1	114.2	67.9	281.0	294.4	100.0
Public health physician	99.5	127.6	88.9	67.2	73.3	74.3	135.6	175.3	100.0
Occupational health physician	117.3	117.4	52.8	73.6	65.0	201.8	229.1	0.0	100.0
Other	106.9	154.0	75.5	11.5	71.4	58.2	162.4	57.0	100.0
Total	105.7	99.4	88.0	84.4	117.4	99.6	130.4	101.8	100.0

Note: Population data refer to estimated population at 31 December 1995.

Source: ABS: Cat. No. 3101.0, June quarter, 1996.

A consequence of accepting this methodology is that it may be considered inequitable to apply it only to the GP workforce.

In the preceding table, one could make a judgement that, for example, Victoria was a 'model' State in terms of its provision of specialists, specialists-in-training, and hospital non-specialists. Indeed, after the introduction of casemix funding in Victoria, one of the successes

claimed by the Victorian Government was a significant reduction in hospital waiting lists and waiting times, with what was said to be more effective use of the existing workforce, rather than an increase in the workforce to achieve this.

Table 6: State and Territory hospital non-specialist, specialist and specialist-in-training workforce provision based on Victorian workforce provision, 1995

Occupation	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	(number)								
Hospital non-specialist	2,226	1,089	902	310	458	119	115	69	5,288
Specialist	5,336	3,870	2,334	1,395	1,548	360	342	133	15,318
Specialist-in-training	1,518	1,310	674	329	447	87	62	39	4,468
Total	9,081	6,269	3,910	2,034	2,454	566	519	241	25,074
	(number per 100,000 population)								
Hospital non-specialist	36	24	27	18	31	25	38	39	29
Specialist	87	86	70	80	105	76	112	75	84
Specialist-in-training	25	29	20	19	30	18	20	22	25
Total	148	139	118	116	166	120	170	136	138
	(number based on Victorian provision)								
Hospital non-specialist	1,482	1,089	799	421	356	114	73	43	4,378
Specialist	5,266	3,870	2,838	1,495	1,263	405	261	151	15,551
Specialist-in-training	1,783	1,310	961	506	428	137	88	51	5,266
Total	8,531	6,269	4,599	2,422	2,046	656	423	245	25,196
	(adjustment)								
Hospital non-specialist	-744	0	-103	111	-103	-5	-42	-26	-910
Specialist	-71	0	505	100	-285	45	-81	18	233
Specialist-in-training	265	0	287	177	-20	50	26	12	798
Total	-549	0	688	388	-408	90	-96	4	121

The results in table 6 of this theoretical modelling, using Victoria as the benchmark, are:

- a total national workforce of 25,196, virtually the same total as before, but considerably re-distributed, with large flows from New South Wales, South Australia and the ACT to Queensland, Western Australia and Tasmania; and
- a large shift from non-specialist to specialist care.

The same modelling could be done using another State as the benchmark, or using different States as the benchmarks for the three workforce segments. However this approach is useful only in highlighting the relative under-provision in Queensland, Western Australia and Tasmania, and high provision in South Australia, when making decisions about prioritising the allocation of education and training resources, and then only where these macro characteristics of distribution apply to individual segments of the workforce under consideration.

However, beyond that, it is not sensible for several reasons, including:

- In contrast to the relative homogeneity and low levels of substitution characterised by the GP workforce, the specialist and hospital non-specialist workforce is very heterogeneous, substitution of service provision is widespread, and the public-private mix varies considerably among States and Territories. Hence it is feasible that different models of service provision may be just as effective in terms of cost and health outcomes.
- Outreach and extended service provision are ignored. For example, the specialist and hospital non-specialist workforce in the ACT services a population 25% larger than the

ACT resident population, while the Northern Territory receives a high proportion of its specialist services on an outreach basis from Adelaide.

- The urban-rural population mix and adequacy of existing services to the rural population are not considered.
- Relative differences in patient need among States are not considered. There are significant differences in age structure, Aboriginality, ethnicity, urbanisation, and health status measures.
- A number of specialist services are not viable for the Territories and Tasmania.

The alternative approach adopted by AMWAC has been to examine the workforce requirements of each specialty in turn, and collate these into a picture of the total specialist and specialist-in-training workforce. AMWAC is also planning an examination of the requirements of the hospital non-specialist workforce.

6.2 Over a long period, growth of the workforce well in excess of population growth, assuming adequate, or near-adequate, supply at the starting point

From 1984–85 to 1996–97, the number of Medicare primary care providers increased by 44.7% from 16,951 to 24,526 recognised general and other practitioners. The specialist workforce increased by 59.2% from 10,421 to 16,590. During the same period the population of Australia increased by 17.5%, from 15.7 million to 18.4 million.

Growth rates of the full-time-equivalent (FTE) GP workforce during the period from 1984–85 to 1996–97 by geographic area show that the workforce per 100,000 population increased fastest in capital cities, next fastest in other metropolitan areas and next fastest again in large rural centres (table 7). Although there were significant gains in GP numbers in the lowly provided rural and remote areas, overall there was worsening relative maldistribution of the workforce. In 1996–97, the FTE GP workforce in Australia increased by 239, with 92.1% of this increase (211 FTE GPs) going to capital cities, indicating an acceleration in the worsening of the relative distribution. The population per FTE GP in 1996–97 was 1,034 in capital cities, 1,105 in other metropolitan areas, 1,200 in large rural centres, 1,306 in small rural centres, 1,683 in other rural areas, 1,881 in remote centres and 2,781 in other remote areas. (However, it should be noted that there may be significant numbers of salaried doctors practising in rural and remote areas who are not counted in Medicare provider statistics. In 1996, there were 108 doctors employed by Aboriginal health services in non-metropolitan areas.)

The demographic characteristics of GP trainees have much to do with propensity to practise in metropolitan areas. In 1996, males represented 41.8% and females 58.2% of GP trainees. Of the male trainees, 71.4% were employed in metropolitan areas; of the female trainees, 77.7% were employed in metropolitan areas (AIHW, 1998). In 1995, Australian-born doctors comprised 66.0% of the trainees – 68.6% were training in metropolitan areas and 31.4% in rural areas, with a similar distribution for doctors born in the United Kingdom and Ireland (5.4% of trainees). Rural training was most attractive to the small number of New Zealand-born doctors – more than half were training in rural areas. Doctors born in Asian countries represented 15.9% of trainees, and 82.6% of these were training in metropolitan areas. Doctors from other countries comprised 10.9% of trainees and 77.8% were training in metropolitan areas (unpublished AIHW data).

Table 7: Full-time-equivalent GPs by geographic area, 1984–85, 1994–95, 1995–96 and 1996–97

Region	1984–85	1994–95	1995–96	1996–97	Increase 1984–85 to 1996–97		
					Number	%	% distn.
(FTE GPs)							
Capital city	7,039	10,903	11,172	11,383	4,344	61.7	74.8
Other metropolitan	808	1,227	1,252	1,267	459	56.8	7.9
Large rural centres	595	889	908	926	331	55.6	5.7
Small rural centres	652	924	929	925	273	41.9	4.7
Other rural	1,115	1,456	1,472	1,462	347	31.1	6.0
Remote centres	87	114	118	116	29	33.3	0.5
Other remote	98	122	120	121	23	23.5	0.4
Total	10,393	15,636	15,971	16,200	5,807	55.9	100.0
(FTE GPs per 100,000 population)							
Capital city	69.8	95.6	96.4	96.7	26.9	38.6	
Other metropolitan	72.5	90.7	91.0	90.5	18.0	24.9	
Large rural centres	65.5	81.7	82.6	83.3	17.9	27.3	
Small rural centres	66.4	77.2	77.2	76.6	10.2	15.3	
Other rural	51.9	59.3	59.9	59.4	7.5	14.4	
Remote centres	41.9	51.6	53.8	53.2	11.2	26.8	
Other remote	29.0	36.3	35.7	36.0	6.9	23.9	
Total	65.8	86.6	87.4	87.5	21.7	33.0	
(population per FTE GP)							
Capital city	1,433	1,046	1,037	1,034	-399	-27.8	
Other metropolitan	1,380	1,102	1,099	1,105	-275	-19.9	
Large rural centres	1,528	1,224	1,211	1,200	-328	-21.4	
Small rural centres	1,506	1,296	1,295	1,306	-200	-13.3	
Other rural	1,926	1,687	1,670	1,683	-242	-12.6	
Remote centres	2,385	1,936	1,860	1,881	-504	-21.1	
Other remote	3,445	2,754	2,802	2,781	-664	-19.3	
Total	1,519	1,154	1,145	1,143	-377	-24.8	

Sources: DHFS 1997a and b; unpublished 1996–97 data.

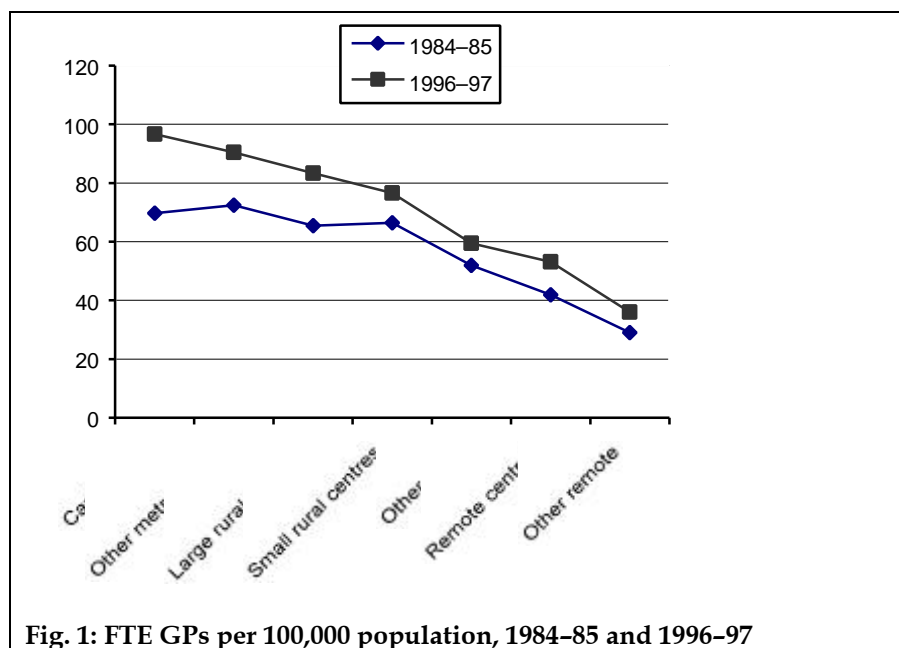


Fig. 1: FTE GPs per 100,000 population, 1984–85 and 1996–97

If growth of the workforce is well above population growth, this may be remedying a shortage at the starting point. In the mid-1980s there was an assessment of adequacy of medical workforce supply undertaken by The Commission of Inquiry into Medical Education and Medical Workforce (1988). This found the following:

- Australia appeared well-endowed overall with medical practitioners compared with other countries.
- There was no evidence of over-supply in the medical specialities, and general agreement that there was under-supply in some smaller specialties and sub-specialties.
- There was some evidence of an over-supply of GPs in some areas of capital cities. A number of submissions said that there was an over-supply of GPs in Australia, that excess GPs tended to set up practice in over-doctored metropolitan areas, and that the workload of many metropolitan GPs was too low to be financially viable.
- There were shortages of resident medical officers in hospitals.

Hence it can be concluded that the GP workforce in capital cities has moved from a position of over-supply in 1985 to far greater over-supply in 1997, given the increase in the capital city FTE GP workforce from 7,039 in 1984–85 to 11,383 in 1996–97, together with the analysis of population requirements in *Australian Medical Workforce Benchmarks* (1996).

6.3 Pricing of medical services significantly below the average, or high adherence to a floor price

Increasing medical workforce supply per 100,000 population increases competition in the market place to the point where prices of medical services will reduce. Further competition from additional supply will reduce price to the floor price, the Medicare rebate. In 1984–85, 52.5% of GP services were bulk-billed. By 1996–97, this had risen to 79.4% for vocationally registered GPs and 88.8% for other primary care medical practitioners, despite the fact that this floor price, the Medicare rebate, was not increased by government to keep pace with inflation and therefore fell in real value. The increases for selected specialist peer groups can be seen in table 8. The extent to which the Medicare rebate represents a price which provides sufficient remuneration to cover practice costs will vary from specialty to specialty and is unknown; this factor will influence the direct-billing rate.

Table 8: Medicare: percentage of services direct-billed, 1984–85 and 1996–97

Selected peer group	1984–85	1996–97
GP–other	52.5	88.8
GP–vocationally registered	. .	79.4
Obstetrician and gynaecologist	10.3	18.9
Specialist surgeon	17.6	26.8
Specialist anaesthetist	3.3	5.6
Psychiatrist	39.2	48.7
Specialist imagist	35.1	65.5
Specialist radiation oncologist	5.1	7.5
Specialist pathologist	45.2	78.6
Specialist dermatologist	30.5	40.9
Physician	20.9	35.1
Other medical	37.5	61.1

Source: Medicare statistics, DHFS.

In some circumstances, monetary price to the consumer is zero for all services. This includes certain salaried services (such as university medical centres and Aboriginal health services), public hospital accident and emergency departments and inpatient services, and private services where there is universal bulk-billing in a geographic area. In these, the main curbs on demand are costs incurred by the patient such as travel time and length of the waiting time to see a practitioner, or, in the case of public hospital inpatients, the waiting time to get a bed to receive the service. However, the more medical practices there are with increasing supply, and the greater the opening hours of the practices, the greater the increase in access for patients and the lower the average personal time and travel cost. In other words, increasing supply lowers the non-monetary as well as the monetary cost of medical services. This is particularly important for rural and remote people, where the non-monetary costs may be quite high, especially when travel costs also include overnight accommodation charges.

If supply increases to the point where there is no waiting time and no monetary cost, then demand can increase accordingly as people take advantage of the lack of a consultation fee and no waiting time. These people include persons who:

- would not normally attend a doctor for a mild complaint or preventive health care, or
- are unsure whether they should attend.

Demand will increase until consumer satiation levels are reached, unless the increase in demand once again creates a significant waiting time. Consumer satiation levels may be increased in various ways by suppliers (discussed more fully later), if the number of suppliers increases past the point where they are fully occupied.

On weekends, supply reduces significantly, and some bulk-billing practices on weekdays have been able to successfully introduce a patient co-payment for weekend consultations (various reports in *Australian Doctor*).

A large drop in supply also occurs late at night. Arnold (1997) has said that there is a shortage of doctors willing to enter old-style 24-hour personal practice. For more than 20 years it has been difficult to recruit doctors willing to do night and weekend work on top of GP practice during the day. Economic proof of this is the 'incredible salaries paid for country locums, and the many city GPs who close their practices during holidays because they cannot afford a locum'.

On the other hand, Arnold said that 'there's no shortage of part-time or casual doctors in "entrepreneurial" practices. The economic proof: the low salaries (or percentages) paid to part-timers and the high percentages retained by the proprietors.'

In summary, in a market becoming over-supplied, three prices are lowered:

- the monetary price of the service to patients;
- the time, travel and other non-monetary prices to patients; and
- the price of salaried medical labour.

Nevertheless, in such a market, there is a much lower supply of doctors willing to work either unattractive hours or in unattractive locations (such as outer metropolitan, low socioeconomic areas), and the three prices above, in real terms, should all be higher for unattractive hours and unattractive locations. When the available Medicare and other monetary and non-monetary remuneration is insufficient to recruit enough doctors for these unattractive hours and locations, there will be the perception of a shortage of doctors in an otherwise over-supplied medical labour market. However, adding to an over-supplied GP

capital city workforce will not solve a problem which is driven by price and the working hour and location preferences of doctors.

6.4 Declining average incomes

Declining real income may be an indicator of over-supply (Schroeder, 1996). However, it can be caused by other factors such as technology reducing prices of some diagnostic and procedural services, or government funding bodies constraining growth in remuneration. It is not a workforce planning concern in itself unless it leads to undesirable outcomes such as unwarranted induced demand which leads to either excessive expenditure by government or poor health outcomes.

During the last decade a powerful downward pressure on GP income has been exerted by the 20.7% decline in the average population per Medicare primary care provider between 1984-85 and 1996-97, and the rapid rise in bulk-billing from 52.5% to 80.4%. In 1989-90 prices, there was an average annual decline of 0.09% per year in the gross fee income from Medicare-funded services for full-time GPs in Australia (DHFS 1997a). Then AMA Vice-President David Brand commented on these data by saying that practice costs have increased and net incomes fallen (*Australian Medicine*, 16 September 1996).

The downward pressure on incomes from reducing average patient loads and market pressure to bulk-bill has been offset to an extent by an 8.1% increase in average services per practitioner, from 4,020 to 4,345. This increase has been largely attributed to transfer of health services from institutional to community care, ageing of the population, increasing community demand, and supplier-induced demand, discussed below. The rise in average services rendered also indicates faster patient consultations on average, as mean hours worked have declined with a rising proportion of female GPs in the workforce, from 25.1% in 1986 to 33.3% in 1996. There is no evidence however that female GPs are reducing their consultation times; they have a higher proportion of longer consultations than males, at least partly associated with a higher percentage of female patients. However, it is likely that both male and female GPs in metropolitan areas are referring a higher proportion of patients to specialists, for medico-legal reasons if nothing else.

The Royal Australian College of General Practitioners (RACGP), in a submission to the AMWAC benchmark working party in 1997, said that general practice has changed because of inadequate remuneration. It said that GPs are in fact frequently seeing patients more quickly than they would prefer for good practice, and it is becoming more common for patients with multiple problems to be asked to come back for a second consultation in respect of the lower priority health conditions.

6.5 Supplier-induced demand

Dr Richard Scotton (1998) says that 'the ability of doctors to influence demand for their services, through their socially accepted role as experts for their patients, is widely accepted by health economists and doctors. Whether "supplier induced demand" (SID) is motivated by financial maximisation or the desire to provide superior service to patients is irrelevant to the argument about its scale or existence. However none of the proponents of SID suggests that doctors are untrammelled in their discretion to determine service use'. Scotton says that 'constraints imposed by ethics, practice protocols and market forces leave room for considerable discretion on the part of individual doctors, the exercise of which is influenced by, among other things, the amount of time they have available and their views on appropriate levels of income. The evidence includes:

- remarkable variations in per capita service use in areas with different population ratios and different methods of payment; and
- rates of growth in service use over time which correlate more closely with increases in doctor numbers than with population growth.'

Scotton concludes that 'the generally accepted implication of these propositions is that, far from having a capacity for self-correction by market forces, the medical practice industry in Australia has a chronic tendency to develop excess capacity and for increments to its workforce to generate additional utilisation of its own services and other inputs to care'. However, there are limits to this. Protection against possible legal action may encourage a level of over-servicing, but at the same time sets limits on the extent of over-servicing which may occur. Likewise fear of investigation by the Health Insurance Commission constrains servicing within outlying statistical and professional bounds of practice norms.

Professor Jeff Richardson (1998) has reviewed the evidence for and against supplier-induced demand in Australia and found that there is strong empirical evidence. He found a high correlation:

- between GP services per capita and the number of full-time-equivalent (FTE) GPs per 100,000 population from 1983 to 1997; and
- between specialist services per capita and the number of FTE specialists per 100,000 population over the same period (excluding the specialties of pathology and radiology).

He modelled supply and demand for medical services with supplier-induced demand using data on FTE GPs in statistical subdivisions for 1996-97, and concluded that the results were 'striking' in support of supplier-induced demand.

Richardson provides an explanation of supplier-induced demand using the plausible assumption that doctors firmly believe in the efficacy of their own treatments and that more of them are better. Hence, from this perspective, 'SID is nothing more than the use of capacity to its limit; something doctors have been trained to do, expect to do and believe is ethically appropriate'.

Phelps (1992) in his textbook *Health Economics* provides two empirical examples of supplier-induced demand from the one study. Hickson, Altmeier and Perrin (*Paediatrics* journal, 1987) conducted a 'randomised controlled trial using residents in a continuity care clinic at a university hospital which randomly selected half of the doctors to receive a fee-for-service payment and the other half to be paid by flat salary. Patients attending the clinic were also randomly allocated to the doctors. Once assigned to a given patient, the patients continued with that doctor for all their care, unless the doctor missed an appointment, in which case another doctor would see the patient.' The patient fees were set at a rate so that the incomes of both sets of doctors should end up about the same. The results were that the fee-for-service doctors scheduled more visits for their patients (4.9 visits per year versus 3.8) and saw their patients more often (3.6 visits versus 2.9). Almost all of the difference in behaviour was due to well-care visits (1.9 visits vs. 1.3 visits).'

'In addition the fee-for-service doctors scheduled excess well-care visits (beyond those recommended) for 22% of their patients, while the salary doctors did this for only 4% of their patients.' The standard for well-care visits (routine examination, vaccination etc.) was a schedule of recommended treatment for children set by the American Academy of Paediatrics.

If this finding was true of GP services in Australia, relatively high growth in well-care visits may be expected if supplier-induced demand was being used as a mechanism to maintain medical incomes in the face of falling average patient numbers and falling prices for

services. A comparison between 1989–90 and 1995 Australian Health Survey data suggests that this may be the case. Between the two survey periods the population increased by only 6.7%. However, the number of people consulting a doctor in a two-week period for a checkup or examination increased three-fold from 264,000 to 826,000 people, and the number consulting for a test, including X-rays, doubled, from 115,000 to 229,000 (table 15, appendix 1). This contrasted starkly with the increase in persons consulting a doctor for most medical conditions, where the changes in numbers were much more in line with expectations based on population growth and disease trends. However, there were changes between the surveys in both the way the question was asked, and in how it was recorded, which may have inflated reporting of a checkup/examination and a test.

Question in 1989–90. I want to talk to you about (this/your most recent) consultation.
 What medical conditions did you have which caused you to consult the (doctor)?
Interviewer: Prompt for condition if a treatment or symptom is reported.

1.
 2.
 3.

Question in 1995. I would like to ask you about your most recent consultation.
 What were the medical reasons for this consultation?
Interviewer: Prompt for condition if a treatment or symptom is reported.

1.
 2.
 3.

Examination/Checkup
 Test

These questionnaire changes from 1989–90 to 1995 make interpretation of the increases in examinations, checkups and tests inconclusive.

One might also expect to find higher levels of use of checkups and examinations among metropolitan doctors but this is not the case. In metropolitan areas, 18.6% of GP consultations were reported as checkups or examinations, in rural centres 22.7% and in other rural and remote areas 20.5% (table 23, appendix 1). During a two-week period, AIHW estimates for 1995 from the ABS data indicate that:

- in the metropolitan population, 4.1% of the population received a GP checkup or examination, and 0.9% a checkup or examination from a specialist;
- in rural centres, these percentages were 4.2% and 0.5%; and
- in other rural and remote areas, the rates were 3.9% and 0.8%.

Scott and Shiell (1997) used data from the Australian Morbidity and Treatment Survey 1990–91 to test the hypothesis that ‘GPs in areas of high competition are more likely to recommend a follow-up consultation compared to GPs in areas of low competition’. They theorised that ‘for medical conditions where there is little consensus about treatment because of uncertainty, there may be more scope for income-generating behaviour compared with the treatment of medical conditions characterised by less uncertainty. This is because where comparatively little is known about the “appropriate” treatment of a condition there are more options available to the GP, including adopting a “wait and see” approach that may involve a follow-up consultation. Thus, the choice facing the GP may involve arranging

another consultation or asking the patient to return if the problem gets worse. In areas of high competition where workload is low, it is more likely that a follow-up consultation will be arranged given that it also generates extra income. In areas of low competition and excess demand where workload is high, GPs may be more likely to tell the patient to return only if the problem gets worse.'

They concluded that 'the results lend some support to the hypothesis that GPs located in areas of high competition were more likely to recommend follow-up consultations relative to GPs in areas of low competition, but only for certain medical conditions'. They found various influences on the decision to follow-up including the age of the patient, the age of the GP, the medical condition and the size of the practice, and they only examined four medical conditions, too few for conclusive results.

Evidence that supplier-induced demand in Australia produces over-servicing includes:

- The Health Insurance Commission's Professional Services Review division is responsible for monitoring and preventing significant over-servicing by Medicare providers, and each year identifies providers with practice patterns well above the norms of their peers. There were 456 medical practitioners and 8 optometrists counselled in 1995-96 because of concerns about their practice, and 19 medical practitioners were referred to the Director, Professional Services Review.
- In 1997, Helen Chryssides, a qualified female dentist, reported widespread supplier-induced over-servicing in dental practice. She had her teeth examined by a four-person panel consisting of her personal dentist, an associate professor at the University of Melbourne's dental school, a senior lecturer at the Sydney University dental school, and the Director of the Dental Health Foundation. All four agreed that she had good oral health and the only dental treatment justified would be a clean and scale at a charge of \$60. She then randomly selected 37 dental practices from all States and Territories and presented at each for a check-up and advice on any work that was needed. She said, 'Most of the practices visited tried to sell me better-looking teeth'. Of the 37, only a few did not attempt to over-service, with quotes for work ranging up to almost \$3,000. Gross over-charging was apparent in a number of instances. Two practices suggested she fraudulently claim from her insurer for work not done. By the end of her journey, she says that 16 out of her 28 teeth had been singled out for treatment. Chryssides feels that the high level of over-servicing is due to an over-supplied workforce for a population requiring much less procedural dental work. She says Australia's dental health has improved dramatically in the last 30 years due to the addition of fluoride to water supplies and better dental health education. For example, the number of 12 year olds with cavities has dropped 84% since the 1960s. However, the number of practising dentists increased from 4,550 in 1976 to 7,600 in 1996.
- In January 1998, recruitment agency Morgan and Banks published a survey of 400 wage and salary earners in which 12.4% admitted taking non-genuine sick leave, and estimated that such sick leave was costing the community \$2.56 billion. Two newspapers, the *Sunday Telegraph* and *Sun-Herald*, decided to test the validity of this by sending reporters out to medical practices across Sydney, telling the doctors that they were not sick but wanted to take a day off work. The newspapers reported on 25 January 1998 that 70% of the general practitioners in each sample of ten practices issued sick leave certificates, despite this being both fraudulent and illegal.

One presentation at the 1997 Trilateral Physician Workforce Conference in Canada put the argument that a workforce over-servicing a population may do more harm than good. 'Then, a constrained supply of the specialists is not rationing but *improving* health care.' In the dental situation in Australia, Chryssides argues that this is the case because dentists

unnecessarily replacing old fillings remove healthy tissue and the tooth is further weakened. If amalgam fillings, which last 20 years, are replaced with white fillings, the latter chip and stain and need replacement after 5 to 10 years. The long-term outcome for the patient is poorer oral health status.

In the surgical disciplines, there is an element of risk of adverse outcome with all surgery, including the risk of exposure to infection just in being hospitalised. Hence any surgery unjustified on clinical grounds, whether supplier-induced or patient-induced, will produce a population outcome where a small number of patients will have had an adverse outcome that was avoidable. Thus there are both cost and health outcome benefits in constraining supply so that there is sufficient queuing and waiting for elective surgery to reduce both patient and/or professional demand for unnecessary, non-urgent procedures to be undertaken. Another important reason for constraining surgical supply is that an over-supply of surgeons could lead to inferior care because of lack of practice with complex procedures. However, supply has to be balanced with community expectations of access and reasonable waiting times.

6.6 Growth in marketing effort

Growth in marketing effort is a response to a market becoming increasingly competitive. Marketing of medical services may help achieve better health outcomes through measures such as increasing immunisation and health screening rates, and increasing patient knowledge of health issues. However, in the last ten years medical marketing has developed much more of a commercial edge. Examples include telephone book advertising for special services offered by specified medical practices, weekly metropolitan newspaper advertisements for diagnosis and treatment of particular conditions by registered doctors, and street advertising of bulk-billing availability, while the décor and furnishing of waiting rooms in many medical centres has become much more consumer-oriented.

Australian Doctor (23 January 1998) even offers a guide for general practitioners to increase both consultations from existing patients and market share from other GPs and alternative health care providers.

In the same issue of *Australian Doctor*, a GP predicts that at least some GPs in over-supplied areas ('congested inner-city areas') who cannot, with marketing and improved services, lift their price above the Medicare rebate, 'can expect to go out of business in the coming decade'.

6.7 Under-employment

There were 1,693 male and 3,406 female GPs working fewer than 35 hours per week in 1996, representing 12.2% and 51.3% of the male and female GP workforces respectively. Kilham (1995) and others have speculated that in an over-supplied market a proportion of these GPs were working shorter hours not through choice but through necessity, ie. there was not enough work available. There is no significant evidence of this because no one has tested this hypothesis explicitly in a survey. In 1997 AMWAC contracted Human Capital Alliance Pty Ltd (HCA) to conduct a stratified sample survey by personal telephone interview of male and female doctors to determine initial career preferences, career paths followed and levels of satisfaction with those career paths. This sample of 296 successful interviews encountered a few metropolitan GPs who volunteered during the course of the interview that they were under-employed. The numbers were not significant and further research is needed (AMWAC 1998.4).

6.8 Market restructuring and the failure of recruitment activity to traditional models of practice

The Australian Bureau of Statistics 1994–95 Private Medical Practice Industry survey found that general practices with one or two practitioners had an average operating profit margin of 23.9%, those with 3 to 5 practitioners a margin of 28.3%, and those with 6 or more a margin of 34.1%. Of the 20,825 general practice medical practitioners, 17% (3,491) worked in medical practices that generated up to \$100,000 in total income while 15% of practitioners worked in practices which earned more than \$1 million. The smallest practices had the lowest fee for medical service income per medical practitioner employed (\$34,100). The million dollar practices reported the highest fee for medical service income per medical practitioner employed (\$171,300), and the highest operating profit margin (36.8%).

In the face of market statistics on profitability and the long hours that have to be worked in a small practice to earn sufficient income, it is not surprising to find that when a doctor leaves a small traditional family practice, there is considerable difficulty in recruiting a replacement, as Arnold (1997) explained in *Australian Medicine*. However, there seems to be a widespread view in the medical profession that such difficulty in recruitment demonstrates a shortage of doctors, rather than an end result of market pressures to improve efficiency.

The 7-day per week, extended hour, large group practice, with its entrepreneurial internal and external architecture and marketing can be seen as a market response to the following:

- declining profitability for small practices, as large practices have significantly lower overheads per practitioner, and can also more effectively attract multi-disciplinary health care teams in the one setting, further lowering overheads per practitioner and attracting more 'customers'.
- consumer demand for a more accessible, more consumer-friendly alternative to the waits in the past of up to several hours for after-hours medical care in public hospital accident and emergency departments, which in the 1990s have increasingly encouraged consumers to use such community general medical care.
- labour force moves away from standard hours of work, and to two income families, which increasing demand for convenient hours of medical care.
- consumer demand from family members who do not want to see the family GP for privacy or convenience reasons, eg. teenagers seeking contraceptive advice, or for parents who are both working in a city area and use the convenience of a medical centre near work.
- need by travellers or persons away from their home location for convenient emergency medical care.
- a rising proportion of medical graduates, both female and male, who prefer to work part-time. The salaried practice arrangements of large group practices facilitate this. Arnold (1997) reports that such practices do not have difficulty in recruiting medical staff.
- a shortage of GPs in small practices willing to undertake after hours and locum work, both because of lifestyle and because of safety factors, as increasing levels of drug addiction in the community led to more frequent incidents of robbery and/or assault on pharmacists and doctors at night.

Whether or not this restructuring is good or bad for medical practice is for others to decide. The reality is that restructuring is underway and will continue.

7. Indicators of workforce shortages

Indicators of workforce shortages are in most cases the opposite to those flagging supply in excess of need, and include:

- Numbers of doctors per 100,000 population in a geographic area or health service well below national norms.
- Pricing of medical services significantly above the average.
- Under-servicing and unmet need compared with population norms.
- Higher waiting times.
- Overworked practitioners.
- Dissatisfaction with the stresses of overwork and being unable to fully meet population need.
- Substitution of services by GPs for specialists, and by nurses for GPs.
- Employment of temporary-resident doctors (TRDs) in area-of-need positions.
- Unfilled public hospital positions.

7.1 Numbers of doctors per 100,000 population well below national average

In section 6.1 it was noted that:

- Queensland and Western Australia had just 88.8% and 86.6% of the national provision of 253.8 practising clinicians per 100,000 population; and
- feedback from some Division of General Practice representatives suggests that large rural centres, excluding Whyalla, appear to be adequately supplied with GPs, at a rate of 107.6 per 100,000 population in 1995.

The same feedback suggested that rural and remote areas outside these large rural centres have real workforce shortages. These areas had 82.6 GPs per 100,000 population in 1995. If this provision of 82.6 per 100,000 population was lifted to a large rural town provision of 107.6 per 100,000 population, then the number of practitioners would increase by 1,020 from 3,480 to 4,500. This figure is in line with 1998 estimates of the rural GP shortage by the Rural Doctors Association of Australia and the Royal Australian College of General Practitioners.

However, this rough benchmark calculation does not take into account the following positive and negative influences on requirements:

- significantly higher standardised morbidity and mortality rates in these areas and therefore a greater population need for medical services (section 4.4);
- greater need arising from population dispersion factors (section 4.6);
- Flying doctor and other outreach services which reduce, to some extent, the need for doctors on the ground;
- Medicare data on utilisation patterns which indicates that males in the 'bush' are less likely to visit a GP than males in metropolitan areas and in large country towns. Age-standardised mortality and hospital morbidity data show that these males in fact have greater ill-health and injury than other males. Lower GP visits may therefore represent unmet need from poorer access, or could be a personality trait of 'toughness' that means

males in the 'bush' are far less likely than their metropolitan counterparts to seek primary medical care for minor ailments, even if the care is accessible; and

- many small rural centres of 10,000 to 25,000 people, quite a few of which are designated cities, may have an adequate medical workforce.

In respect of specialists, numbers of resident specialists in rural areas per 100,000 population are considerably below those of metropolitan areas. However, this lower provision has to be carefully interpreted on the basis of the following factors:

- type of specialist;
- population and infrastructure requirements for long-term viable practice;
- outreach services provided;
- patient morbidity and patient utilisation levels compared with metropolitan areas;
- transport linkages to centres providing specialist services; and
- level of substitution by GPs and generalist specialists such as general surgeons.

Further information on the population and other factors influencing sustainability for specialist services is contained in the recent AMWAC report, *Sustainable Specialist Services: A Compendium of Requirements* (AMWAC 1998.7).

In respect of hospital non-specialists, numbers per 100,000 population are not meaningful because of the large scope for substitution of services by GPs and specialists.

7.2 Pricing of medical services significantly above the average

Above-the-norm pricing of medical services in areas of shortage was demonstrated in *Australian Medical Workforce Benchmarks* (1996) where the average co-payment for GPs in major rural areas was 12.2%, in minor rural areas 11.3%, and in remote areas 19.5%, compared with 7.5% in capital cities and 7.3% in other metropolitan areas.

Dr Andrew Jackson (*Australian Doctor*, 23 January 1998) says that in well-supplied inner city areas, an increase in price will deter patients from presenting and the practice will lose patients, as happened to an inner Sydney practice which was forced to reintroduce bulk-billing or go broke (*Australian Doctor*, 5 December 1997). In areas of shortage, Jackson says that practices can generally increase fees and raise revenue, without losing significant numbers of patients, particularly if patient services are improved.

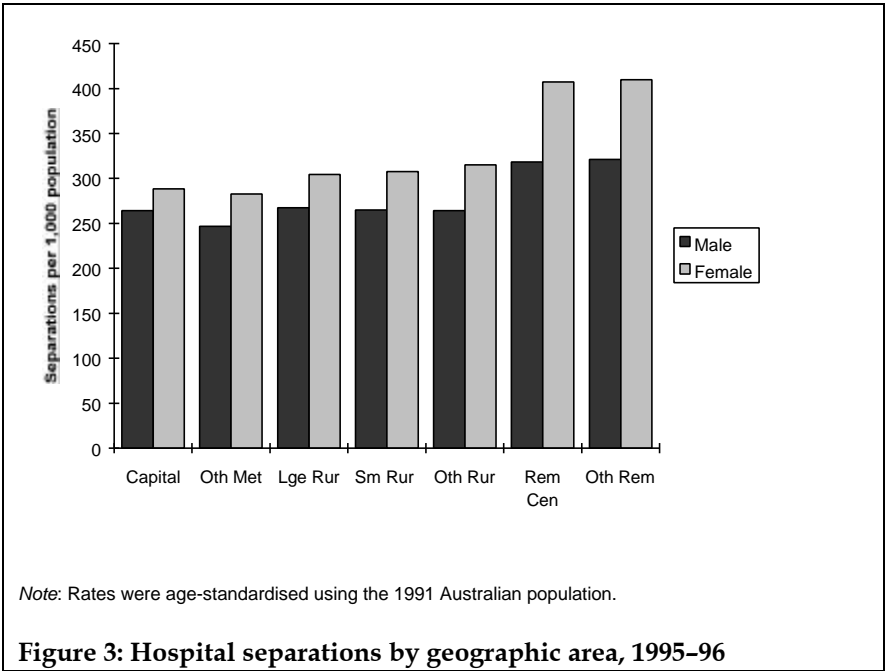
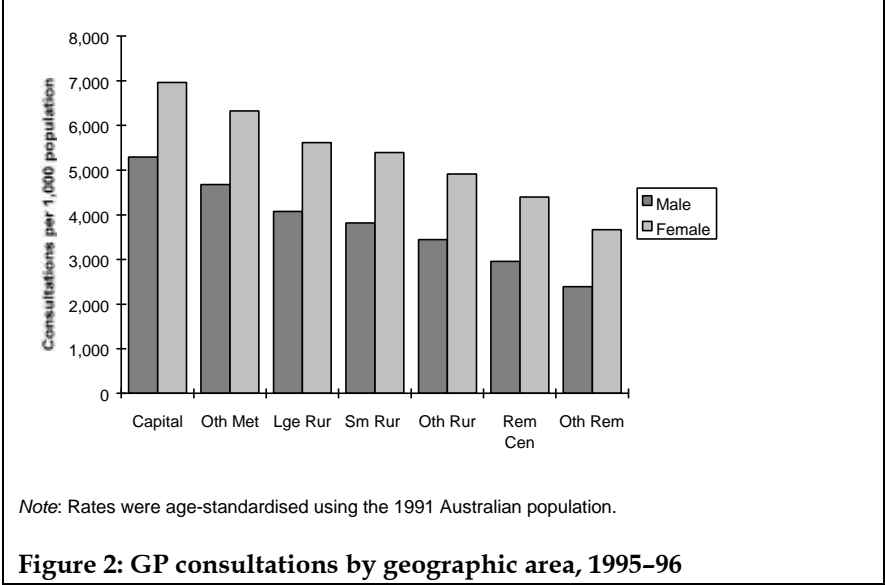
Paterson (1994) noted that it seemed to be too much of a coincidence that the medical specialities that appeared to have the greatest shortages also had the highest co-payments. However, inter-relationships between level of supply, provision of services, price of services, cost of production of the service, private health insurance coverage and other factors are complex for the medical specialties and therefore simple relationships are difficult to establish with confidence.

7.3 Under-servicing and unmet need compared with population norms

AIHW analyses of Medicare data for AMWAC studies of specialties have consistently found a lower coverage of the rural population receiving specialist services, while numbers of GP consultations per person are much lower (table 18, appendix 1). This is only partly due to the exclusion from Medicare statistics of Aboriginal people receiving care from Aboriginal health services. There is also an unknown effect from possible differences in private health insurance coverage between rural and urban areas. However the 1997 AIHW report *Rural*,

Remote and Metropolitan Health Differentials: A Summary of Preliminary Findings shows that this is countered by higher rates of hospitalisation for rural people.

The 1995 Australian Health Survey found that, during a two-week period, 22.0% of metropolitan residents consulted a GP and 4.5% a specialist, 18.6% of residents of rural centres consulted a GP and 3.0% a specialist, and 18.9% of residents of other rural and remote areas consulted a GP and 3.1% a specialist (table 24, appendix 1).



Because AMWAC has yet to find evidence of over-supply of specialists in metropolitan areas, the lower percentages for rural populations consulting specialists suggest unmet need, although these may also mean that specialist services are in fact being adequately delivered to rural residents, but less frequently, or through GPs as substitute providers.

The GP figures in table 24 showing 18.6% of the population in rural centres, and 18.9% of other rural and remote populations, consulting a GP in a fortnight do not suggest under-servicing, although below the 22.0% of the population in metropolitan centres consulting a GP during the same period. However, Medicare data show that the more remote the locality, the less likely the GP service is rendered by a resident GP. In 1995–96, 98.1% of the GP consultations of capital city residents were provided by capital city GPs. For residents of ‘other remote’ areas, only 64.5% of their GP services were provided by a GP from an ‘other remote’ area, with 11.0% provided by a capital city GP, either on an outreach basis or through the patient travelling to attend the GP (table 25, appendix 1). Not having sufficient resident GPs to fully meet local needs may be considered by such populations to be an unmet need.

For GPs whose practices were in an ‘other remote’ area, 83.8% of consultations rendered were to ‘other remote’ area residents, with 4.9% to capital city residents, who may be casual or temporary visitors to the remote area, or patients of GPs who moved to and from capital cities during a year.

7.4 Overworked practitioners

Average weekly hours worked, and on-call not worked, are much higher for rural practitioners than for metropolitan. The percentage of doctors working 60 hours a week or more rises with distance from a capital city.

In *Medical Labour Force 1996* (AIHW, 1998) the hours worked by different types of clinicians are examined in some detail. The report found that:

- 10.1% of clinicians reported working 65–79 hours per week and a further 4.5% reported working 80 or more hours.
- 56.1% of interns and resident medical officers worked 50–64 hours while 15.3% worked 65 or more hours per week. The AIHW medical labour force survey does not collect data on the length of shifts worked.
- 49.1% of specialists-in-training worked 50–64 hours per week, while 20.6% worked 65 or more hours.
- 41.2% of specialists worked 50–64 hours per week, while 17.0% worked more than 65 hours per week. In the surgical specialties, 28.7% of doctors worked 65 hours per week or more, compared with 19.7% in internal medicine, 4.9% in pathology specialists and 12.8% in other specialties. The main specialties in which practitioners worked 65 hours a week or more were cardiothoracic surgery (44.8%), vascular surgery (34.0%), orthopaedic surgery (30.7%) and paediatric surgery (30.1%).
- 32.4% of primary care practitioners worked 50–64 hours per week, while 11.5% worked 65 or more hours.
- 32.4% of salaried hospital career practitioners worked 50–64 hours per week, while 11.2% worked 65 or more hours.
- The highest proportions of doctors reporting working 80 or more hours per week were surgeons (9.6%), specialists-in-training (6.6%), internal medicine specialists (5.6%), and interns and resident medical officers (5.1%).

In Europe legislation has been introduced in some countries for patient and doctor safety reasons to reduce the maximum hours that could be worked; since 1996, the Australian Medical Association has been developing a safe working hours policy in a campaign to reduce excessive hours worked by junior doctors.

7.5 Higher waiting times

A consultancy study on rural general practice by Intstat Pty Ltd (1997–98) has found anecdotal evidence from Divisions of General Practice of waiting times of up to a week or more for non-urgent consultations in areas where there are GP shortages.

The National Waiting Times Data Collection on public hospital waiting times in Australia in 1995–96 found waiting and clearance times above the norm in specialties assessed by AMWAC as experiencing shortages: ophthalmology, urology, orthopaedic surgery, and ear, nose and throat surgery (*Australia's Health 1998*, pp. 205–09).

7.6 Dissatisfaction with the stresses of over-work and being unable to fully meet population need

The 1997 AMWAC career paths survey of medical practitioners has found dissatisfaction among solo rural practitioners about being overworked (AMWAC 1998.4). The National Centre for Epidemiology and Population Health survey of GPs in 1995 reported that 24.8% of GPs experienced dissatisfaction arising from workforce shortages.

7.7 Substitution of services by GPs for specialists, and by nurses for GPs

In rural areas outside of the large country towns, rural GPs substitute to a significant extent for specialists by undertaking higher levels of procedural work than their metropolitan counterparts, who would refer much of the procedural cases to specialists instead of doing it themselves. In remote areas specified by State health authorities as experiencing significant GP shortages, nurses have special powers for a limited range of prescribing and other activities normally undertaken by a GP.

7.8 Distance to medical services

In its 1994 national survey of Aboriginal and Torres Strait Islander health, ABS used access to services within a distance of 25 km to measure apparent deficiencies in access. It found that in all States and Territories and across all regions, doctors were available either on a permanent or visiting basis in the majority of cases. In each State fewer than 10% of Aboriginal and Torres Strait Islander people did not have a doctor, either permanent or visiting, within 25 km. In rural areas, service provision was least satisfactory, with over 15% of people in private dwellings not having a doctor available to them within 25 km, and only one in three people having a permanent doctor within that distance.

In rural areas, 78.1% of Aboriginal and Torres Strait Islander people did not have access to a mental health service within 25 km, either permanent or visiting, 44.7% to an antenatal service, 40.7% to a diabetic service, 35.1% to a women's health service, 17.1% to a baby health service, 55.5% to a health promotion service, and 47.5% to a sexually-transmitted diseases clinic. However, in the Northern Territory, Aboriginal health workers were available within 25 km to 93% of people.

7.9 Under-representation of Aboriginal doctors in the workforce

The overseas literature suggests that the medical workforce should have an adequate representation from ethnic and racial minorities where the practice of medicine is enhanced by cultural understanding and cultural communication skills.

Aboriginal and Torres Strait Islander people represent 2% of the Australian population and are the most disadvantaged population group in Australia as measured by their health and socioeconomic status indicators. However, there are relatively quite few Aboriginal medical practitioners, and, while the numbers of Aboriginal medical students have been increasing, they represent less than 1% of medical student intakes. At the 1996 census, there were 29 Aboriginal and Torres Strait Islander GPs, 20 specialists, 12 doctors-in-training and 21 medical administrators enumerated. The GPs and specialists represented 0.1% of the medical workforce.

7.10 Employment of TRDs in area-of-need positions

Area-of-need positions, filled by temporary-resident doctors because they were unable to be filled by Australian medical graduates, represent shortages of Australian permanent resident graduates willing to do these jobs. In 1995-96, a total of 980 migrated to Australia for employment. They were mainly employed in Queensland and Western Australia, the two States with medical workforce numbers per 100,000 population significantly below the national average. In 1996-97, the number of TRDs who arrived in Australia for employment increased to 1,597.

8. Indicators of a workforce in balance

A medical workforce in balance in a geographic area or health care institution has neither signs of significant workforce excess or significant workforce shortage. However, there may be segments within an otherwise balanced workforce where there are clearly shortages, eg. doctors unwilling to undertake home visits late at night, to work every weekend, to undertake locum work far from home, and to work in the public hospital system for extended periods.

In the international benchmark literature, a medical workforce in balance in a particular geographic area or health care service, and considered a suitable benchmark, has the following features:

- It is 'lean', ie. the workforce is adequate to meet population need without significant evidence of shortages or poor health outcomes, and is at the lower end of provision in terms of numbers of active doctors per 100,000 population compared with other areas and similar populations.
- The price of medical services has not been forced down to the floor price, nor has been set at a level high enough to discourage patients because the practitioners are overworked. One might therefore expect that in a locality where the medical workforce is in balance that, while health card holders and disadvantaged people might be bulk-billed, GPs should successfully be able to charge a co-payment to patients who are financially well-off. However this would be influenced by the degree of entrepreneurial action within the locality by individual practices wishing to increase market share.
- Doctors working long hours are doing so by choice and not necessity, and doctors working short hours are also doing so by choice and not because of under-employment.
- There is general (but not universal) satisfaction with remuneration, hours of employment, patient care provided and health outcomes.
- It is an efficient workforce where there are waiting times accepted by the community.
- Workforce growth is in line with need indicators such as population growth, ageing of the population, and research and technology advances which improve health outcomes.

Issues for discussion and feedback are:

- Most medical specialties claim to have workforces in balance or suffering from small shortages. What appear to be shortages measured by hospital waiting times in certain specialty areas are claimed to be mainly due to funding restrictions by hospital authorities, rather than inadequate workforce capacity.
- In primary care, as already discussed, the GP workforces closest to being in balance may be the large rural centres, namely Albury-Wodonga, Dubbo, Lismore, Orange, Port Macquarie, Tamworth, Wagga Wagga, Ballarat, Bendigo, Shepparton-Mooroopna, Bundaberg, Cairns, Mackay, Maroochydore-Mooloolaba, Rockhampton, Toowoomba, and Launceston. However, quite a number of the small rural centres such as Armidale, Bathurst, Nowra-Bomaderry, Morwell, Wangaratta, Gladstone, Noosa, Mandurah, and Devonport may also be adequately supplied. This will need further feedback and analysis.
- In a hospital, a medical workforce with low funded vacancy rates is seen to be in balance. However, excessively long hours worked (greater than 60 hours per week) by a significant proportion of the workforce, based on traditional practice, would appear to present risks for both optimum patient health outcome, and optimum provider health

outcome. This suggests that the traditional view of a balanced hospital workforce would fail some of the key indicator tests listed.

9. Further labour market issues

9.1 Uneven workloads and varying work patterns

A principle of primary care medical workforce provision proposed by the 1988 Doherty Committee was that it is far better to have a few too many GPs than not quite enough (Committee of Inquiry into Medical Education and Medical Workforce, 1988). Outside the densely populated metropolitan areas, the Australian population is not distributed in neat workloads for individual practitioners. In reality a small town with a catchment population that has a patient workload of 120% of that desirable for a full-time GP can normally at best hope for one full-time GP, much the same as a town with perhaps 80% of a desirable workload. Larger towns do not have workloads than neatly fit to two, three, four or five GPs.

Furthermore, the practice patterns of individual doctors vary considerably. For example, a doctor with teenage children attending a boarding school is much more likely to be prepared to work long hours to meet his family financial commitments, than a doctor whose life cycle has passed that phase, or a doctor under 35 years of age with a very young family involved in shared child rearing activities.

Hence having some surplus capacity to fit together the rough edges of workforce and population is highly desirable. However, the geographic areas in most need of this surplus capacity are rural areas experiencing shortages. In Western Australia, rural GP shortages have largely been solved by drawing on surplus capacity in Perth to provide locum and other support services to the longer term resident GP workforce (personal communication, Dr Brian Williams, Director, Western Australian Centre for Remote and Rural Medicine, 1996).

9.2 Elasticity of work effort

Richard A Cooper MD (1995) noted large over-supply in a number of States of the USA compared with the national norm. In respect of these he said:

Unlike other labour markets where surpluses lead to unemployment, the elasticity of physician work effort tends to reduce the general level of effort among physicians, masking true surpluses. The magnitude of this elasticity is unknown. Questions persist concerning how physicians will change their work effort to accommodate their own lifestyle preferences and to compensate for physician surpluses in their communities.

What does this mean in plain English? In Australia, new entrants to the GP workforce have been relatively more likely to join an over-supplied workforce in a capital city than start in a rural or remote area experiencing shortages (table 7). Many of the new entrants, if not most, have provided the staff for the large, profitable extended hour medical centres. None of the new entrants need become unemployed because of what it is termed the elasticity of the market.

This elasticity means that, even though the market has a much higher number of doctors per 100,000 population than rural cities experiencing no shortage of doctors, expansion of the patient workload occurs to make medical practice viable, although profitability may suffer for some practices. Despite fewer patients on average per doctor, the overall patient workload expands through activities including the following, a number of which represent improvements in patient care:

- established practices with fewer patients filling vacant bookings by encouraging patients to make return visits to check on progress;
- encouraging or directing patients with multiple problems to make multiple visits;
- expanding the volume and range of subspecialty practice areas, such as acupuncture, Chinese medicine, counselling, sex therapy, impotence clinics, family planning, travel medicine, sports medicine, medico-legal activity and others. A number of these are advertised GP services in phone books and newspapers in capital cities that would seldom be advertised as services in rural areas;
- where not already done, introduction of patient follow-up and public health marketing for preventive medicine activities such as pap smears, vaccinations and check-ups;
- introduction of new technology and new medical knowledge allowing conditions to be treated successfully for the first time, or in new ways for the first time; and
- over time, ageing of the population increasing the numbers of consultations needed. However, this is offset by what demographers describe as the 'doughnut' effect, ie. declining populations in inner city suburbs. The average household size of inner city populations drops as children grow up and leave home, while most young families reside in the mortgage belt outer suburbs. As the mortgage belt suburbs age and children grow up and leave home, the inner area of declining or stable population expands. Redevelopment of these areas tends to only slow down rather than arrest the population decline. However, these inner areas of the metropolitan doughnuts have the highest residential concentrations of doctors.

9.3 High inner suburb concentrations

The highest concentrations of GPs are in the inner suburbs of the metropolitan areas. These suburbs have declining average household size and ageing populations. The lowest metropolitan concentrations are in the new, rapidly growing, outer, mortgage-belt suburbs (*Australian Medical Workforce Benchmarks*; table 26, appendix 1). For example, in Sydney the Eastern Suburbs statistical subdivision had the lowest patient workload per FTE GP in 1994 (785 standard whole-patient equivalents), lowest population per dwelling (2.41), a low population proportion under 15 years of age (13.7%) and a high population proportion aged 65 or more (17.4%). In contrast, Fairfield–Liverpool had the highest patient workload per FTE GP in 1994 (1,155 standard whole-patient equivalents), highest population per dwelling (3.28), high population proportion under 15 years of age (24.1%) and low population proportion aged 65 or more (11.3%).

The reasons for high concentrations of general practitioners in inner city areas include, not in any order of relative importance:

- historical;
- lifestyle-related: access to amenities, shopping, theatre, restaurants, major sports facilities etc.;
- spouse-related: greater employment opportunities for spouses who are professionals;
- child-related: better access to secondary and tertiary education services;
- professional, family and social ties and ambitions; and
- economics. Demand for bulk-billing is very high from young families with heavy mortgage commitments in the new, mortgage belt suburbs. The economics of long-term financial viability from bulk-billing at a new practice in an outer suburb are that it probably needs to be a large, group practice with extended, or 24 hour, 7 day per week

opening hours. The medical entrepreneur making the capital investment to establish such a practice may only afford to pay relatively low salaries, whereas what is needed is a premium to compensate for living in an area without the lifestyle, spouse employment and education access opportunities of inner city living. In contrast, inner city group practices in high socioeconomic areas can, for the most part, successfully charge patient co-payments, only bulk-billing low income earners. For example, in Sydney in 1994, high socioeconomic Hornsby-Kuringai had an average GP co-payment of 12.9% compared with the 2.7% for low socioeconomic inner Sydney and 5.6% for mid-socioeconomic outer Western Sydney. In the inner suburbs, there are likely to be sufficient numbers of older GPs retiring and new entrepreneurial 24 hour medical clinics starting up to offer a sizeable annual job market for new GPs coming into the labour market.

Dr Jack Sparrow, Chief Medical Officer, Tasmanian Department of Health and Community Services notes that these reasons also apply to the rural medical workforce, and they cannot be solved passively by market forces, because market forces (including the lifestyle and family influences listed) are responsible for the disincentives for practice in outer metropolitan and rural areas. He points to the limited success of Commonwealth, State and local government financial and other incentives in increasing the rural GP workforce (table 7 and figure 1). However, for further improvements to occur, he feels that research and policy consideration should be given to additional incentives and disincentives, including geographically based differential medical rebates and geographically restricted provider numbers (Dr Jack Sparrow, comments on draft of this paper). The option of measures to compel doctors to work in rural areas if current incentive schemes do not work has been raised by Dr Brendan Nelson MP, chairman of the Commonwealth Government's health committee, in a meeting on 11 March 1998 with the AMA and Rural Doctors Association of Australia to discuss increasing rural medical workforce (Canberra Times, 12 March 1998). New rural doctor initiatives announced by the major parties in the 1998 federal election campaign included retention incentives for rural doctors (the Government) and bonded scholarships for medical students (the Australian Labor Party).

In addition, Dr Bill Coote, AMA Secretary-General, argues that the GP recruitment difficulties of metropolitan areas will not be solved by adding more and more GPs to capital city workforce supply. The remuneration and other disincentives must be addressed first; otherwise the market, lifestyle, family and professional influences discussed work against the additional GPs practising where they are most needed and exacerbate over-supply problems (comments on draft).

9.4 Effect on recruitment of medical labour market elasticity

Because a new practice can start up in an over-supplied area and the market responds by increasing the volume of patient consultations for the area, there is no pool of unemployed doctors waiting for jobs, other than a small pool of doctors at any point in time who are new entrants or re-entrants to the workforce. Hence when vacancies are created in practices, whether in under-supplied, adequately supplied or over-supplied areas, there will be difficulty in recruitment, particularly at those times of the year when new fellows of the RACGP are not entering the market. Inability to recruit cannot therefore be taken as prima facie evidence of workforce shortage in areas which overall are well supplied with GPs. However, the pool of new RACGP fellows entering the labour market has been cut back to 400 per year, and the net increase in the GP workforce had declined from 594 in 1990-91 to 170 in 1995-96 and 150 in 1996-97. Recruitment for this smaller new graduate pool is therefore much more competitive than in the early 1990s, particularly because the demographic profile of new graduates has changed. One outcome of this is that incentives

for employment in less attractive areas may need to be stronger to attract doctors from this smaller new entrant pool.

9.5 Factors contributing to excess supply

Kilham (1995) says that there are a number of factors which have contributed to excess supply in Australia, further factors which are adding to the over-supply, and several which are helping to absorb over-supply. These provide an additional understanding of the medical labour force market.

He attributes past excess supply to:

- too many medical graduates;
- too many medical immigrants;
- lower population growth because of a slowdown in birth rates and lower immigration;
- productivity growth through new technology; and
- changes in care patterns with shorter average patient stays in hospital and rising use of day surgery.

He says particular problems have arisen in the GP area because of:

- lower barriers to entry to the workforce until recently, compared with the specialties;
- incursions by specialties into what GPs do; and
- incursions by para-medical professions.

He feels that factors adding to over-supply include:

- population growth slowing even further;
- new medical technologies markedly reducing the costs of care and substantially increasing the productivity of the medical workforce;
- possible expansion of managed care arrangements in the private health care sector; and
- possible widespread introduction of health care rationing by governments.

9.6 Factors absorbing excess supply

Factors Kilham sees as helping to absorb some of the excess supply include:

- increased demand for health care as household incomes rise;
- new medical technologies which push back the boundaries of feasible treatments and ferment demand;
- the ageing of the population;
- the rising female percentage of the medical workforce, coupled with a rising proportion of the workforce part-time; and
- measures to address the shortages in rural and remote areas and measures to address the shortages in some specialties.

9.7 Demand for services of the best performers

In *Australian Doctor* on 27 February 1998, RACGP President Dr Peter Joseph asked why, if the GP workforce is in over-supply, it cannot keep up with demand. His particular interest

was in the future of GPs practising 'quality general practice', as opposed to 'rapid turnover' practice.

In any field of service provision, the service providers who provide the best customer service outcomes will generally generate the highest levels of demand for their services. Assuming equal levels of marketing of services, the best restaurants within each price and taste range will attract the most customers, the best surgeons the largest waiting lists, the best radio announcers the highest ratings, the best musicians the largest audiences, the best football teams the greatest crowds, and so on.

In general practice, and in primary care in general, word-of-mouth assessments and referrals may be expected to contribute greatly to the level of demand for the services of any individual GP, physiotherapist, chiropractor, masseur or other provider. In 1995-96, only 35.7% of patients consulted just one GP, with more than one-third consulting three or more. This demonstrates widespread exposure by the population to more than one GP. Those with high patient satisfaction levels will be more likely to generate high return visits and high rates of word-of-mouth recommendation. The reverse will be true for GPs with low patient satisfaction levels. However, it is also true that standards for medical registration in Australia are very high, and, for ad hoc episodic GP attendances for minor ailments, the 24 hour medical clinic may adequately and conveniently meet the needs of much of the population, despite the fact that the consumer may see a different doctor each time.

Table 9: Medicare: number and percentage of patients by number of general practitioners consulted, 1995-96

	Number	Per cent
Not consulting a GP	3,051,421	16.3
Consulting a GP	15,657,944	83.7
Number of GPs consulted:		
1	5,594,954	35.7
2	4,319,724	27.6
3	2,575,953	16.5
4	1,417,469	9.1
5 or more	1,749,844	11.2
Total	15,657,944	100.0

Source: Health Insurance Commission.

In summary, in a market where Dr Joseph argues that the economics of bulk-billing and the level of the Medicare rebate have forced more and more GPs to a 'rapid turnover', 'commercial model' of general practice, it can be argued that:

- demand might be expected to increase for GPs who still provide longer consultations and good outcomes for patients with more severe, chronic or complex problems, especially if the numbers of such GPs are declining and if rapid turnover practices are less likely to provide enough consultation time to these patients; and
- consumer demand will also be strong for free, quick turnover, short waiting time, open-all-hours, GP services for patients needing a quick service such as a medical certificate and medication for a respiratory illness, the most common reason for a GP consultation in the 1995 national health survey.

9.8 Government financial and regulatory incentives

Given the high level of rural medical workforce shortage documented in *Australian Medical Workforce Benchmarks* (1996), and the strong market forces discussed in this paper which act to maintain that maldistribution, government financial and regulatory incentives have a major role to play in providing adequate medical services to the rural population.

The three tiers of government all offer, to a greater or lesser extent across the States and the Northern Territory, incentives to attract practitioners to rural practice.

The Commonwealth Government's General Practice Rural Incentives Program has five principal elements:

- relocation grants – one-off incentive grants of \$20,000 to GPs to assist in relocation from well-serviced areas to identified under-serviced areas;
- training grants – individually based grants of up to \$78,000 for relocating GPs or those already in rural practice, to allow GPs to upgrade their skills in areas necessary for rural general practice;
- remote area grants – up to \$50,000 per annum, for GPs practising in isolated and difficult areas where the economic base of the practice may be marginal and there are increased professional difficulties;
- continuing medical education/locum grants – to encourage rural GPs to maintain and increase skills in areas relevant to rural practice and to obtain leave; and
- rural undergraduate support grants.

Family support and other specific purpose grants have also been made (*DHFS 1997a*).

Commonwealth government 1996–97 budget measures included:

- in addition to \$15 million per year for the GP Rural Incentives Program, \$20 million per year in real terms to rural hospitals and medical schools to fund projects to provide opportunities for medical undergraduates and graduates to train and work in rural areas;
- \$27 million over four years for six university departments of rural health to be established;
- \$1 million over four years for improved availability of locum services so that rural doctors are able to take leave and undertake further training and continuing education;
- nearly \$4 million over four years for up to 150 scholarships per year under the newly introduced John Flynn Scholarship scheme which will enable medical students to spend time training in a rural area;
- continued funding of Health Jobs Australia, a pilot national medical vacancy system;
- the Advanced Specialist Training Posts Program which aims to improve access to specialist medical services in rural areas by establishing new specialist training posts in major rural centres; and
- continued grant-in-aid to the Royal Flying Doctor Service.

In 1997, the Commonwealth Government provided funds for training of 100 permanent resident overseas-trained doctors unable to gain Australian registration, providing these doctors work in rural areas on completing their training.

State Governments have a significant role to play through their salaried and contract staffing arrangements for rural hospitals, including the level of accident and emergency and outpatient department services. These arrangements vary from State to State. A number of

State Governments subsidise the indemnity insurance premiums of rural general practitioners to ensure that obstetrics practice is financially viable for these practitioners.

It is becoming more and more common for a local government body to attempt to attract a GP to practise in a town without a doctor by offering a significant incentive package such as a house and surgery and spouse support service.

The limited success of these measures in increasing workforce numbers and patient access can be seen in the data in tables 7 and 8.

9.9 Self-management

During the last decade, specialist colleges have made a major effort to organise networks of outreach services to rural populations, and thereby ameliorate the disadvantage to rural communities of low numbers of resident specialists.

In general practice, Divisions of General Practice are becoming more involved in examining workforce provision and addressing shortages.

9.10 GP and OMP turnover and length of stay

The rates of both turnover and retention have a major effect on the labour market in both rural and urban areas. GP and OMP turnover and length of stay were analysed by geographic area in *General Practice in Australia: 1996*. From 1985–86 to 1994–95, annual GP and OMP turnover increased in remote areas from around 20% to more than 30%, but annual turnover in all other categories of rural area was steady at around 10 to 15%. A major contributor to the high turnover in remote areas would be completion of contracts by temporary-resident overseas-trained doctors filling area-of-need positions.

Rural areas had 62% of GPs and OMPs remaining in the same area after one year, declining to 25% after nine years; retention rates were lower for remote areas.

9.11 Summing up: the macro versus micro conflict

In summary, the distribution of the medical workforce in Australia is characterised by the following.

- Under current health system structure and remuneration, there are economic and social market forces which act against distributing the medical workforce equitably to meet population need in the geographic regions of Australia.
- Efforts being made to counter these economic and social market forces include incentives and support services offered by government authorities; control of global supply inputs by government; self-management of service imbalances by specialist colleges and other professional bodies; medical entrepreneurs and others restructuring the market place; and medical schools revamping both student intakes and training.
- Real growth in national and household wealth does not appear to be keeping up with increasing patient demand for health services expenditure mainly arising from population growth, population ageing, new drugs and new technology extending treatment boundaries and improving existing treatment protocols, and increased public health awareness. Hence there is pressure in the current budgetary climate to constrain growth in government outlays on health services.
- There have been very significant gains in improving access to medical services in rural and remote areas. However, these gains have been accompanied by even greater gains in

GP medical workforce provision per 100,000 population to metropolitan areas considered to be experiencing over-supply in the mid-1980s.

- Such workforce increases in general practice in metropolitan areas are of public policy concern because of perceptions of diminution in quality of care, of levels of servicing over and above servicing to improve health outcomes, and of expenditure on the latter which might be better spent elsewhere. The increases are of private practitioner concern because of fewer patients per doctor, and competitive pressure to universally bulk-bill and change medical practice to less satisfying medicine to maintain income.
- Constraining future growth in the metropolitan GP workforce is therefore highly desirable, but reductions in RACGP training output appear to have diminished the flow of new GP graduates to under-served rural areas, created frustration amongst metropolitan practices unable to obtain locums or fill genuine vacancies, and not been welcomed by junior hospital doctors denied access to provider numbers for private practice.
- Stronger incentives may therefore be needed to attract new workforce entrants from a smaller pool to less attractive workforce positions with high patient need. Action taken by medical schools to produce graduates more likely to work in rural areas will take more than a decade to begin to make an impact.
- A more rapid restructuring of the GP workforce in metropolitan areas from a present majority of small practices to large group practices may address some of the micro problems of the metropolitan workforce.
- Specialist colleges appear to have achieved significant success in addressing under-servicing of the rural population by self-managing service provision with outreach programs (AMWAC 1998.7). There are strong labour market demographic, lifestyle and social and peer support reasons why it is highly unlikely that rural and remote areas will ever have 'enough' resident general practitioners. Divisions of General Practice across Australia, supported by other medical bodies and government, would appear to provide the infrastructure needed to facilitate self-management outreach programs to rural populations which may assist in overcoming apparent under-servicing. The Western Australian Centre for Remote and Rural Medicine has claimed considerable success in this field in that State.
- Studies by the New South Wales Health Department on the role of nurse practitioners indicate that an enhanced role and greater participation by registered nurse practitioners have the potential to relieve medical service provision pressures in rural and remote areas and in public hospitals.

10. Data issues

Australia has the most comprehensive range of medical workforce data collections of any country in the world. Only the United Kingdom with its highly regulated National Health Service and a few other European countries appear to have comprehensive annual data collection, and their health systems are different to Australia's. New Zealand has a labour force survey at registration only every three or four years, and the content is not as comprehensive as that in the Australian survey. In Canada and the United States, only a few provinces and States undertake detailed medical workforce data collection; the national population census and some limited administrative databases appear to be the primary sources of medical workforce data.

The Australian Institute of Health and Welfare has produced a paper which summarises Australia's medical workforce data collections, discusses strengths and weaknesses and outlines possible processes and time frames which may be considered to improve coverage and quality of data (AIHW cat. HWL8).

Since *Australian Medical Workforce Benchmarks* was released in 1996, more recent and more comprehensive data and information have become available from many sources:

- the AIHW national labour force survey (1995, 1996 and 1997 data);
- Medicare 1995–96, 1996–97 and 1997–98 data;
- the ABS 1994–95 survey of medical practices;
- the ABS 1995 national health survey;
- the ABS 1996 national population census;
- the AIHW-AMWAC report *Female Participation in the Australian Medical Workforce* and subsequent AMWAC report *Influences on Female Participation in the Australian Medical Workforce* (AMWAC 1998.4);
- the AIHW-AMWAC report *Characteristics of Students Entering Australian Medical Schools 1989 to 1997* (AMWAC 1997.7);
- AMWAC reports on the workforce requirements of several additional specialties;
- the AMWAC report *Sustainable Specialist Services: A Compendium of Requirements* (AMWAC 1998.7);
- Department of Health and Family Services' 1996 and 1997 reports on general practice in Australia;
- Health Insurance Commission annual statistical reports for 1995–96 and 1996–97;
- the ABS-AIHW report *The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples*;
- the AIHW report *Rural, Remote and Metropolitan Area Health Differentials: A Summary of Preliminary Findings*.
- the AHMAC report *Australia's Health System in 2010*;
- the first report of the Medical Training Review Panel (MTRP); and
- the 1998 AIHW and National Centre for Epidemiology and Population Health report *Expenditures on Health Services for Aboriginal and Torres Strait Islander People* by Deeble et al.

Internationally a number of reports have been published on medical workforce benchmarking and other methods of medical workforce planning in other countries. In November 1997, Professor John Horvath, Chair of AMWAC, attended the second Trilateral Physician Workforce Conference for the USA, United Kingdom and Canada, at which a range of relevant papers were presented. Professor Horvath reported from this conference that Australia's information systems on the medical workforce are much more advanced than those in Canada and the USA.

Nevertheless, there are gaps in medical workforce information in Australia that limit, to some extent, ability to analyse supply and demand. Some of the main gaps include:

1. General practice morbidity and treatment data

The most recent study of general practice service provision in Australia collecting data on morbidity and treatment was the Australian Morbidity and Treatment Survey 1990-91 conducted by the Family Medicine Research Unit (FMRU) of the University of Sydney. The FMRU, in collaboration with the AIHW, commenced a new continuous study in April 1998, using a sample of 1,000 randomly selected active VRGPs, each recording 100 consecutive consultations, to provide an annual database of 100,000 encounters.

2. Duration of consultation and weeks worked per year

Estimation of how many GPs are required to service a given consultation workload would be assisted by data on duration of consultations and numbers of weeks worked per year in patient care by type of practice. The Medical Benefits Schedule is unhelpful as well over 90% of consultations are level B, which involves one or more problems of less than 20 minutes. No other data on duration of consultation are collected.

3. Responsibility for patient treatment in hospitals

The national hospitals data collection does not identify the health professionals principally involved in providing the care. For example, for an uncomplicated birth in a hospital, it is not known whether the baby was delivered by a midwife, a junior hospital doctor, a Career Medical Officer, a Hospital Medical Officer, a GP, or a visiting obstetrician. This makes planning the future workforce requirements for obstetrics services very difficult.

4. VRGPs and OMPs practising mainly in other fields

Medical practitioners classified on the basis of their billing activity as VRGPs and OMPs by the Health Insurance Commission include up to several thousand doctors whom Divisions of General Practice would not consider as active general practitioners for the purpose of Division workforce planning on the basis of their main activity and/or on level of activity. While numbers of hospital doctors and other non-GPs can be estimated reasonably well at the national level by comparing Medicare and national labour force survey statistics for GPs and OMPs, this is not the case at the local area level where Divisions want reliable up-to-date workforce numbers for active providers of defined general practice services. What constitutes these defined GP services is unclear but they may exclude GPs practising mainly in specialised fields of primary care such as impotence clinics, public health medicine, and travel medicine.

5. Waiting times for specialist consultations

Waiting times for non-urgent consultations are considered an important indicator of the adequacy of workforce supply for specialist services. Although national data are collected for hospital waiting lists and waiting times, data are not routinely collected on waiting times by specialty for non-urgent consultations in private rooms. Several AMWAC specialist reviews have collected these data on a one-off basis by surveying Fellows of the relevant specialist colleges.

Feedback will be welcomed on other gaps in data.

11. Some methodology issues in benchmark analysis

11.1 Overview

Australian Medical Workforce Benchmarks (1996) found that in 1994 there was considerable maldistribution of the Australian medical workforce. The review of the international literature in this discussion paper confirms that the methodology used was fundamentally sound but can be strengthened in several areas, and that the problem of maldistribution is an international one where possibly only the United Kingdom with a highly regulated medical workforce does not suffer from similar problems to Australia.

There continues to be the need to reconcile macro decisions on long-term medical student and migration numbers and micro decisions on distortions of supply. This reconciliation includes taking into account factors which will influence these distortions over time, including:

- population growth and ageing of the population;
- increased demand as household incomes rise;
- new medical technologies;
- a rising proportion of female doctors in the medical workforce;
- any decisions taken by public hospitals to reduce the hours worked by junior hospital doctors, an issue highlighted by the safe working hours campaign being developed by the AMA;
- government announcements in the 1996–97 budget papers that:
 - i. From 1 November 1997, temporary resident doctors will not be able to be deemed as ‘medical practitioners’ for Medicare purposes unless they have relevant overseas postgraduate qualifications in their field;
 - ii. No temporary resident doctors will be deemed as medical practitioners for Medicare purposes after 1 January 2000;
- lack of access by junior hospital doctors to Medicare provider numbers until they are accepted into a recognised GP or specialist training program;
- the introduction of a postgraduate medical degree in a number of medical schools. This will shorten the working life of medical graduates of the future as new graduates will be older on average than in the past;
- changes to the role of general practitioners in the health system:
 - coordinated care trials underway are testing alternative roles for GPs in coordinated care models for patients with chronic conditions;
 - After Hours Primary Medical Care Trials are also testing changed roles for GPs;
 - the Relative Values Study task force being undertaken by the Department of Health and Family Services and the Australian Medical Association is considering a revised consultation structure for remunerating doctors for their Medicare services to reward time spent with patients. This may alter the dynamics of GP practice;
 - the GP Strategy Review Groups Report identified, for immediate action, the promotion of ‘new practice arrangements to increase efficiency and provide better lifestyle and career choices for GPs’. The report has called for innovative solutions to provide full access to GPs’ skills and services by rural populations, disadvantaged groups, Indigenous people, some people with chronic illness and

others currently not receiving full access. The report has identified 'scope for an expanded role for GPs in public health issues' by 'engaging GPs in activities beyond individual patient care'. The Government supported these recommendations and will establish a program costing \$20 million for micro-economic reform and restructuring, including incentives for practice amalgamations;

- Divisions of General Practice are moving to outcomes-based funding models; and
- an expansion of the role of nurses and other health care professionals in provision of medical care. The nursing workforce is now much more highly trained and is already providing limited primary medical care in remote areas. During the 1990s, the NSW Health Department has undertaken a three-stage detailed review of the role of nurse practitioners, followed by pilot projects at 10 sites. In its April 1996 report, the steering committee concluded that 'the evidence from the research conducted by each pilot project, and the across-project research, supported that nurse practitioners were feasible, safe and effective in their roles and provide quality health services in the range of settings researched'. It said 'the Nurse Practitioner model provides a legal and professional framework for specialist advanced nursing practice in a range of contexts'. The Minister announced in August 1998 that the Government intended to seek legislation to establish up to 40 nurse practitioner positions in selected areas of the State where there is demonstrated local need, local agreement and local support for them. Some other State health authorities are also considering a similar expanded role for nurse practitioners.

For the future, key concerns are how quickly these factors will soak up, or increase, any areas of over-supply, and whether, in this process, under-supplied areas will be adversely affected. Hence an update of *Australian Medical Workforce Benchmarks* will have to include disaggregated projections of the medical workforce which address these questions, and not stop at total projections of the workforce, the methodology used in the previous benchmarks report.

11.2 Improvements in technology and increases in consumer demand

Of the preceding factors, the most difficult to assess will be the impacts on workforce requirements of improvements in technology and increases in consumer demand as real household incomes increase and information available to consumers continues to increase. The two are related to an extent: rising living standards lift community expectations about affordability of advances in medicine. In *Australian Medical Workforce Benchmarks* (1996), three scenarios were presented in respect of increases in demand for unreferral and specialist attendances and services for operations due to advances in medicine. A low annual increase in demand was assumed to be 0.3% pa, a medium increase 0.6% pa, and a high increase 0.9% pa. These assumptions are crucial for future benchmark studies.

11.3 Changes in practice models

Kletke et al. (1996) reported that in the USA, between 1983 and 1994, the proportion of patient care physicians practising as employees rose from 24.2% to 42.3%, the proportion self-employed in solo practices fell from 40.5% to 29.3%, and the proportion self-employed in group practices fell from 35.3% to 28.4%. 'These trends, which are evident in virtually every segment of the patient care physician population, are especially prominent among young physicians.'

While changes in USA healthcare to greater HMO employment of physicians has accelerated such changes, there are similar trends in practice arrangements in Australia although the great majority of practices in Australia are still small. In the 1994–95 ABS survey, 77.0% of general practice medical services and 93.9% of specialist medical services in 1994–95 had only one or two medical practitioners (ABS, 1997). However, ABS classified practices using legal entity definitions; data from other sources suggest a significant number of single legal entities operate in group arrangements in medical centres, and one-third or more of GPs now work in large group practices. However, the proportion of solo practitioners is 50% higher in remote areas (DHFS, *General Practice in Australia: 1996*).

Large group extended-hour practices are increasing for the economic and consumer reasons already discussed in this paper, and because of the medical workforce labour market – rising numbers of young female doctors in the workforce, and to a lesser extent, male doctors, for whom these practices offer desirable employment arrangements. This restructuring reduces the need in the workforce for locum and deputising services as large practices can organise staff to cover such needs. It also increases doctor productivity as administrative overhead time per doctor is reduced.

In the general practice workforce in over-supplied metropolitan areas, competition from large practices threatens the financial viability of solo practitioners. For many years the AMA has suggested that the solution for the solo practitioner will be to enter into ‘shared management practices, in which groups of GPs operate from a large centre and share management costs, while retaining, if appropriate, independent solo practice and individual goodwill’ (Brand, 1996a). This model is seen to achieve the financial, professional and consumer benefits of the large practice employing salaried practitioners. Market forces are likely to steer the GP workforce increasingly towards large practice arrangements, achieving a more efficient and productive GP workforce.

The GP Strategy Review Group Report strongly recommended new organisational arrangements:

- ‘A program be developed over the next 5 years to assist general practices to embrace microeconomic reform which should include improved practice and workforce efficiencies, amalgamation of practices and other models of cooperative working.
- Following implementation of the program proposed in the previous recommendation, a mechanism be developed for a planning framework to address the distribution of general practices and to encourage the establishment of new practices in areas of need. This mechanism to be based on an exploration of the issues and on the development of guidelines agreed between consumers, GPs and the Government.’

The Government will be establishing a program costing \$20 million for micro-economic reform and restructuring, including incentives for practice amalgamations. This should expedite the processes occurring naturally through market forces.

A reduction in the proportion of small practices over time suggests that a productivity improvement factor is desirable in projections of the GP workforce in metropolitan areas for the period beyond the next five years. However, offsetting this is expected to be a reduction in the proportion of practitioners with very high through-put statistics after recommendation 87 of the GP Strategy Review Group Report is implemented. This recommendation, strongly supported by the Government, said:

In the interests of quality and safety, the RACGP with the support of other national GP organisations research and jointly develop, within 12 months, a statement on what level of services in a defined period it is appropriate for GPs as individuals to

provide, taking into account what is a reasonable workload for safe practice, a balanced lifestyle and the time required to provide appropriate care for each patient.

11.4 Impacts of rising participation in the workforce by female doctors

The rising percentage of the workforce which is female will have other major effects on workforce supply. In *Female Participation in the Australian Medical Workforce* (AMWAC, AIHW, 1996), the Institute calculated that, over a lifetime, a female GP is estimated to work 62.8% of the total hours worked by a male GP. For specialist practice, the proportion is around 75%. In addition, female general practitioners have been shown to practise differently to males, managing different types of medical conditions, with some differences due to patient mix and patient selectivity, and others inherent to the sex of the physician (Britt et al., 1996).

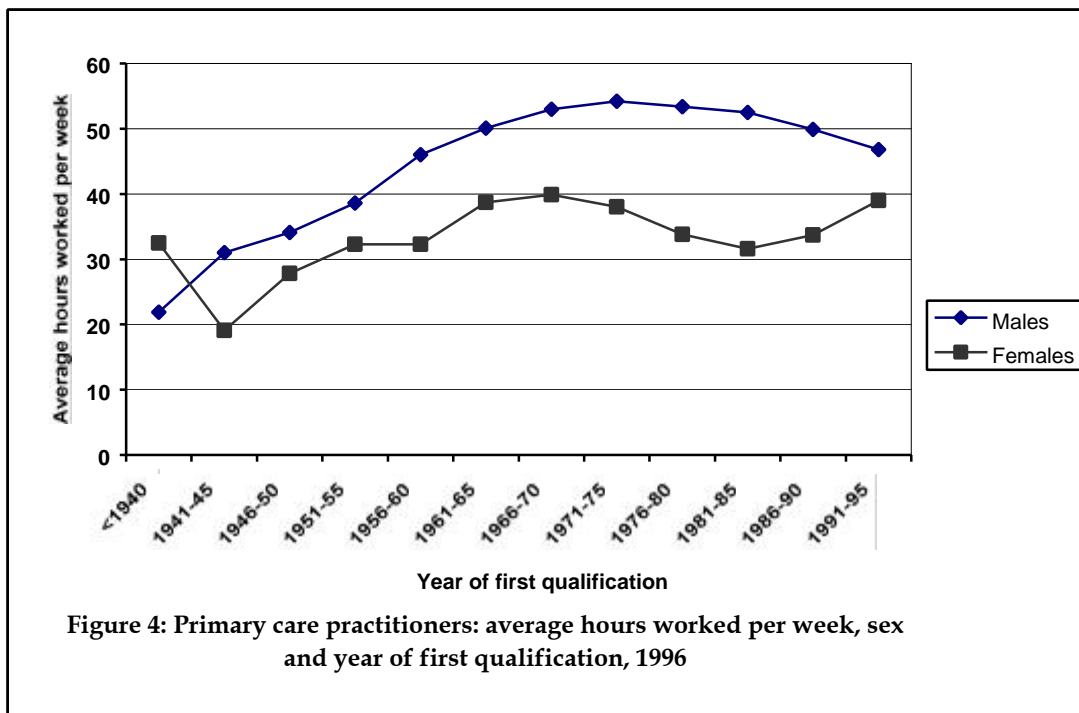


Table 10: Australian medical workforce: per cent female, 1993 to 1996

Occupation	1993	1994	1995	1996
<i>Clinician:</i>	25.0	26.3	27.0	27.5
Primary care/GP trainee	29.9	31.0	31.7	32.5
Hospital non-specialist	40.6	41.9	42.0	43.2
Specialist/specialist trainee	17.0	17.8	17.9	18.7
<i>Non-clinician:</i>	28.0	29.9	31.5	31.5
Administrator	26.9	28.7	31.3	31.0
Teacher/educator	22.7	28.9	29.1	29.5
Researcher	27.6	26.7	33.5	38.3
Public health physician	35.8	43.2	39.5	39.6
Occupational health physician	21.1	23.6	16.0	20.0
Other	29.3	28.6	31.4	29.0
Total	25.2	26.5	27.2	27.7

Source: AIHW.

Therefore the speed of the increase in the proportion of females in the medical workforce will have a major impact on the total hours of clinical time available for patients.

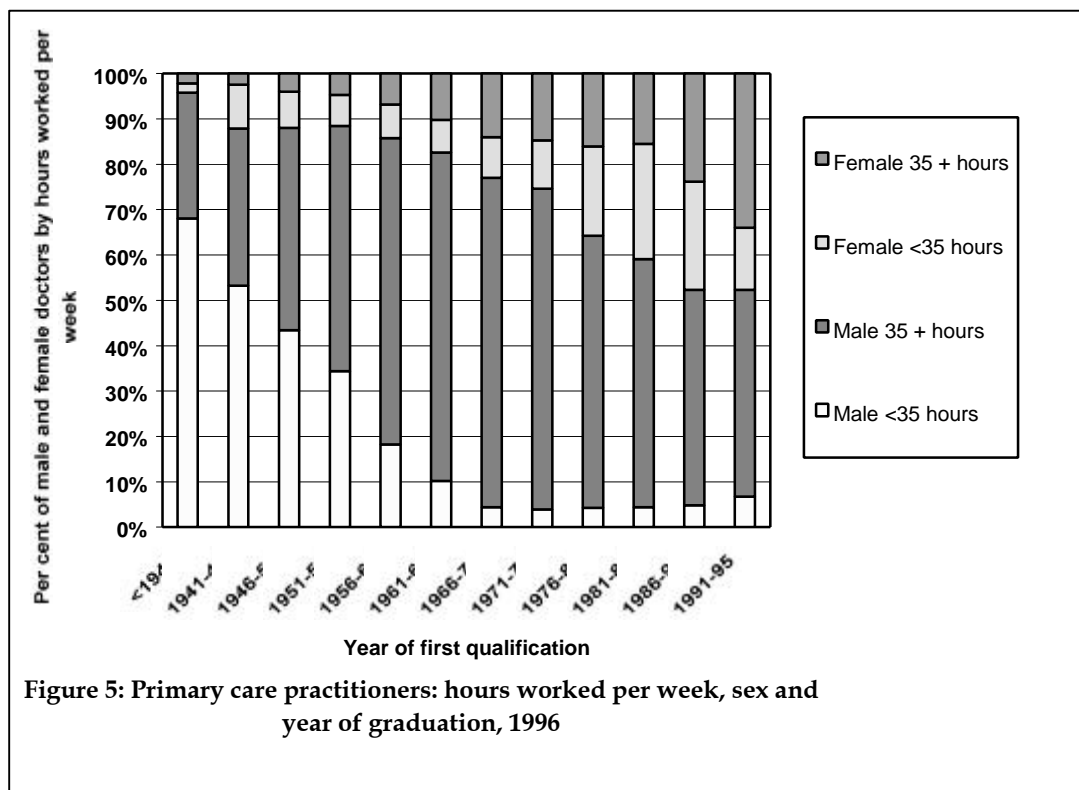
Table 11: Australian medical workforce: projected per cent female, 2000 to 2030

Occupation	2000	2010	2020	2030
<i>Clinician:</i>	30.6	37.8	45.1	52.4
Primary care/GP trainee	35.8	43.9	52.0	60.1
Hospital non-specialist	46.3	54.3	62.3	70.3
Specialist/specialist trainee	20.6	25.7	30.8	35.9
<i>Non-clinician</i>	36.1	45.9	55.9	65.9
Total	30.8	38.1	45.4	52.7

Note: Linear projection of trend from 1993 to 1996 data. However, this assumes that the proportion of female medical students will continue to rise to 70% (an unlikely assumption), producing a hospital non-specialist workforce which is 70% female.

Source: AIHW.

If a linear projection is made of the trends from 1993 to 1996, it can be seen that it will take another generation of medical practitioners before the numbers of males and females in the workforce are roughly equal, and then only if the proportion of medical students which is female rises to more than two-thirds by 2025. Although this has happened in pharmacy, physiotherapy and some other health professions, it is unlikely to happen in medicine.



11.5 The hospital workforce

Trends in patient care in hospitals during the last decade which have impacted on the hospital non-specialist medical workforce include more intensive use of beds with more patients passing through more quickly. This has increased the level of stress on the hospital non-specialist workforce, now caring for many more patients during a working week than a decade ago. Hence it is much less feasible to continue working the excessively long hours of the past and cope with the increase in intensity of practice. Therefore it is expected that in the future working hours for hospital non-specialist doctors will reduce significantly and this will have to be factored in to projections of workforce need.

Improved career arrangements for salaried hospital doctors, the contraction in the numbers who can enter general practice, and lack of access to Medicare provider numbers to temporary-resident doctors, should significantly increase the numbers of doctors available to work as hospital non-specialists.

Benchmarking of the hospital non-specialist workforce therefore has to be guided by workforce requirement scenarios if working hours of the current workforce were reduced, and if there is an increase in the numbers of temporary-resident doctors (TRDs) available in hospitals because of increasing restrictions on access to private practice for TRDs under Medicare. Inequities in distribution and adequacy of the current workforce are very difficult to assess because of substitution arrangements with alternative providers including visiting GPs and specialists, and because of the extent of outreach services provided.

11.6 The specialist workforce

In the previous Australian medical workforce benchmark study data available on the workforce requirements for individual specialities was very limited. Since then AMWAC has either completed or commenced comprehensive studies of the workforce requirements of medical specialties encompassing more than 50% of the specialist workforce. These assess future demand growth from population growth and ageing, research and technology, and other factors. Nearly all of these studies have concluded that some workforce shortage existed, and recommended temporary increases in training numbers to AHMAC to address the shortages. These recommendations have been accepted by AHMAC and steps taken to implement the recommendations and monitor the training and workforce situation on an ongoing basis.

To estimate benchmark requirements for the total specialist workforce, it will be necessary to make assumptions about the workforce adequacy of the medical specialties which AMWAC has not studied, while reviewing the most recent data available on inequities in distribution of specialists among States and Territories and in specialty service provision for residents of rural, remote and metropolitan areas.

11.7 Delivery of medical services to Aboriginal and Torres Strait Islander people

Aboriginal health services have a major role in delivering medical services to Aboriginal and Torres Strait Islander people. These employ salaried doctors whose contribution may not be included in Medicare provider and patient utilisation statistics.

In examining GP workforce requirements, *Australian Medical Workforce Benchmarks* (1996) used Medicare data and did not make any adjustments for delivery of primary care medical services outside the Medicare system, especially for Aboriginal and Torres Strait Islander people in rural and remote areas. Hence shortages of GPs in remote areas may have been over-stated.

Data are now available from three sources which may lead to such adjustments being feasible:

- 1996 census data on the distribution of Aboriginal and Torres Strait Islander people throughout Australia;
- the 1998 AIHW and National Centre for Epidemiology and Population Health report *Expenditures on Health Services for Aboriginal and Torres Strait Islander People* by Deeble et al.; and
- AIHW national medical labour force survey data on doctors employed in Aboriginal health services.

The expenditure report found that, per person, Aboriginal and Torres Strait Islander people received benefits under Medicare only 27% of the average for non-Indigenous people, and under the Pharmaceutical Benefits Scheme only 22% of the non-Indigenous average. 'The pattern of use of services by Aboriginal and Torres Strait Islander people was quite different to the average for other Australians. They relied much more on publicly-provided hospital and community health services than the typical non-Indigenous person.' Overall, in 1995-96, total health spending for and by Aboriginal and Torres Strait Islander people was \$2,320 per person, about 8% higher than that for and by other Australians.

Appendix 1. Statistical supplement

Table 12: Health services expenditure and GDP, 1976 to 1996

Year ended 30 June	Expenditure (thousands of dollars)									
	Health		Hospital		Pharmaceutical		Medical		GDP	
	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real
1976	5,719	17,679	2,094	6,514	560	1,486	919	2,870	76,643	235,825
1977	6,603	18,021	2,455	6,689	596	1,461	1,031	2,847	87,635	242,756
1978	7,469	18,841	2,897	7,279	631	1,423	1,152	3,010	95,294	244,972
1979	8,240	19,517	3,151	7,481	693	1,457	1,277	3,102	108,465	258,866
1980	9,078	19,502	3,485	7,489	694	1,365	1,461	3,180	122,933	264,372
1981	10,224	19,699	3,983	7,669	810	1,442	1,607	3,143	140,166	273,762
1982	11,798	20,393	4,567	7,869	950	1,534	1,876	3,345	158,127	279,871
1983	13,239	20,673	5,235	8,112	1,053	1,569	2,118	3,443	172,476	276,235
1984	14,958	21,989	5,681	8,292	1,221	1,753	2,416	3,664	195,830	293,003
1985	16,546	22,862	6,166	8,472	1,320	1,809	2,686	3,755	217,129	307,904
1986	18,586	24,180	6,753	8,770	1,491	1,930	3,091	4,099	240,475	319,924
1987	21,115	25,341	7,720	9,138	1,693	2,039	3,471	4,360	264,007	327,084
1988	23,328	26,287	8,471	9,503	1,864	2,062	3,887	4,470	299,340	345,051
1989	26,127	27,719	9,421	9,948	2,164	2,253	4,351	4,742	339,275	359,338
1990	28,874	28,874	10,359	10,359	2,490	2,490	4,945	4,945	370,188	370,188
1991	31,316	29,474	11,182	10,544	2,782	2,590	5,491	5,098	378,716	367,094
1992	33,213	30,372	11,812	10,850	3,101	2,745	5,928	5,383	387,045	368,554
1993	34,976	31,476	12,154	11,040	3,432	2,927	6,422	5,808	404,802	380,639
1994	36,577	32,609	12,487	11,220	3,797	3,274	6,886	6,115	429,713	399,566
1995	38,898	34,279	13,166	11,620	4,245	3,655	7,371	6,438	457,646	417,572
1996	41,742	36,099	14,869	12,869	4,902	3,992	7,808	6,731	489,184	433,656
% increase										
1976 to 1996		102.2		95.0		171.6		135.6		81.5

Notes:

1. Nominal means actual dollar values for that financial year.
2. Real means that a deflator has been applied to convert all nominal values to the equivalent in 1989–90 dollars.

Source: AIHW.

Table 13: GDP and health services expenditure per person, in 1989–90 dollars, 1976 to 1996

Year ended 30 June	Population in millions	Real GDP & health services expenditure per person (\$)				
		GDP	Health	Hospital	Pharmaceut.	Medical
1976	13.9657	16,886	1,266	466	106	205
1977	14.1107	17,204	1,277	474	104	202
1978	14.2796	17,155	1,319	510	100	211
1979	14.4364	17,932	1,352	518	101	215
1980	14.7519	17,921	1,322	508	93	216
1981	14.8098	18,485	1,330	518	97	212
1982	15.0516	18,594	1,355	523	102	222
1983	15.2914	18,065	1,352	531	103	225
1984	15.4851	18,922	1,420	535	113	237
1985	15.6820	19,634	1,458	540	115	239
1986	15.9009	20,120	1,521	552	121	258
1987	16.1350	20,272	1,571	566	126	270
1988	16.3990	21,041	1,603	579	126	273
1989	16.6856	21,536	1,661	596	135	284
1990	16.9387	21,855	1,705	612	147	292
1991	17.1770	21,371	1,716	614	151	297
1992	17.3949	21,187	1,746	624	158	309
1993	17.5874	21,643	1,790	628	166	330
1994	17.7634	22,494	1,836	632	184	344
1995	17.9585	23,252	1,909	647	204	359
1996	18.1920	23,838	1,984	707	219	370
% increase						
1976 to 1996	30.0	40.4	56.3	50.8	109.2	81.5

Source: AIHW.

Table 14: Health services expenditures as a percentage of GDP, 1976 to 1996

Year ended 30 June	Expenditure as a % of GDP				% of health expenditure		
	Health	Hospital	Pharmaceut.	Medical	Hospital	Pharmaceut.	Medical
1976	7.46	2.76	0.63	1.20	36.84	8.40	16.07
1977	7.53	2.76	0.60	1.18	37.12	8.10	15.61
1978	7.84	2.97	0.58	1.21	38.63	7.55	15.42
1979	7.60	2.89	0.56	1.18	38.33	7.46	15.50
1980	7.38	2.83	0.52	1.19	38.40	7.00	16.09
1981	7.29	2.80	0.53	1.15	38.93	7.32	15.72
1982	7.46	2.81	0.55	1.19	38.59	7.52	15.90
1983	7.68	2.94	0.57	1.23	39.24	7.59	16.00
1984	7.64	2.83	0.60	1.23	37.71	7.97	16.15
1985	7.62	2.75	0.59	1.24	37.06	7.91	16.23
1986	7.73	2.74	0.60	1.29	36.27	7.98	16.63
1987	8.00	2.79	0.62	1.31	36.06	8.05	16.44
1988	7.79	2.75	0.60	1.30	36.15	7.84	16.66
1989	7.70	2.77	0.63	1.28	35.89	8.13	16.65
1990	7.80	2.80	0.67	1.34	35.88	8.62	17.13
1991	8.27	2.87	0.71	1.45	35.77	8.79	17.54
1992	8.58	2.94	0.74	1.53	35.72	9.04	17.85
1993	8.64	2.90	0.77	1.59	35.07	9.30	18.36
1994	8.51	2.81	0.82	1.60	34.41	10.04	18.83
1995	8.50	2.78	0.88	1.61	33.90	10.66	18.95
1996	8.53	2.97	0.92	1.60	35.65	11.06	18.71

Source: AIHW.

Table 15: Reason for most recent consultation with a doctor, National Health Survey, 1989-90 and 1995

Reason for most recent consultation	1995			1989-90		
	Males	Females	Persons	Males	Females	Persons
	('000s)					
Infectious & parasitic diseases	52.3	62.4	114.7	40.5	60.6	101.1
Neoplasms	34.7	39.9	74.6	34.8	36.9	71.6
Endocrine, nutritional & metabolic diseases & immunity disorders	57.9	70.2	128.1	44.0	72.2	116.2
Diseases of the blood & blood forming organs	3.3	13.2	16.5	6.1	19.3	25.4
Mental disorders	55.9	62.8	118.7	34.7	58.1	92.8
Diseases of the nervous system & sense organs	123.7	152.8	276.5	122.2	142.7	264.9
Diseases of the circulatory system	131.1	152.6	283.7	141.5	220.0	361.5
Diseases of the respiratory system	383.3	462.9	846.2	339.3	401.4	740.7
Diseases of the digestive system	98.5	97.3	195.8	95.5	102.5	198.0
Diseases of the genito-urinary system	29.6	113.5	143.1	26.4	108.0	134.4
Complications of pregnancy, childbirth & the puerperium	—	3.9	3.9	—	12.0	12.0
Diseases of the skin & subcutaneous tissue	116.2	139.1	255.3	92.1	114.0	206.1
Diseases of the musculoskeletal system & connective tissue	183.3	191.4	374.7	172.6	219.4	392.0
Symptoms, signs & ill-defined conditions	110.8	170.5	281.3	113.8	169.4	283.2
Injuries & poisonings	143.9	95.5	239.4	151.4	97.1	248.5
Disability, not elsewhere classified	3.2	2.3	5.5	2.7	4.6	7.3
Other factors influencing health status or contact with health services—						
Check-up/examination	364.4	462.0	826.4	106.9	157.4	264.3
Test (including X-rays)	73.0	156.2	229.2	26.0	89.4	115.4
Pregnancy supervision	—	73.4	73.4	—	103.5	103.5
Contraceptive management	0.8	23.9	24.7	2.8	29.4	32.2
Immunisation	54.3	62.2	116.5	42.0	52.2	94.2
Other reasons	6.9	8.6	15.5	8.0	14.4	22.4
Total	1,836.2	2,370.4	4,206.6	1,426.9	1,973.3	3,400.2
	% of total					
	% increase 1989-90 to 1995			1995	1989-90	
Infectious & parasitic diseases	29.1	3.0	13.5	2.7	3.0	
Neoplasms	-0.3	8.1	4.2	1.8	2.1	
Endocrine, nutritional & metabolic diseases & immunity disorders	31.6	-2.8	10.2	3.0	3.4	
Diseases of the blood & blood forming organs	-45.9	-31.6	-35.0	0.4	0.7	
Mental disorders	61.1	8.1	27.9	2.8	2.7	
Diseases of the nervous system & sense organs	1.2	7.1	4.4	6.6	7.8	
Diseases of the circulatory system	-7.3	-30.6	-21.5	6.7	10.6	
Diseases of the respiratory system	13.0	15.3	14.2	20.1	21.8	
Diseases of the digestive system	3.1	-5.1	-1.1	4.7	5.8	
Diseases of the genito-urinary system	12.1	5.1	6.5	3.4	4.0	
Complications of pregnancy, childbirth & the puerperium	—	-67.5	-67.5	0.1	0.4	
Diseases of the skin & subcutaneous tissue	26.2	22.0	23.9	6.1	6.1	
Diseases of the musculoskeletal system & connective tissue	6.2	-12.8	-4.4	8.9	11.5	
Symptoms, signs & ill-defined conditions	-2.6	0.6	-0.7	6.7	8.3	
Injuries & poisonings	-5.0	-1.6	-3.7	5.7	7.3	
Disability, not elsewhere classified	18.5	-50.0	-24.7	0.1	0.2	
Other factors influencing health status or contact with health services—						
Check-up/examination	240.9	193.5	212.7	19.6	7.8	
Test (including X-rays)	180.8	74.7	98.6	5.4	3.4	
Pregnancy supervision	—	-29.1	-29.1	1.7	3.0	
Contraceptive management	-71.4	-18.7	-23.3	0.6	0.9	
Immunisation	29.3	19.2	23.7	2.8	2.8	
Other reasons	-13.6	-40.3	-30.8	0.4	0.7	
Total	28.7	20.1	23.7	100.0	100.0	

Source: ABS Cat. No. 4364.0.

Table 16: Population distribution by geographic category and indigenous status, 1996

Geographic category	Total area (in sq. km)	Population	Per cent	Population per sq. km	Indigenous population	Per cent Indigenous
Capital cities	33,591	11,644,479	63.6	346.65	117,103	1.0
Other metropolitan centres	7,206	1,376,057	7.5	190.96	22,880	1.7
Large rural centres	18,451	1,095,727	6.0	59.39	33,435	3.1
Small rural centres	64,935	1,194,581	6.5	18.40	34,009	2.8
Other rural areas	953,409	2,442,251	13.3	2.56	63,807	2.6
Remote centres	821,233	218,399	1.2	0.27	27,530	12.6
Other remote areas	5,769,747	336,125	1.8	0.06	87,088	25.9
Total	7,668,571	18,307,619	100.0	2.39	385,852	2.1

Source: ABS.

Table 17: Geographic distribution of primary care medical practitioners, 1995

Geographic category	Practitioners per 100,000 persons			Total
	VRGPs	RACGP trainees	OMPs	
Capital cities	109.4	8.6	12.1	130.0
Other metropolitan centres	98.4	7.6	8.8	114.8
Large rural centres	94.9	6.1	5.8	106.8
Small rural centres	85.3	5.8	5.6	96.6
Other rural areas	70.7	4.8	3.6	79.1
Remote centres	70.7	6.8	6.3	83.8
Other remote areas	45.0	6.0	14.0	64.9
Total	99.1	7.6	9.8	116.5

Source: AIHW.

Table 18: Primary care – GP consultations per 1,000 persons, 1995–96

RRMA category	Males	Females	Total	M:F ratio
Capital city	5.287	6.958	6,133	0.76
Other metropolitan	4.677	6.321	5,508	0.74
Large rural centre	4.073	5.614	4,853	0.73
Small rural centre	3.819	5.396	4,617	0.71
Other rural area	3.438	4.910	4,188	0.70
Remote centres	2.952	4.397	3,693	0.67
Other remote	2.389	3.668	3,045	0.65
Total	4,725	6,367	5,557	0.74

Source: AIHW from DHFS data.

Table 19: Death rates per 1,000 population, 1991–95^(a)

Cause of death	Capital city	Other metropol.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	Total
All causes								
Males	8.43	8.62	9.08	9.02	8.75	10.39	10.30	8.62
Females	5.15	5.29	5.46	5.40	5.35	6.68	6.78	5.26
Coronary heart disease								
Males	2.13	2.25	2.42	2.36	2.28	2.39	2.39	2.20
Females	1.17	1.26	1.34	1.28	1.25	1.51	1.29	1.21
Melanoma								
Males	0.07	0.09	0.08	0.08	0.06	0.04	0.06	0.07
Females	0.03	0.03	0.04	0.04	0.03	0.02	0.04	0.03
Injury								
Males	0.54	0.59	0.66	0.65	0.77	0.91	1.15	0.60
Females	0.21	0.22	0.22	0.23	0.26	0.30	0.44	0.22
Road accidents								
Males	0.13	0.16	0.19	0.19	0.27	0.33	0.35	0.17
Females	0.06	0.06	0.07	0.08	0.12	0.10	0.17	0.07
Homicide								
Males	0.02	0.02	0.02	0.02	0.02	0.06	0.08	0.02
Females	0.01	0.02	0.01	0.01	0.01	0.03	0.08	0.01
Asthma								
Males	0.04	0.04	0.05	0.04	0.05	0.06	0.07	0.04
Females	0.04	0.04	0.05	0.05	0.05	0.06	0.05	0.04
Diabetes								
Males	0.16	0.13	0.15	0.18	0.18	0.30	0.27	0.16
Females	0.11	0.10	0.13	0.12	0.14	0.24	0.30	0.12

(a) Rates were age-standardised using the 1991 Australian population.

Table 20: Hospital separations per 1,000 persons for selected major diagnosis categories, 1995–96^(a)

MDC code	Capital city	Other metropol.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	Total
All separations								
Male	264.1	246.7	267.3	265.0	264.2	318.6	321.2	264.4
Female	288.4	282.6	304.5	307.8	315.0	407.3	409.8	295.0
MDC 01 Diseases & disorders of the nervous system								
Male	12.5	11.1	14.6	14.6	16.2	17.0	22.6	13.3
Female	10.0	9.4	11.9	12.5	14.3	15.0	19.5	10.9
MDC 04 Diseases & disorders of the respiratory system								
Male	15.7	14.6	18.6	18.5	20.4	32.5	32.9	17.1
Female	10.9	9.6	12.6	14.2	15.7	25.3	28.5	12.1
MDC 05 Diseases & disorders of the circulatory system								
Male	24.5	24.3	27.0	27.0	26.9	26.0	30.6	25.2
Female	15.2	14.8	17.4	18.4	19.6	20.2	26.3	16.3
MDC 06 Diseases & disorders of the digestive system								
Male	38.1	36.6	39.0	40.7	39.7	39.3	42.4	38.5
Female	34.9	32.9	36.6	38.9	38.9	39.0	47.4	35.9
MDC 10 Endocrine, nutritional & metabolic diseases & disorders								
Male	2.1	1.8	2.6	2.6	2.9	3.6	4.8	2.3
Female	3.0	2.7	3.3	3.6	3.7	5.0	6.5	3.2
MDC 11 Diseases & disorders of the kidney & urinary tract								
Male	36.8	34.5	27.9	25.3	21.3	59.2	26.6	33.2
Female	25.3	25.3	21.8	16.5	14.1	81.9	27.8	23.3
MDC 12 Diseases & disorders of the male reproductive system								
Male	10.6	9.7	12.8	12.0	12.1	10.0	10.9	10.9
MDC 13 Diseases & disorders of the female reproductive system								
Female	26.8	28.8	29.4	32.6	28.8	23.6	28.8	27.6
MDC 14 Pregnancy, childbirth & the puerperium								
Female	47.4	54.3	56.8	55.4	59.2	71.6	73.4	50.4
MDC 19 Mental diseases & disorders								
Male	7.7	5.7	5.2	5.9	5.2	6.0	6.4	7.0
Female	8.6	7.4	5.8	7.5	7.4	7.0	8.7	8.1
MDC 21 Injuries, poisonings & toxic effects of drugs								
Male	6.1	5.8	6.7	7.6	7.6	12.0	13.5	6.6
Female	4.9	4.6	5.4	5.7	5.9	10.6	11.3	5.2

MDC: major diagnosis category.

(a) Rates were age-standardised using the 1991 Australian population.

Table 21: Medical and surgical separation rates per 1,000 population, Australian hospitals, 1995–96^(a)

	Capital city	Other metropol.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	Total
Medical								
Males	165	147	159	163	170	236	243	166
Females	167	160	177	178	197	297	300	173
Surgical								
Males	75	76	85	79	74	66	63	75
Females	99	101	106	109	100	93	94	100

(a) Rates were age-standardised using the 1991 Australian population.

Table 22: Self-assessed health status by geographic area, National Health Survey, 1995

Geographic area	Excellent	Very good	Good	Fair	Poor	Total
	(per cent)					
Metropolitan						
Sydney/other metro	18.0	35.1	29.9	12.8	4.3	100.0
Melbourne/other metro	21.3	35.7	27.1	11.7	4.2	100.0
Brisbane	21.6	33.3	28.7	12.5	3.9	100.0
Other Qld metro	20.1	35.3	28.4	13.3	2.9	100.0
Adelaide	19.1	35.1	28.0	13.6	4.1	100.0
Perth	19.9	37.0	28.1	11.2	3.8	100.0
Hobart	19.9	39.5	21.4	12.4	6.7	100.0
NT urban	19.6	35.8	32.0	10.9	1.8	100.0
ACT	20.5	38.6	27.0	11.0	3.0	100.0
<i>Total</i>	<i>19.7</i>	<i>35.4</i>	<i>28.5</i>	<i>12.3</i>	<i>4.1</i>	<i>100.0</i>
Large & small rural centres						
NSW	20.6	33.8	27.6	13.9	4.0	100.0
Vic	21.0	37.4	24.8	13.2	3.6	100.0
Qld	19.5	34.3	29.6	13.7	3.0	100.0
SA	15.4	35.5	31.8	13.6	3.5	100.0
WA	15.2	34.6	35.0	12.0	3.2	100.0
Tas	20.0	34.2	26.8	15.5	3.5	100.0
<i>Total</i>	<i>19.7</i>	<i>34.9</i>	<i>28.3</i>	<i>13.6</i>	<i>3.5</i>	<i>100.0</i>
Other rural & remote areas						
NSW	18.5	34.9	26.9	15.8	4.0	100.0
Vic	19.3	38.2	25.7	12.7	4.1	100.0
Qld	17.7	35.5	30.4	12.3	4.1	100.0
SA	17.7	36.8	29.1	12.6	3.8	100.0
WA	17.9	37.3	33.7	8.2	2.9	100.0
Tas	19.0	35.3	26.3	15.1	4.3	100.0
<i>Total</i>	<i>18.4</i>	<i>36.3</i>	<i>28.4</i>	<i>13.0</i>	<i>3.9</i>	<i>100.0</i>
Total						
NSW	18.4	34.9	29.3	13.3	4.2	100.0
Vic	21.0	36.2	26.6	12.0	4.1	100.0
Qld	20.2	34.2	29.2	12.8	3.6	100.0
SA	18.6	35.4	28.5	13.4	4.0	100.0
WA	19.1	36.8	29.8	10.7	3.6	100.0
Tas	19.6	36.5	24.7	14.3	4.9	100.0
NT urban	19.6	35.8	32.0	10.9	1.8	100.0
ACT	20.5	38.6	27.0	11.0	3.0	100.0
Total	19.5	35.4	28.4	12.6	4.0	100.0

Source: AIHW from ABS national health survey data

Table 23: Persons consulting a doctor in a 2-week period by geographic area, National Health Survey, 1995

Locality	Checkup or examination		All doctor consultations		Checkup or examination as % of all consultations		% of population receiving a checkup or examination in a 2-week period	
	GP	Specialist	GP	Specialist	GP	Specialist	GP	Specialist
NSW								
Metropolitan	212,665	48,912	1,080,583	234,144	19.7	20.9	4.7	1.1
Rural centres	38,862	2,895	140,266	16,738	27.7	17.3	5.0	0.4
Other	46,206	7,314	160,665	29,172	28.8	25.1	5.9	0.9
<i>Total</i>	<i>297,733</i>	<i>59,121</i>	<i>1,381,514</i>	<i>280,054</i>	<i>21.6</i>	<i>21.1</i>	<i>4.9</i>	<i>1.0</i>
Victoria								
Metropolitan	136,830	26,873	712,426	147,251	19.2	18.2	4.1	0.8
Rural centres	16,324	3,523	86,908	16,552	18.8	21.3	3.3	0.7
Other	22,712	3,699	127,910	22,989	17.8	16.1	3.5	0.6
<i>Total</i>	<i>175,866</i>	<i>34,095</i>	<i>927,244</i>	<i>186,792</i>	<i>19.0</i>	<i>18.3</i>	<i>3.9</i>	<i>0.8</i>
Queensland								
Brisbane	56,686	13,999	316,583	62,349	17.9	22.5	3.8	0.9
Other metropolitan	22,421	5,049	94,158	20,250	23.8	24.9	5.4	1.2
Rural centres	29,785	4,431	122,378	24,107	24.3	18.4	4.6	0.7
Other	18,030	6,392	117,983	18,994	15.3	33.7	2.5	0.9
<i>Total</i>	<i>126,922</i>	<i>29,871</i>	<i>651,102</i>	<i>125,700</i>	<i>19.5</i>	<i>23.8</i>	<i>3.9</i>	<i>0.9</i>
South Australia								
Adelaide	36,238	7,571	242,816	43,939	14.9	17.2	3.4	0.7
Rural centres	3,501	468	20,528	3,230	17.1	14.5	3.3	0.4
Other	9,633	1,571	53,934	8,883	17.9	17.7	3.3	0.5
<i>Total</i>	<i>49,372</i>	<i>9,610</i>	<i>317,278</i>	<i>56,052</i>	<i>15.6</i>	<i>17.1</i>	<i>3.3</i>	<i>0.7</i>
Western Australia								
Perth	38,752	7,098	257,092	47,198	15.1	15.0	3.1	0.6
Rural centres	3,954	1,218	26,407	4,623	15.0	26.3	3.1	1.0
Other	10,503	1,597	56,557	3,839	18.6	41.6	3.1	0.5
<i>Total</i>	<i>53,209</i>	<i>9,913</i>	<i>340,056</i>	<i>55,660</i>	<i>15.6</i>	<i>17.8</i>	<i>3.1</i>	<i>0.6</i>
Tasmania								
Hobart	8,117	1,555	33,494	6,843	24.2	22.7	4.2	0.8
Rural centres	3,814	0	27,800	4,233	13.7	0.0	2.6	0.0
Other	6,170	1,517	34,392	6,647	17.9	22.8	4.6	1.1
<i>Total</i>	<i>18,101</i>	<i>3,072</i>	<i>95,686</i>	<i>17,723</i>	<i>18.9</i>	<i>17.3</i>	<i>3.8</i>	<i>0.6</i>
NT urban	4,337	1,202	22,581	4,189	19.2	28.7	3.8	1.1
ACT	6,867	1,881	57,002	13,028	12.0	14.4	2.3	0.6
Total:								
Metropolitan	522,913	114,140	2,816,735	579,191	18.6	19.7	4.1	0.9
Rural centres	96,240	12,535	424,287	69,483	22.7	18.0	4.2	0.5
Other	113,254	22,090	551,441	90,524	20.5	24.4	3.9	0.8
Total	732,408	148,765	3,792,462	739,199	19.3	20.1	4.1	0.8

Source: ABS Cat. No. 4364.0.

Table 24: Percentage of the population consulting a doctor in a 2-week period by geographic area and type of doctor, National Health Survey, 1995

Locality	Population	% of population consulting a doctor in a 2-week period	
		GP	Specialist
NSW			
Metropolitan	4,556,185	23.7	5.1
Rural centres	779,458	18.0	2.1
Other	779,500	20.6	3.7
<i>Total</i>	<i>6,115,143</i>	<i>22.6</i>	<i>4.6</i>
Victoria			
Metropolitan	3,370,742	21.1	4.4
Rural centres	487,537	17.8	3.4
Other	643,721	19.9	3.6
<i>Total</i>	<i>4,502,000</i>	<i>20.6</i>	<i>4.1</i>
Queensland			
Brisbane	1,489,069	21.3	4.2
Other metropolitan	415,932	22.6	4.9
Rural centres	643,714	19.0	3.7
Other	728,658	16.2	2.6
<i>Total</i>	<i>3,277,373</i>	<i>19.9</i>	<i>3.8</i>
South Australia			
Adelaide	1,080,972	22.5	4.1
Rural centres	104,698	19.6	3.1
Other	288,296	18.7	3.1
<i>Total</i>	<i>1,473,966</i>	<i>21.5</i>	<i>3.8</i>
Western Australia			
Perth	1,262,569	20.4	3.7
Rural centres	126,336	20.9	3.7
Other	342,818	16.5	1.1
<i>Total</i>	<i>1,731,723</i>	<i>19.6</i>	<i>3.2</i>
Tasmania			
Hobart	194,668	17.2	3.5
Rural centres	144,102	19.3	2.9
Other	134,252	25.6	5.0
<i>Total</i>	<i>473,022</i>	<i>20.2</i>	<i>3.7</i>
NT urban	112,970	20.0	3.7
ACT	304,125	18.7	4.3
Total:			
Metropolitan	12,787,232	22.0	4.5
Rural centres	2,285,845	18.6	3.0
Other	2,917,245	18.9	3.1
Total	18,051,230	21.0	4.1

Source: AIHW, derived from ABS NHS and population data.

Table 25: Medicare A1 group GP consultations by location of patient and provider, 1995–96

Provider major practice location	Location of residence of patient							Total
	Capital city	Other metrop.	Large rural centre	Small rural centre	Other rural	Remote centre	Other remote	
	(number)							
Capital city	60,250,460	292,200	222,640	281,710	824,970	49,920	86,150	62,008,050
Other metropolitan	335,480	6,513,350	45,940	77,410	156,980	6,380	9,300	7,144,840
Large rural centre	158,890	27,500	4,428,060	83,060	511,550	16,420	21,940	5,247,420
Small rural centre	222,740	47,580	91,100	4,520,670	418,620	5,370	41,280	5,347,360
Other rural	380,290	61,660	148,500	160,520	7,587,480	25,730	72,180	8,436,360
Remote centre	30,590	3,060	7,570	7,930	22,640	521,720	46,510	640,020
Other remote	29,520	4,280	7,690	12,030	28,480	15,350	504,450	601,800
Total	61,407,970	6,949,630	4,951,500	5,143,330	9,550,720	640,890	781,810	89,425,850
	(residence of patient: per cent of services by locality of provider)							
Capital city	98.1	4.2	4.5	5.5	8.6	7.8	11.0	69.3
Other metropolitan	0.5	93.7	0.9	1.5	1.6	1.0	1.2	8.0
Large rural centre	0.3	0.4	89.4	1.6	5.4	2.6	2.8	5.9
Small rural centre	0.4	0.7	1.8	87.9	4.4	0.8	5.3	6.0
Other rural	0.6	0.9	3.0	3.1	79.4	4.0	9.2	9.4
Remote centre	0.0	0.0	0.2	0.2	0.2	81.4	5.9	0.7
Other remote	0.0	0.1	0.2	0.2	0.3	2.4	64.5	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	(location of main practice of provider: per cent of services by locality of patient)							
Capital city	97.2	0.5	0.4	0.5	1.3	0.1	0.1	100.0
Other metropolitan	4.7	91.2	0.6	1.1	2.2	0.1	0.1	100.0
Large rural centre	3.0	0.5	84.4	1.6	9.7	0.3	0.4	100.0
Small rural centre	4.2	0.9	1.7	84.5	7.8	0.1	0.8	100.0
Other rural	4.5	0.7	1.8	1.9	89.9	0.3	0.9	100.0
Remote centre	4.8	0.5	1.2	1.2	3.5	81.5	7.3	100.0
Other remote	4.9	0.7	1.3	2.0	4.7	2.6	83.8	100.0
Total	68.7	7.8	5.5	5.8	10.7	0.7	0.9	100.0

Source: AIHW, from Medicare statistics, DHFS.

Table 26: Persons per dwelling by statistical subdivision, selected cities, 1996

Statistical subdivision	Dwellings	Population	Persons per dwelling	% popn. under 15	% popn. 60 or more
Sydney					
Eastern Suburbs	95,575	230,748	2.41	13.7	17.4
Lower Northern Sydney	109,307	267,744	2.45	15.4	17.9
Inner Sydney	110,976	276,866	2.49	12.2	13.8
Northern Beaches	80,332	212,014	2.64	17.9	18.2
Inner Western Sydney	54,594	148,608	2.72	16.6	19.4
St George–Sutherland	141,754	391,962	2.77	19.4	18.0
Central Western Sydney	93,452	270,586	2.90	20.4	15.6
Canterbury–Bankstown	98,020	290,095	2.96	21.0	17.7
Hornsby–Kuringai	79,048	235,778	2.98	20.7	17.5
Outer Western Sydney	97,771	293,009	3.00	25.6	10.7
Blacktown–Baulkham Hills	110,504	351,764	3.18	24.7	10.1
Outer South Western Sydney	65,438	209,295	3.20	28.3	8.4
Fairfield–Liverpool	91,932	301,982	3.28	24.1	11.3
Melbourne					
Inner Melbourne	100,598	228,991	2.28	10.4	14.9
Southern Melbourne	142,806	358,872	2.51	18.0	20.1
Boroondara City	55,997	144,590	2.58	17.4	19.3
Moreland City	50,273	130,093	2.59	17.0	20.5
Mornington Peninsula Shire	42,114	110,409	2.62	22.3	21.4
Northern Middle Melbourne	87,661	234,388	2.67	18.1	18.6
Frankston City	38,448	103,971	2.70	23.0	14.6
Eastern Middle Melbourne	139,872	391,784	2.80	17.2	17.8
Western Melbourne	136,996	387,173	2.83	20.3	15.0
Eastern Outer Melbourne	76,204	222,117	2.91	23.6	12.0
Yarra Ranges Shire Part A	44,115	130,043	2.95	25.3	11.0
Greater Dandenong City	42,575	126,179	2.96	20.4	14.7
South Eastern Outer Melbourne	60,407	184,129	3.05	27.5	9.0
Melton–Wyndham	35,729	113,066	3.16	27.6	7.1
Hume City	35,632	116,030	3.26	26.8	8.5
Northern Outer Melbourne	47,905	156,310	3.26	25.0	8.5
Brisbane					
Redcliffe City	19,327	48,026	2.48	19.3	23.7
Brisbane City	303,118	806,746	2.66	17.8	16.5
Caboolture Shire Part A	32,963	94,451	2.87	25.9	15.2
Gold Coast City Part A	14,036	40,349	2.87	26.3	11.5
Ipswich City (Part in BSD)	38,806	114,481	2.95	25.7	11.4
Logan City	52,243	158,460	3.03	26.9	7.3
Pine Rivers Shire	33,466	103,193	3.08	25.9	7.6
Beaudesert Shire Part A	7,153	23,078	3.23	27.2	6.5
Adelaide					
Western	84,842	201,801	2.4	16.8	22.8
Eastern	86,510	214,257	2.5	16.0	20.0
Southern	119,384	304,664	2.6	20.6	17.9
Northern	119,962	325,132	2.7	22.9	13.7

Source: 1996 census, ABS.

Appendix 2. Literature review

Steven A. Schroeder MD, How Can We Tell Whether There Are Too Many or Too Few Physicians? The Case for Benchmarking, Editorial, *Journal of the American Medical Association (JAMA)*, (1996)

'By any method imaginable – common sense, needs- or demand-based planning, or benchmarking – evidence is overwhelming for an impending physician over-supply, especially of specialists. The implications are enormous – for health care and its costs'.

Schroeder reviews the Goodman et al. study (following) and argues in his JAMA editorial that public policy on physician workforce supply is important for at least four reasons:

- determination of the number of medical student positions;
- public subsidy of medical school and postgraduate medical education;
- demand by young people for medical training well in excess of positions available; and
- supply of physicians – and its distribution according to specialty, geography and ethnic makeup – exerts important influences on such key issues as medical expenditures, quality of care and access.

Common sense indicators of physician over-supply in the USA include:

- incomes falling after decades of steady growth;
- job advertisements for specialists have declined steeply;
- poor job satisfaction: large numbers of physicians say if they had to do it all over again they would choose a different career; and
- newly trained physicians finding it difficult to find full-time employment.

The traditional quantitative planning methods have been use of needs-based and demand-based measures. Briefly, needs-based demand estimates compare the projected supply with estimates of disease frequency and new technology development. Demand-based planning extrapolates future physician utilisation levels from current ones and then estimates supply requirements accordingly.

In contrast, benchmarking compares the present physician supply in an area with different geographic regions or with organised health care systems that have distinctive staffing patterns. The benchmark used is a 'lean' level of supply, in which there is no evidence of shortages having adverse effects on health outcomes.

Schroeder says that 'conceivably standards other than efficiency could be used to benchmark national or local workforce levels. For example, physician supply benchmarks could be extrapolated from communities with the lowest infant mortality rates or longest life expectancy'. This has pitfalls, given the tenuous link between health status and medical care.

David C Goodman MD et al., Benchmarking the US Physician Workforce, *JAMA* (1996)

The study used the per capita number of clinically active physicians by specialty, adjusted for age and sex population differences and out-of-region health care utilisation, for 306 hospital referral regions in the USA.

The measured physician workforce was compared with four benchmarks: staffing of a large HMO (2.4 million members), a hospital referral region dominated by managed care, a region dominated by fee-for-service, and a balanced physician supply (50% generalists).

Goodman says that comparing physician resources with a benchmark health plan or region provides a guidepost that does not depend on a hypothetical optimal physician level but depends on a real-world and attainable health care system. Needs-based planning suffers from having to rely on a panel of experts to estimate the per capita number of physicians needed to treat the diseases managed by a given specialty. Forecasting disease rates, outcomes of physician services, and technology is very difficult, regardless of the level of expertise. He says that demand-based planning perpetuates current utilisation and ignores the evidence that an increased supply of medical resources leads to increased utilisation.

Benchmarks selected are those that achieve low levels of deployment of clinically active physicians without measured loss of patient welfare due to shortage of physicians. The benchmarks are then used as a current best estimate of a reasonable physician workforce active in patient care. Goodman said, 'A reasonable step using current data is to identify communities that are similar in their demographic and health profiles, including overall mortality, but are markedly different in their costs and deployment of health care resources. The benchmarking question can then be framed, "If the population of Minneapolis or Wichita can achieve apparently equal outcomes with fewer physicians, why shouldn't we?" Comparing Miami with Minneapolis, for example, one finds 35% more physicians there, 2-fold greater Medicare expenditures, nearly identical mortality rates, and no benefits in terms of satisfaction with care.'

Dr Richard A Cooper, USA (1995)

In 1995 Richard A Cooper MD assessed physician supply and demand in the United States for the period extending to 2020. He estimated the national benchmark for physician demand in 1993 as 205 per 100,000 population. Demand was 'projected to increase by 18% by 2020, because of both an expansion in beneficial services and a reduction in physician work effort'. In his model, expanding beneficial services included increases in specialist care, science and technology, ageing of the population, and the death rate, while declining physician work effort arose from changes in the age structure, more female doctors, and changes in physician lifestyle leading to reductions in hours worked.

Supply was forecast to 'initially increase more rapidly, resulting in a surplus of 31,000 physicians (5% of patient care physicians) in the year 2000 and increasing to 62,000 physicians (8%) in 2010, after which the gap will narrow'. However, he qualified this by emphasising that 'physician distribution is not homogeneous, and the number of physicians per capita varies by more than twofold among states. Relative to the national norm, surpluses already exist in some states and shortages in others. Local surpluses will be influenced principally by how physicians distribute themselves geographically.' A map of the United States shows physician supply in 1993 ranging from 281 per 100,000 population in New York and 292 in Massachusetts down to 118 in Mississippi, 132 in Idaho and 143 in Alaska. Cooper also notes that, while in 1993 the overall physician-to-population ratio was 208 per 100,000 population, metropolitan areas had an average ratio of 226 per 100,000 population and non-metropolitan areas an average ratio of 118 per 100,000. Fourteen per cent of Americans were estimated to live in areas with ratios of primary care physicians to population of 30 per 100,000 or less, and 0.2% live in counties with no physicians at all.

Cooper cites a number of previous studies predicting significant surpluses. He said that 20 years earlier, 'just as the United States was finishing an unprecedented doubling of its capacity to train new physicians', the Graduate Medical Education National Advisory Committee (GMENAC) undertook a study of supply and predicted a 13% surplus by 1990 and 22% surplus by 2000. Such large surpluses did not eventuate because of what Cooper

estimates to have been a 15% decrease in physician work effort, as defined above, over a 15-year period.

In more recent studies, very large surpluses have been estimated because of projected rapid rises in the proportion of the United States population covered by health maintenance organisations (HMOs), and a medical workforce per 100,000 patients in HMOs well below the national norm.

Dr ML Barer and Dr Greg L Stoddart, Canada (1992)

In the *Canadian Medical Association Journal* on 1 February 1992, Barer and Stoddart, well-known Canadian health economists, wrote that among the first tier medical workforce issues in Canada was poor geographic distribution of physicians including 'the overwhelming consensus that there were serious surpluses of general practitioners in urban centres'.

Council on Graduate Medical Education (COGME), USA (1992, 1994)

COGME reports to Congress and the Secretary of the Health Department with the legislative requirement to advise on physician workforce issues. In its third (1992) and fourth (1994) reports, its key findings were:

- The USA has too few generalists and too many sub-specialties.
- The current physician to population ratio is adequate; further increases will do little to enhance the health of the public, or to address the problem of access to care, and will hinder efforts to contain costs.
- Problems of access to medical care persist in rural and inner city areas.
- The racial and ethnic composition of the nation's physicians does not reflect the general population and contributes to access problems for under-represented minorities.

Note: the US active physician to population ratio was 245.0 per 100,000 population in 1992 and included physicians working in teaching, research and administration. The equivalent figure for Australia in 1995 was 269.4 per 100,000 population.

David A Kindig MD, PhD and Kevin Grumbach MD, USA (1996)

Kindig and Grumbach provided a paper *The US Physician Workforce* to the first Trilateral Physician Workforce Conference in November 1996. This presents what appears to be a comprehensive literature review on the US medical workforce.

In respect of comparisons between projected supply and requirements for specialists:

- The paper notes a number of studies projecting large surpluses.
- Of interest though is an opposing methodology used by Schwartz et al. (1988) for internal medicine. Using a sustainable practice approach, Schwartz and colleagues made projections based on the assumption that every city greater than 50,000 population needs a sub-specialist in every field, and this may be warranted for cities with a population of 30,000 or more. They then concluded that there would be a shortfall of 7,000 internal medicine sub-specialists in cities of this size by the year 2000. Furthermore, they calculated that, after making adjustments for projected declines in resident and female physician productivity, demand for physician services would increase by 1.3% per capita per year, based largely on the needs of new technology and increased coverage.

In respect of generalists, there are federal criteria for designating Health Professions Shortages Areas (HPSAs) and Medically Underserved Areas (MUAs). Once the boundaries

of each geographic area in a State have been defined, the predominant criterion used to determine adequacy, shortage or surplus has been the ratio of primary care physicians to population. Initially a MUA was any area with less than a 1:4,000 ratio (25 per 100,000), but the ratio now is 1:3,500 (29 per 100,000) with a higher 'level 2' criterion of 1:3,000 (33 per 100,000) for areas of unusually high need or insufficient capacity. A 'level 3' ratio of 1:2,000 (50 per 100,000 population) was identified to approximate a 'target ratio' of adequacy. It was estimated by the US Department of Health and Human Services in 1994 that 5,085 additional generalists were needed to remove the HPSA designation and 11,708 extra to achieve a target provision of 50 per 100,000 population.

A benchmarking approach is also used to argue that there is a great under-representation of doctors in the workforce of particular ethnic backgrounds. '1990 census data show a white physician to white population ratio of 251 per 100,000 population, while the comparable figures for hispanics, blacks and native americans are 129, 71 and 48 respectively. Scenarios are modelled to test options for increasing these ratios to higher levels by 2020.'

In looking to the future, Kindig and Grumbach discuss a number of influences on future requirements for physicians which have been raised in the health literature:

- Without reform, health expenditures in the US will approach 20% of GDP by 2002. This will increase pressure to examine lower cost alternative workforce composition for given conditions, mixing professionals and para-professionals in local area models, and an increasing focus on the issues of over-service.
- There will be an increasing emphasis on the workforce issues associated with non-financial barriers such as culture, language, social support, individual behaviour change, and interfaces with other sectors such as education, environment and welfare.
- Advances in biomedical science may reduce chronic disease and degeneration.
- Advances in information systems may give patients more responsibility for health care decisions and reduce a substantial amount of care provided in person.

Kindig and Grumbach prepared an addendum paper *A Physician Workforce Research Agenda: Moving from Body Counts to Measuring System Performance* for the Trilateral Physician Workforce Conference in November 1996.

This argues that physician workforce planning needs to move to a health outcome focus. They report that initial ventures in this field have tended to be of either the telescopic or microscopic variety. The telescopic approach has 'consisted largely of cross-sectional analyses of small areas (often using counties as the unit of analysis) that attempt to measure associations between physician supply and/or specialty mix and various outcomes such as health care costs, hospitalisation rates, or mortality'. The problem with this approach is that it is difficult to tease out the unique contribution of doctors independent of other health system and ecological variables. 'Causal inferences are not robust.'

The microscopic approach scrutinises individual patients and practitioners, and can demonstrate findings such as care being more costly by specialists than GPs when managing similar patients to GPs. This approach does not lead very far in determining outcomes for different supply parameters for geographic regions.

Kindig and Grumbach then argue for studies which in the Australian setting might be:

- comparing health outcomes and costs for similar rural Aboriginal communities with different mixes of supply between doctors, nurses and Aboriginal health workers;
- comparing the health outcome measures of capital cities or large rural centres with similar demographic profiles against different medical workforce supply parameters; and

- comparing GP workforce productivity between high and low supply metropolitan areas.

Robert B Sullivan MA, MAB and Mamoru Watanabe MD, PhD, Canada (1996)

Canada has criteria which determine over-supplied and under-supplied areas, but these are not described in the paper. From April 1994, Nova Scotia physicians starting practice in over-serviced areas were to be paid 80% of the schedule fee, and at 115% in under-serviced areas.

Canada had a number of rounds of reducing medical school intakes in the 1980s and 1990s in responses to projections of over-supply, mainly arising because population growth from the 1970s onwards was much lower than projected in the 1960s.

In 1992, there were 99.1 primary care practitioners per 100,000 population, ranging from 79.2 in Prince Edward Island province to 113.0 in Yukon Territory. At the same time there were 88.3 specialists per 100,000 population, ranging from 13.3 in the Yukon Territory to 101.8 in Quebec.

David Spurgeon, Canada (1997)

Spurgeon reported in the 16 August 1997 edition of the *British Medical Journal* that, since 1995, doctors who moved into areas of British Columbia deemed by the medical services commission to have too many doctors received only 50% of the negotiated pay scale. Similar schemes have been adopted by other provinces. However in 1997 the Canadian Supreme Court ruled that this was unconstitutional.

Alan Maynard and Arthur Walker, UK (1997)

Workforce forecasting has changed from dealing with a predominantly male workforce seeking to work full-time until retirement at age 65 or more to a workforce with:

- increasing part-time employment by both male and female doctors, eg. 10% of female and 6% of male junior doctors now have part-time contracts, and the proportion of GPs in England working full-time has dropped from 94.5% in 1990 to 87.6% in 1995;
- increasing early retirement; and
- the gender balance expected to change quite rapidly. In 1993 there were 52,797 UK male physicians and 25,319 UK female physicians. In the 1990s the numbers of male and female medical students became approximately equal. By 2020 it is forecast that there will be 55,056 UK male physicians and 46,668 UK female physicians.

‘Central to the determination of requirements in many of the forecasts over the years is the concept of the physician/population ratio.’ The physician to population ratio for the UK is low by OECD standards, with just over 100,000 physicians serving a population of 58.4 million in 1993, of whom 80% live in urban areas. ‘Current policy is based on the view that there is a shortage of physicians and a modest expansion of the medical school intake has been set in train.’

The overwhelming proportion of GP income comes from the NHS, principally via a practice allowance and age-weighted capitation payments for each patient on their list. There is a long-standing practice of restricting new physicians to certain areas. Since 1977 the number of patients per GP principal has fallen to reach 1,900 in England and Scotland in 1994.

Lynda Buske and Sheri Newton, Canadian Medical Association, Canada (1996)

Buske and Newton argue that doctor to population ratios are a very broad indicator of whether or not the number of physicians is increasing or decreasing relative to the patient population. To be more useful than that, such ratios need to take account of:

- differing population needs, eg. age and sex;
- services obtained outside the population area;
- critical mass issues, ie. the minimum number of physicians required in an area to provide adequate professional support; and
- variation in service provision levels of individual physicians.

A marked increase in attrition rates has had a significant effect on the expected doctor-to-population ratio in Canada. Annual rates of retirement and semi-retirement increased by over 40% between 1985–89 and 1990–95, while physicians moving abroad accounted for between 25% and 30% of attrition. The average net gain from 1985–89 was 1,783 per year; this dropped to 960 per year from 1990–95, mainly because workforce losses almost doubled from 6,965 to 12,236. This trend accelerated in 1994 and 1995, resulting in a net loss of 149 for the two-year period, mainly because of a changeover in the training period which reduced new entrants to the workforce.

The conclusion that can be drawn from this experience is that increased early retirement and net migration of Australian doctors need to be carefully monitored and factored into future supply projections. The AMWAC survey of career paths in late 1997 found that almost half of the doctors interviewed had spent a year or more overseas.

Mamoru Watanabe MD, PhD, geographic distribution in Canada (1997)

Watanabe says that universality and access are key principles of the Canada Health Act and dictate that health services be available to all Canadians regardless of geography and social status.

He says that policies and practices across Canada 'have favoured redistributing physicians from urban centres, considered to be relatively over-doctored, to rural and remote sites, considered to be under-supplied and under-serviced. And, indeed, perhaps resulting from these policies and practices, the distribution of physicians in rural Canada has been improving through the years.'

Watanabe then argues that in the 1990s the concepts of outcomes, health status and determinants of health re-orient thinking from 'demands' to 'needs' for health services. In the past, 'demands' thinking has had an objective of equalising distribution of doctors, but it is naive to think that the gaps in health status between native and non-native Canadians would be solved by equal numbers of doctors per 100,000 population to serve both. There is much to be gained in a change of thinking to planning physician services on the basis 'of providing solutions that, in responding to population health needs, minimises disparities in health status and equalises health outcomes'.

He points to measurable disparities in health status between urban and rural populations, although these are much smaller than the disparities between rich and poor within urban Canada, and between Canada's native and non-native populations. He concludes by saying that while closing the gap in disparities between the health status of subgroups in the population is a worthwhile objective, it is one which cannot be attained solely by improved access to conventional health care services, essential as those services are.

Albert C Baggs, *The Lancet*, 1996 (6 January)

Baggs discusses the campaign by the Permanent Working Group of European Junior Hospital doctors to place upper limits on working hours. In the Netherlands, as a result of the reduction in hours, the government budgeted for 1,700 extra junior doctors. A reduction in working hours for junior doctors in Australia would be likely to lead to a similar increased requirement for hospital medical staff.

Medical Workforce Standing Advisory Committee Third Report, *Planning the Medical Workforce*, UK, December 1997

Future demand for doctors is estimated to grow by from 1.4% to 2% per annum, with a central estimate of 1.7%.

The wastage rate for UK doctors is just over 3.5% per annum, a composite of death, retirement, and non-participation (due, for example, to working overseas, a career break or a career move).

Because the time scale for medical education and training is long, projections of supply and demand must cover 20 years into the future. Inevitably this length of time introduces uncertainty.

Long-term demand for health care is expected to rise significantly because of:

- demographic change, including a rising proportion of aged people;
- medical advances, making new treatments available for diseases not currently treatable;
- rising expectations from the public for medical investigation and treatment in primary and secondary care;
- society's view that high quality health care widely available is desirable; and
- political initiatives such as the reduction of waiting times.

Long term demand for doctors would be influenced by

- the rise in health care demand;
- changes to patterns of work, including reduced hours for junior doctors which will significantly increase the numbers required to provide the same service, and changes flowing from society generally (eg. more shared responsibility for child care, demand for more leisure time, earlier retirement);
- increased training given by consultants and GP principals, reducing service time. The European Working Time Directive now applies in the UK which applies a 48 hour limit to the working week of doctors-in-training. This may extend over time more broadly in the medical workforce, but has not been assessed yet;
- increased need for CME and other activities to keep abreast of modern techniques and to increase skills in more specialised areas, reducing service time;
- reduction in the whole life contribution from doctors of the future, both female and male;
- career patterns of new graduates different from previous generations, and a much greater need for part-time posts;
- in primary care, an increase in the tendency of individuals to consult their GPs, driven largely by an expansion in community care and the introduction of a wider range of services in primary care. More consultations are taking place in the surgery and by phone, and fewer in patients' homes;

- technological change – there is no evidence that technological change will reduce demand for doctors;
- changing ways of delivering care, including much shorter hospital stays, and more day surgery, increasing demand for more specialist management of patients rather than more doctors in the training grades; and
- improvements in quality through increasing use of research and development, evidence-based medicine and audit. However, it is not possible yet to determine the effect on workforce needs of these improvements.

Data from the 1991 Population Census has been used to estimate the length of the economic working lives of health service professionals. This was 30 years for male doctors and 22 years for female doctors. Equivalent figures from the 1995 labour force survey are 31.5 years for men and 22 years for women. The current average of around 27 or 28 years, gives an annual wastage figure of 3.5% to 3.7%.

Of 1983 graduates, 3% of males and 45% of females were working part-time in 1994. Before age 50, men work more hours than women, but hours become roughly equal at this age.

Peter Newbery, 'Substitution' For and Among Physicians: A Canadian View, Canada, 1997

Newbery notes that, as in Australia, many rural Canadian communities have great difficulty finding a physician. Nurses have been used in the past and increasingly governments are seeing nurses as a cost-effective substitute. 'Ministry of Health documents call for decreases in the number of family physicians and changes in the way they are paid in order to make room for nurse practitioners.'

Newbery's personal experience is of an isolated community of 1,000 First Nations people where 15 years ago a family physician who departed was replaced by two nurse practitioners, who, along with a resident public health nurse, could maintain a 24 hour a day on-call program. Physicians were available 30 minutes travel time away.

Newbery references studies which demonstrate that quality and effectiveness of care in providing a limited range of primary care service is as high for nurse practitioners as for doctors, and, in specific areas such as pap smears, the input by a nurse to a population served only by a male doctor can attract additional population coverage to the service.

In Canada, as in Australia, the shortage of specialists in rural communities means that GPs with the skills provide a significant level of specialist care.

Newbery concludes that the medical profession has a moral obligation to provide doctors for rural communities, and only if they abdicate that responsibility should nurses be substitutes. However, if nurses are to be substitutes, then work is needed to describe advanced nursing practice, define it in law, and develop mechanisms for nurses to bill patients and be remunerated for their work.

Jay Noren MD, MPH, A National Physician Workforce Policy, USA (1997)

'The current status can be summarised succinctly. If we seek to simply maintain the current physician-to-population ratio (approximately 200 physicians per 100,000 population), we must reduce the number of physicians by 29% overall, including 33% in non-primary care specialties and 20% in primary care specialties. In a managed care-dominated system, conservative estimates indicate that we must downsize further: 43% reduction overall, 52% in non-primary care specialties, and 29% in primary care.'

Manitoba Centre for Health Policy and Evaluation, Needs-Based Planning for Manitoba's Generalist Physicians, Canada, 1996

This report states that:

- age, gender, socioeconomic status and health status are important factors in determining need for physician services. It uses age, gender, a socioeconomic risk index and premature mortality to calculate expected physician visits and compare these with actual visits; and
- healthy people should visit a physician once every five years or so, or more often if in an at risk category, for preventive services and diagnosis of conditions for which early treatment might help.

The methodology, supplemented by the additional factor of premature mortality, is virtually the same as in *Australian Medical Workforce Benchmarks* for calculating GP under-supply and over-supply. The premature mortality rate has been suggested in some studies as the best single indicator of health status capturing the need for health care, and is currently used in the UK for allocation of funds from the Department of Health to regional health authorities.

They ask the question, 'Does a physician surplus provide health benefits?' To date they have found no evidence to support this. Higher than expected levels of doctor consultations should be associated with lower than expected premature mortality (better health), and the converse should hold for lower than expected consultations. No such relationships were found ($r^2 = 0.001$). A further study found that for elderly people over a 12-year period regular doctor contacts did not result in any improvements in quality of life indicators compared with people of the same age not having regular medical consultations.

They say that disadvantages of over-supply are concerns about overtreatment and that over-supply means expenditure of public money beyond what is needed.

They found marked differences among doctors in the numbers of consultations for patients with similar chronic conditions.

They say their methodology (similar to *Australian Medical Workforce Benchmarks*) is one of the more sophisticated attempts to assess physician supply and overcomes many of the weaknesses of earlier efforts. However, it is open to criticism that:

- there is a risk of over-estimating the need for physician services since the approach used tends to assume that all services delivered were needed; and
- it assumes that all services currently provided must be delivered by physicians, when in fact at least some of the services could be provided by nurses and other health professionals.

They ask if they could be wrong in their calculations of over-supply. If supply was reduced in over-supplied areas, would this produce long waiting lists for appointments? They think not. They have a higher supply than Newfoundland and New Brunswick and note that Manitobans make 5.0 visits to generalist physicians per year, compared with an average of only 3.2 for Americans.

Manitoba Centre for Health Policy and Evaluation, Issues in the Management of Specialist Physician Resources for Manitoba, Canada, 1996

This report says that planning the specialist workforce is challenging because:

1. There is no consensus on how best to estimate the number of specialists needed in any jurisdiction, either for current requirements or the future when practices may change.

2. Specialist supply bears no demonstrable relationship to population health status. Areas with low rates of contact with specialists can have equal or better health than those elsewhere. Similar findings have been made in the United States.
3. Some types of care delivered primarily by one specialty group can also be delivered by other types of practitioners. Paediatricians, GPs and nurse practitioners all provide certain types of care for children; optometrists can provide a significant amount of care delivered by ophthalmologists; midwives and GPs can substitute for obstetricians.
4. Most specialists are located in metropolitan areas. Therefore knowing that a province has more or fewer specialists per capita than others says little about the access of people of that province to specialist services, particularly if specialists are not providing an equal level of care to those outside the urban areas.

The methodology for specialist workforce planning is to address the following questions:

1. What is the adequacy of supply in a particular province by comparing it with
 - supply of specialists relative to recommended doctor-to-population ratios
 - supply relative to other provinces
 - level of care delivered in the province relative to other provinces?
2. Is there a problem with ageing of the workforce, and is projected supply sufficient to keep up with ageing of the population?
3. How well do specialists serve the residents of all regions of each province?
4. How well do specialists serve high-need populations?

Recommended population per FTE physician ratios are shown in table 27.

Table 27: Recommended population per FTE physician ratios from Federal-Provincial-Territorial Guidelines, Canada, 1996

Specialty	Recommended ratio
General practice	1,307
Medical specialties:	
Neurology	89,948
Dermatology	77,098
Medical specialists	8,166
Paediatrics	19,355
Psychiatry	10,232
Obstetrics & gynaecology	18,074
General surgery	18,074
Surgical specialties:	
CVT surgery	128,213
Neurosurgery	165,761
Ophthalmology	30,099
Otolaryngology	51,456
Orthopaedic	34,127
Plastic	107,938
Urology	56,464
Anaesthetics	13,805

Source: Manitoba Centre for Health Policy and Evaluation.

These ratios are acknowledged to have major limitations and represent best 'guesstimates'.

The methodology used to estimate future growth in demand for specialist services is to take age and sex breakdowns of current utilisation and project these for 20 years using

population forecasts. To take into account ageing of the workforce and a rising proportion of women specialists, projected FTE supply is calculated.

To evaluate the adequacy of surgical services to rural residents, rates of surgery experienced by rural residents were compared with those of metropolitan residents, and found to be the same in Manitoba, despite the concentration of surgeons in metropolitan areas. However, in psychiatry, specialists provide fewer services to residents of middle and low income neighbourhoods than they do to residents of upper income neighbourhoods.

Permanent Working Group of European Junior Hospital Doctors, *Medical Manpower in Europe by the Year 2000 – from Surplus to Deficit, (1996)*

This makes supply and demand projections for 19 European countries.

This analysis is particularly interesting on a couple of issues:

- Some countries have an over-supplied medical workforce to the point of significant unemployment. The most notable and their unemployment rates for doctors are Italy (24.5%), Austria (8.9%), Germany (5.2%), Spain (4.7%), and the Netherlands (4.6%).
- FTEs were calculated as a fraction of activity at age 50. In Australia, as in the UK and a number of other countries, age 50 is the point at which both men and women doctors average almost the same hours worked, and these hours are the highest average hours at any age during their working life.

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