

first  
national report  
on health sector  
performance  
indicators

*'public hospitals – the state of play'*

FEBRUARY 1996

A REPORT OF THE NATIONAL HEALTH MINISTERS' BENCHMARKING WORKING GROUP  
TO THE AUSTRALIAN HEALTH MINISTERS' CONFERENCE

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## FOREWORD

Developing benchmarks for health sector performance is a difficult but intriguing task with which to be charged.

It is difficult because the health industry encompasses a broad range of health care facilities, health programs, and administrative and financing arrangements.

At the same time it is an intriguing task because a succinct set of national health sector benchmarks which allows comparison of performance between states has not previously existed. The ability to make meaningful performance comparisons will form a significant component of best practice developments.

The National Health Ministers' Benchmarking Working Group was charged with this task by the Australian Health Ministers' Conference. The Working Group has made significant progress in developing a framework for the measurement of effectiveness, efficiency and equity in the acute health sector, and definitions for performance indicators within this framework which are nationally applicable.

Consistent national data are not yet available for some of the new indicators, but nonetheless, there are sufficient results to date to stimulate questions as to why differences occur among jurisdictions. It is through asking these questions that the health industry will learn further ways of improving the management processes and clinical pathways which contribute to outcomes in this sector.

For much of the early work of the Working Group, Mr Chris Sheedy, Assistant Secretary, Health Service Outcomes Branch of the Department of Human Services and Health, was the Chair of the Working Group and I would like to thank him for his significant contribution.

Finally, it is with pleasure I present this report to the Australian Health Ministers' Conference, and recommend its use in the Australian health industry.

Bob Wells

Chair

National Health Ministers'  
Benchmarking Working Group

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## **PREFACE**

This document represents the efforts of the National Health Ministers' Benchmarking Working Group to develop a set of performance indicators for the health sector, and to bring together national data for the purpose of reporting against these indicators. The Australian Institute of Health and Welfare was contracted to provide technical assistance to the Working Group and to prepare this report.

While considerable progress has been made in developing and reporting health sector performance indicators, problems still exist in the quality and comparability of much of the data presented in this report. These problems are discussed throughout the report and readers are urged to exercise caution in interpreting the results.

Results are highlighted in the text with a solid vertical bar at the column margin. The reporting and discussion of the performance indicators appears in the coloured section in the middle of the document.

### ***Acknowledgments***

I am grateful to the many organisations and people who contributed to this report, and acknowledge firstly the members of the Working Group whose energy, commitment and liaison skills enabled the production of the report.

Secondly, I would like to thank the officers of the State and Territory health authorities who provided the Institute with data, as well as many sections of the Commonwealth Department of Human Services and Health which provided input. In particular, I acknowledge the assistance of the Hospitals Strategies Section which provides secretariat services to the Working Group and coordinated many aspects of the report preparation.

Within the Institute I received invaluable assistance from staff in the Health Services Division, particularly Anne Broadbent and Susan Salloom, in the preparation of data. I am also grateful to Chris Stevenson who provided technical advice regarding the analysis of intervention rates. Finally, I would like to acknowledge the efforts of the Publications Unit in managing the publication of this report within a tight timeframe.

Mark Cooper-Stanbury  
Senior Project Officer  
Australian Institute of Health and Welfare



## ABBREVIATIONS

–	Nil or rounded to zero
ABS	Australian Bureau of Statistics
ACHS	Australian Council on Healthcare Standards
AHMAC	Australian Health Ministers' Advisory Council
AHMC	Australian Health Ministers' Conference
AIHW	Australian Institute of Health and Welfare
ALOS	Average length of stay
AMC	Australian Manufacturing Council
AN-DRG	Australian National-Diagnosis Related Groups
COAG	Council of Australian Governments
DRV	Depreciated replacement value
HACC	Home and Community Care Program
HASAC	Health and Allied Services Advisory Council
HEDIS	Health Plan Employer Data and Information Set
HSH	Commonwealth Department of Human Services and Health
HUCS	Hospital utilisation and costs study
ICD-9-CM	International Classification of Diseases, 9th Revision, Clinical Modification
IFRAC	Inpatient fraction
MBS	Medicare Benefits Schedule
na	Not applicable
NHDD	National Health Data Dictionary
NHMBWG	National Health Ministers' Benchmarking Working Group
NHOP	National Hospital Outcomes Program
NHQMP	National Hospital Quality Management Program
NMDS	National Minimum Data Set
np	Not provided
OECD	Organisation for Economic Cooperation and Development
PBS	Pharmaceutical Benefits Scheme
TRV	Total replacement value
US	United States of America
VMO	Visiting medical officer

## SUMMARY

1. Australia, like other developed countries, is faced with the issues of rising health care costs, rising demands for health care services, and greater consumer expectation of quality and improved health outcome.

Achieving efficiency gains is an appropriate response to these pressures, but this must be done without compromising effectiveness. To monitor efficiency and effectiveness, performance indicators have been developed that measure key processes and outputs in health service delivery. These indicators assist governments, funders and managers of health services in management and policy development. Specifically, they provide baseline data and enable the setting and monitoring of best practice levels of performance.

2. The process of systematically searching for and incorporating international best practice into an organisation is known as benchmarking, and is common practice among leaders in other industries. This report represents the efforts of the National Health Ministers' Benchmarking Working Group, a working group of Commonwealth, State and Territory health authority officers, the Australian Hospitals Association and the Australian Institute of Health and Welfare. The Working Group was established in March 1994 by the Australian Health Ministers' Conference to develop health sector benchmarks.
3. The Working Group developed a set of hospital performance indicators in the areas of efficiency, productivity, quality and access. These indicators were developed in the light of current national collections and, for some measures, in liaison with other working groups and programs. The scope was limited to acute hospitals for this report, with extension to other areas of the industry possible in the future.
4. To put the hospital results in context, data are presented on a range of institutional and non-institutional health services, and a sketch of the demography of the Australian population is provided. Key contextual data include:
  - expenditure in the acute hospital sector amounted to just over \$12 billion, with the entire health system contributing 8.5% to Australia's gross domestic product in 1993–94;
  - there were 1,130 acute health care facilities supplying 4.2 beds per 1,000 population; and
  - on average, each person received 10.2 medical services through the year.
5. The main part of this report (Chapter 3) defines and reports on the hospital performance indicators developed to date. The Working Group found that the quality of available data was highly variable, and in only a few cases were collected data based on nationally consistent definitions. For these reasons, results in this chapter should be interpreted with caution.

6. The main findings in the area of efficiency for public hospitals were:
  - the average cost per casemix-adjusted separation ranged from \$2,208 in South Australia to \$3,237 in the Australian Capital Territory, with the national average being \$2,327 (Table 3.2); and
  - there was a high degree of consistency in average length of stay among the States and Territories for the top 20 treatment categories reported (Tables 3.4 and 3.5).
7. In the area of productivity, indicative data were provided though results can not be directly compared.
8. In the area of quality:
  - data relating to quality of care indicators are reproduced from a report of the Australian Council on Healthcare Standards (ACHS) Care Evaluation Program. These data are based on a small, non-representative sample of hospitals in each State and Territory:
    - the rate of unplanned readmissions ranged from 0.8% in the Australian Capital Territory to 6.3% in the Northern Territory (Table 3.9);
    - the rate of return to operating room ranged from 0.1% in Tasmania to 4.2% in the Northern Territory (Table 3.10);
    - the rate of hospital-acquired bacteraemia ranged from 0.03% in South Australia to 0.3% in Tasmania (Table 3.11); and
  - as a stand-in measure for the quality of the processes of care, the number of hospital facilities accredited by ACHS is reported: the proportion of public and private acute hospitals accredited ranged from 16% in Queensland to 64% in New South Wales (Table 3.16).
9. The main findings in the area of access were:
  - the average clearance time for elective surgery patients ranged from 1.8 months in New South Wales to 9.9 months in the Northern Territory (Table 3.18). Clearance time is a prospective measure of the capacity of the system to clear patients from the waiting list;
  - there were large variations among the States and Territories in the separation rates for selected procedures (Table 3.23). The largest percentage difference above the comparison rate was for hip replacements in the Australian Capital Territory (72.8%), while the largest difference below the comparison rate was for lens insertions in Western Australia (43.7% below);
  - total admissions per 1,000 population ranged from 226.5 in the Australian Capital Territory to 283.4 in South Australia (Table 3.24); and
  - for public acute hospitals, the highest rate of public patient admissions was in the Northern Territory (91%) and the lowest in New South Wales (72%).

10. The Working Group developed an agenda for developing indicators and establishing benchmarking practices in the health sector. In summary, four areas of development are discussed with possible timeframes indicated:
- improve indicators reported in this first national report (12 months);
  - develop agreed indicators not reported in first report (18–24 months);
  - extend the set of agreed indicators to cover all components of the framework, such as outcomes and locational disadvantage (18–24 months); and
  - other activities, including facilitation of benchmarking networks, investigation of indicators to cover the continuum of hospital and non-hospital components of care, and investigation of options for international networks (18–36 months).

# 1 INTRODUCTION

## PREAMBLE

Australia's health care system is complex and multifaceted. It is also a system which is generally considered effective in terms of health outcomes, consumer satisfaction and cost. The Organisation for Economic Cooperation and Development (OECD) 1994–95 Economic Survey of Australia favourably compares Australia's performance in health care provision with other OECD countries.

It found that 'The health status of Australians had improved significantly over recent decades, helped by the health care system which guarantees universal coverage and yields a large measure of satisfaction among the population at a reasonable overall cost to the economy' (OECD 1995).

Like other OECD countries, Australia is experiencing growth in health care expenditures. Factors influencing this growth are frequently documented and include demand factors such as rising incomes, population ageing and increased access, and supply factors such as improved therapeutic and diagnostic technology, and increased supply of medical personnel and equipment.

Funders of health care services are keen to find sensible solutions to curbing this growth. Increasingly sophisticated incentives—such as casemix funding arrangements—are being trialled to monitor and control this growth.

Efficiency measures should not, however, be introduced without attendant incentives to maintain and improve effectiveness, quality and equity within the system.

Various measures already exist to look at the performance of these elements of the system. However, a national system for defining benchmark performance of the health system as a whole has not previously existed.

The moves by private industry to benchmark with competitors in order to make organisations more competitive in world markets has prompted the health sector to look at the potential of this movement for its own purposes. In this context, the Australian Health Ministers' Conference (AHMC) of March 1994 agreed to the development of nationally consistent benchmarks for the health sector in a number of areas, including efficiency, quality, access and outcomes.

The purpose of developing health sector benchmarks is to provide an incentive for improved efficiency, effectiveness and equity in the health sector through:

- defining an acceptable national standard of performance in health service delivery;
- creating a greater focus on measurement of performance in the health sector; and
- providing governments, other funders and managers with a core

set of management performance information to assist in health sector management and policy development.

## **BACKGROUND**

### **Origin of the program**

As noted above, in March 1994 Health Ministers agreed to the development of nationally consistent benchmarks for the health sector in a number of areas. Ministers also agreed to the establishment of a working group of Commonwealth, State and Territory officers to coordinate the development of the benchmarks. This group, known as the National Health Ministers' Benchmarking Working Group (NHMBWG), first met in August 1994. The membership of the Working Group as at October 1995 is shown in Appendix A.

### **Relationship to other programs**

The work of the NHMBWG relates to that of a number of other groups and programs. A brief description of two of the principal programs and the relationship follows. Appendix B contains a summary of some of the related programs with their objectives.

#### ***Council of Australian Governments Review of Commonwealth/State Service Provision***

As part of the Council of Australian Governments (COAG) Review of Commonwealth/State Service Provision, a number of working groups were set up in key areas. The Hospitals Working Group, in liaison with the Commonwealth Department of Human Services and Health, developed a set of nationally agreed performance indicators relating to

the efficiency and effectiveness of the public hospital system. At the July 1994 meeting of the Steering Committee for the review, it was agreed that the Hospitals Working Group's tasks in respect of performance measurement would be merged with that of the NHMBWG.

The NHMBWG therefore took on the suggested performance indicators to develop them further in the context of its own terms of reference. To avoid duplication, the Hospitals Working Group is represented on the NHMBWG by officers of the Industry Commission (which provides secretariat services to the review) and the Victorian Department of Treasury and Finance (which is responsible for chairing the Hospitals Working Group).

#### ***National Hospital Outcomes Program***

The National Hospital Outcomes Program (NHOP) replaced the National Hospital Quality Management Program (NHQMP) in July 1995. The NHQMP, an incentive program under the 1993–98 Medicare Agreements, promoted a national approach to the improvement of quality of care and health outcomes of hospital services. The program also addressed priority areas such as the development and use of national clinical and non-clinical indicators of quality and outcomes of care, medical record reform, integrated discharge planning and promoting a stronger consumer focus.

The NHOP builds on the work of the NHQMP and will, over the next three years, develop and implement performance measures for standards of

quality and outcomes of care in Australian hospitals.

The quality of care indicators discussed in this report were initially advanced by the NHQMP (they were originally developed as part of the Australian Council on Healthcare Standards Care Evaluation Program), and the further development and reporting of quality measures under the NHOP is closely linked to the NHMBWG's objectives.

## OBJECTIVES

### Objectives of the Working Group

The terms of reference of the Working Group identify its objectives as follows:

1. to establish appropriate national indicators of performance in the health sector under the following categories:
  - quality
  - production efficiency
  - outcomes
  - investment utilisation
  - access
  - human resource management
  - business operations;
2. in establishing these indicators, to give due consideration to:
  - the validity of the indicators, in terms of the degree to which they provide clear and direct information about the efficiency and effectiveness of the health sector;
  - the understandability of the indicators; and
3. to develop standardised definitions of nominated performance indicators, where required, to ensure comparability of data across all States/Territories;
4. to establish procedures for the ongoing collection of performance indicator data and publication of these data on an annual basis at national, State and local level;
5. to undertake the national coordination of benchmarking activities, including the development of networks to facilitate exchange of information on best practice and the setting of initial benchmarks;
6. to give consideration to linkages with other activities/programs being undertaken in this area, that is:
  - COAG Review of Commonwealth/ State Service Provision;
  - National Hospital Outcomes Program (formerly National Hospital Quality Management Program);
  - Better Health Outcomes for Australians: National Goals, Targets and Strategies for Better Health Outcomes Into the Next Century;
  - the National Demonstration Hospitals project;
  - the national Best Practice Program;

- Schedule I of the Medicare Agreements relating to outcome indicators and measures; and
  - the Institute's standardisation of data definitions work; and
7. to establish a methodology for the casemix adjustment of data.

### **Objectives of this report**

This is the first national report on health sector performance indicators, and the objectives of the report are appropriately broad:

1. to present data and analyses for indicators where data are available and of sufficient quality;
2. to provide a status report for indicators where data are inadequate to report at a national level;
3. to introduce the concept of benchmarking in the health sector; and
4. to outline an agenda for further development of health sector performance indicators.

## **SCOPE**

### **Scope of the collection**

Developing performance indicators for the health sector is a complex task, so it is appropriate when starting out to focus on one part of the sector. With the merging of this program with that of the COAG review, it was fitting that the scope of this report be limited to the acute hospital sector. Acute hospitals provide services predominantly to patients with acute or temporary ailments. The term 'acute hospital' is often used synonymously

with general hospital or recognised hospital.

Some contextual information (see Chapter 2) is also drawn from beyond the acute hospital sector, and some from outside the hospital sector—notably the large Commonwealth health programs.

For most indicators, the scope is restricted to public acute hospitals, but where balance of care is an issue, private acute hospitals are included.

### **Period of the collection**

Most data sets cover activity in the 1993–94 financial year. Exceptions to this are:

- waiting list data were collected by each State and Territory (except Queensland) for a one-month period between June and September 1994; and
- hospital morbidity data and some demographic data were available only for the 1992–93 financial year.

## **DATA SOURCES**

One of the keys to achieving timely reporting of performance data was to use data already flowing from State and Territory health authorities to Commonwealth agencies. The establishment of new data collections for this report was not possible in the timeframe dictated by the COAG review.

Principal data sets include:

- National Minimum Data Set (NMDS) survey program data, that is, hospital- and patient-level data collected for the Institute's



*Hospital Utilisation and Costs Study* (HUCS) series;

- casemix data, that is, data supplied to the Department of Human Services and Health (HSH) primarily for the purpose of casemix development;
- data supplied to HSH as part of the Medicare Agreements;
- waiting lists data supplied to the Institute; and
- population and other demographic data prepared by the Australian Bureau of Statistics (ABS).

State and Territory health authorities were also requested to provide data regarding capital asset valuation and related material. These data have not been part of a routine collection by any of the Commonwealth agencies.

Additional information on projects and activities related to the agreed performance indicators was also requested to illustrate indicators for which national data were not available.

Other data compiled for the report include:

- Medicare Benefits Schedule (MBS) services and expenditure, and medical providers receiving benefits under the scheme;
- Pharmaceutical Benefits Scheme (PBS) prescriptions and expenditure, and approved retailers; and
- hours of care under the Home and Community Care (HACC) Program.

## **DATA QUALITY AND AVAILABILITY**

### **Survey of data quality and availability**

In March 1995 the Institute conducted a survey of the State and Territory health authorities that aimed to evaluate the likely availability and quality of data for this report given the current collection parameters (definitions, scope and timetable). The survey took the form of a structured questionnaire addressing each indicator and included a discussion of some of the outstanding definitional and collection issues.

Based on the information compiled from the survey it was evident that much work was required to achieve valid comparative hospital performance measures. The Working Group decided that only a small subset of the agreed indicators be used for comparison purposes, and that the indicators be accompanied by a number of qualifying statements.

Though data on other indicators are available, they are either not available for all jurisdictions or not of sufficiently high quality to use for national comparisons. Where appropriate, these data are used to illustrate the type of reporting possible, or the type of developmental work required to bring the indicator into the arena of national reporting. A discussion of a possible development program is contained in the last section of this report.

### **Data quality in general**

Data quality is usually higher where data are collected according to nationally agreed definitions. Such definitions are published by the Institute in the *National*

*Health Data Dictionary* (NHDD) and cover data items for some of the indicators (see specific indicators in Chapter 3). The Dictionary has been declared by the Australian Health Ministers' Advisory Council as the authoritative source of health data definitions for Australia.

Even where national definitions exist and are used by the health authorities, they may be inconsistently applied. This inconsistency is difficult to control and correct for, and may affect—to a minor degree—the comparability of indicators constructed from the data.

Data quality is generally seen to improve over time when data are collected and published at a national level. One of the positive outcomes of this report may be that data quality improves as data providers seek to enhance the comparability of data collected.

## **COMPARING HOSPITAL PERFORMANCE**

### **Data quality and comparing hospital performance**

It follows from the discussion in the previous section that comparisons are valid only where data quality (at least in terms of consistency) is high. Where data are extracted from disparate sources and collected for purposes other than national comparisons, some caution is required in interpreting the results.

Although great efforts have been made in this report to standardise the data used to construct indicators, some anomalies among and within States and Territories still exist. These anomalies are stated

where they occur, as are the techniques used to standardise the data or control for known differences in the practices of service providers.

### **The nature of performance indicators**

Performance indicators are just indicators. They are an attempt to describe a real aspect of the behaviour or performance of a provider, and are useful for generating questions about such behaviour or performance. Indicators are also useful for establishing baseline levels of performance and monitoring changes achieved as part of a quality improvement program.

Indicators do not necessarily reveal how a system is performing with respect to its stated aims, such as maximising the health gain of the population it serves. This sort of evaluation is beyond the scope of currently available data on health outcomes.

The performance of a provider may appear to be short of desired levels because the indicators used fail to account for certain aspects of the patients treated. For example, none of the indicators reported in full in this report takes account of the severity of illness of patients treated.

Indicators must be developed that avoid biases or make appropriate adjustments.

### **Benchmarking hospital performance**

The application of benchmarking processes in the health sector in Australia is very much in its infancy.

Benchmarking requires high-quality data

that are consistent among the benchmarking partners.

State and Territory representatives on the NHMBWG believed that the data quality and availability are presently inadequate to set benchmarks and report against those benchmarks. The data collected and presented in this report are nonetheless useful for motivating health authorities to question and investigate the behaviours of the providers that led to the results.

Chapter 4 contains a more comprehensive discussion of the use of benchmarking in the health sector.

## **STRUCTURE OF THE REPORT**

Following this introduction, information is provided in Chapter 2 that helps put the hospital indicators data in context.

Chapter 3 reports the hospital performance indicators for which data are available, and addresses the indicators for which data are not presently available.

Chapter 4 contains a discussion of the application of benchmarking in the health sector, and the final chapter attempts to outline an agenda for the development of the hospital indicators, and indicators for the broader health sector.

## 2 THE ACUTE HOSPITAL SECTOR IN CONTEXT

### THE AUSTRALIAN HEALTH CARE SYSTEM

The Australian health care system is pluralistic and complex. It involves three levels of government—Commonwealth, State and local—with public and private providers who may be individuals or institutions. In 1993–94 the health system contributed 8.5% of Australia’s gross domestic product.

The health system can be broadly divided into institutional and non-institutional services. The following sections provide an overview of these areas.

#### Institutional health services

Institutional health services accounted for just under half of all recurrent health expenditure in 1992–93 (the most recent year for which detailed expenditure data are available).

Table 2.1 provides key statistics on the institutional health system. Highlights of the table are:

- in 1993–94 there were 690 public acute hospitals, 329 private acute and psychiatric hospitals and 111 free-standing day hospital facilities;
- these 1,130 hospitals supplied 4.2 beds per 1,000 population (see Figure 2.1); expenditure in

acute hospitals amounted to \$12.0 billion;

- 27 hospitals were dedicated to care for the mentally ill; and
- residential care for the aged was provided in 2,822 facilities, supplying 90.5 beds per 1,000 population aged 70 years and over.

The number of hospitals is understated in this report to the extent that health authorities manage as a single unit a group of hospitals in an area or district. Conversely, the number of hospitals is overstated for Queensland by the inclusion of outpatient centres (which do not admit patients) in the count of acute hospitals.

The number of hospitals and beds in the acute sector is also affected by the progressive integration of repatriation and psychiatric hospitals. Repatriation hospitals were managed by the Commonwealth Department of Veterans’ Affairs and are not counted in the number of public acute hospitals. At 30 June 1994, four hospitals were being managed by the Commonwealth Department of Veterans’ Affairs, supplying approximately 1,300 beds.

Figure 2.1 shows the number of available beds per 1,000 population for public and private acute hospitals.

**Table 2.1: Institutional health services: key statistics, 1993–94**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Acute hospitals</b>									
<b>Number</b>									
Public									
Teaching	14	13	8	5	6	2	–	–	48
Non-teaching	170	121	170	83	75	15	3	5	642
Total public	184	134	178	88	81	17	3	5	690
Private <sup>(a)</sup>	91	113	51	24	38	9	2	1	329
Free-standing day hospital facilities <sup>(b)</sup>	63	24	9	7	3	1	4	–	111
Total acute hospitals	338	271	238	119	122	27	9	6	1,130
<b>Average available beds</b>									
Public									
Teaching	6,707	4,250	3,237	2,205	2,036	886	–	–	19,321
Non-teaching	10,230	7,807	6,572	2,876	3,023	588	765	575	32,436
Total public	16,938	12,056	9,809	5,081	5,059	1,474	765	575	51,757
Private <sup>(c)</sup>	5,834	6,031	4,403	1,881	2,142	590	220	140	22,158
Total acute hospitals	22,772	18,087	14,212	6,962	7,201	2,064	985	715	73,915
<b>Beds per 1,000 population<sup>(d)</sup></b>									
Public									
Metropolitan <sup>(e)</sup>	2.4	2.4	3.0	2.6	2.7	3.5	2.6	3.6	2.6
Non-metropolitan	4.1	3.7	3.3	4.2	5.6	2.4	na	3.2	3.8
Total public	2.8	2.7	3.1	3.0	3.5	3.1	2.6	3.4	2.9
Private									
Capital city	1.2	1.6	1.5	np	1.9	np	0.7	1.8	1.2
Rest of state	0.7	0.8	1.4	np	0.4	np	na	–	0.8
Total private <sup>(e)</sup>	1.0	1.4	1.4	1.1	1.5	1.3	0.7	0.8	1.3
Total acute hospitals	3.8	4.1	4.6	4.2	4.9	4.4	3.3	4.2	4.2
<b>Total recurrent expenditure (\$m)</b>									
Public									
Metropolitan									
Teaching	1,884	1,080	645	575	530	168	–	–	4,883
Non-teaching	851	605	156	105	116	20	191	62	2,105
Total metropolitan	2,735	1,684	801	680	646	188	191	62	6,988
Non-metropolitan	1,085	547	680	216	174	66	na	54	2,822
Total public	3,821	2,231	1,481	896	820	253	191	116	9,809
Private <sup>(f)</sup>	648	668	409	203	232	66	–	–	2,226
Total acute hospitals	4,469	2,899	1,890	1,099	1,052	319	191	116	12,035
<b>Public psychiatric hospitals<sup>(g)</sup></b>									
Number	4	10	5	5	2	1	–	–	27
Average available beds	1,414	1,178	1,292	451	662	142	–	–	5,139
Beds per 1,000 population	0.2	0.3	0.4	0.3	0.5	0.3	–	–	0.3
<b>Nursing homes</b>									
Number	488	437	201	112	153	53	6	7	1,457
Available beds	29,174	17,082	12,224	6,101	6,812	2,094	557	192	74,236
Beds per 1,000 population aged 70 and over	57.8	46.7	50.8	52.4	50.3	29.9	41.9	65.9	51.2
<b>Hostels</b>									
Number	430	325	245	154	149	42	13	7	1,365
Available beds	18,446	13,832	11,444	5,111	6,039	1,347	603	128	56,950
Beds per 1,000 population aged 70 and over	36.5	37.8	47.6	43.9	44.6	19.2	45.4	43.9	39.3

(a) Includes private psychiatric hospitals.

(b) Private hospitals providing care on a same-day basis only.

(c) Includes beds for free-standing day hospitals in Australian column only.

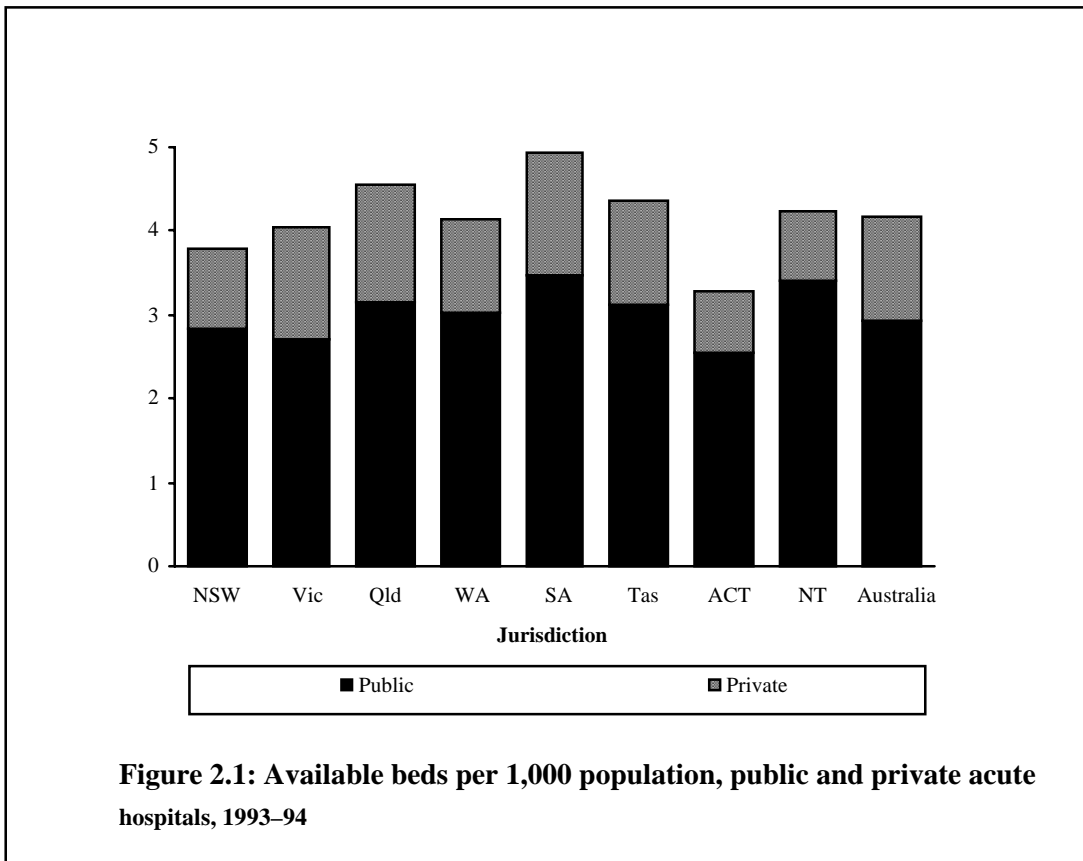
(d) Based on ABS estimated resident population, 30 June 1993.

(e) Metropolitan includes capital cities plus the major urban areas of Newcastle, Wollongong, Geelong and Launceston.

(f) As reported in *Private Hospitals Australia, 1993–94*, ABS Cat. No. 4390.0.

(g) Private psychiatric hospitals are included in private acute.

Sources: AHW National Minimum Data Set collection, unpublished; ABS Estimated Resident Population, Cat. No. 3101.0; HSHA Annual Report 1993–94; *Private Hospitals Australia, 1993–94*, ABS Cat. No. 4390.0.



### Non-institutional health services

Non-institutional health services primarily comprise medical services under Medicare, drugs and medicines subsidised by the Pharmaceutical Benefits Scheme (PBS), and community health services and assistance.

Table 2.2 contains key results for the Medicare scheme (Medicare Benefits Schedule services, or MBS), the PBS, and the Home and Community Care Program (HACC), which provides care and assistance to people at risk of being institutionalised to enable them to stay in their own residences. Figure 2.2 shows the average number of medical services per person during 1993-94.

Highlights of the non-institutional sector include:■

2.2 medical practitioners per 1,000 population provided MBS services in 1993-94;

- there were 10.2 MBS services per person, amounting to just over \$300 per person;
- approximately 114 million prescriptions were subsidised by the PBS, to the value of \$1.7 billion or the equivalent of \$95 per person; and
- 1,838 hours of HACC services per 1,000 target population were provided, as well as 1,129 meals per 1,000 target population. The target population is an ABS estimate of the number of people with severe or moderate disability.

**Table 2.2: Non-institutional health services: key statistics, 1993–94**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Medical workforce (per 1,000 population)</b>									
Metropolitan									
Recognised GPs <sup>(a)</sup>	1.0	0.9	1.1	0.9	1.1	1.3	1.0	0.7	1.0
Other GPs <sup>(b)</sup>	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.9	0.5
Other practitioners <sup>(c)</sup>	1.1	1.1	1.0	1.0	1.3	1.4	0.9	0.7	1.1
Total practitioners	2.5	2.5	2.6	2.4	2.9	2.7	2.2	2.3	2.6
Non-metropolitan									
Recognised GPs	0.8	0.8	0.6	0.7	0.9	0.7	20.4	0.5	0.7
Other GPs	0.2	0.2	0.3	0.3	0.2	0.2	5.3	0.5	0.2
Other practitioners	0.5	0.4	0.2	0.2	0.1	0.3	3.6	0.2	0.3
Total practitioners	1.4	1.4	1.1	1.2	1.1	1.1	29.3	1.2	1.3
Total									
Recognised GPs	0.9	0.9	0.9	0.9	1.0	1.0	1.1	0.6	0.9
Other GPs	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.7	0.4
Other practitioners	0.9	0.9	0.8	0.7	1.0	0.7	0.9	0.4	0.9
Total practitioners	2.2	2.3	2.1	2.1	2.4	2.1	2.3	1.7	2.2
<b>MBS services (per 1,000 population)</b>									
<b>In-hospital services <sup>(d)</sup></b>									
MBS services									
GP attendances	38	56	73	37	76	26	3	15	51
Specialist attendances	125	170	170	92	177	138	106	51	145
Radiology services	52	45	36	39	51	33	30	10	45
Pathology services	246	251	198	186	229	201	75	61	226
Other services	223	249	229	186	260	192	178	88	227
Total services	684	772	706	539	793	590	392	225	693
MBS benefits (\$)									
GP attendances	947	1,441	1,844	931	2,057	754	63	383	1,295
Specialist attendances	4,507	6,111	6,286	3,277	6,161	4,659	3,727	1,840	5,212
Radiology services	3,797	3,757	3,014	2,937	4,346	2,453	2,365	663	3,522
Pathology services	4,743	4,760	4,021	3,622	4,289	3,804	1,674	1,303	4,366
Other services	28,420	30,731	28,853	24,641	32,694	24,692	23,928	10,868	28,732
Total services	42,414	46,800	44,018	35,407	49,547	36,362	31,756	15,057	43,127
<b>Out of hospital services</b>									
MBS services									
GP attendances	5,844	5,336	5,385	4,766	5,444	4,833	4,712	2,971	5,425
Specialist attendances	932	844	640	627	882	646	803	296	809
Radiology services	568	466	469	485	418	402	461	339	496
Pathology services	2,539	1,940	2,418	2,115	1,745	1,837	1,062	1,093	2,202
Other services	669	547	627	533	555	519	591	333	600
Total services	10,551	9,133	9,538	8,525	9,043	8,236	7,628	5,031	9,532
MBS benefits (\$)									
GP attendances	128,819	117,620	116,681	102,856	121,257	107,151	103,021	63,695	119,114
Specialist attendances	46,187	43,158	32,362	30,082	44,132	31,769	38,085	13,340	40,445
Radiology services	45,588	35,483	33,394	33,435	30,902	29,788	38,465	22,476	37,746
Pathology services	40,751	30,999	40,333	33,844	27,513	26,719	16,354	17,897	35,452
Other services	31,878	26,101	30,372	24,933	28,687	24,883	27,861	14,347	28,805
Total services	293,222	253,361	253,141	225,150	252,490	220,310	223,786	131,755	261,562
<b>Total services (per person)</b>									
Services	11.2	9.9	10.2	9.1	9.8	8.8	8.0	5.3	10.2
Benefits (\$)	336	300	297	261	302	257	256	147	305

(continued)

**Table 2.2 (continued): Non-institutional health services: key statistics, 1993–94**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Approved pharmacy outlets</b>									
Metropolitan									
Retail pharmacies	1,302	929	678	344	283	100	65	16	3,717
Non-metropolitan									
Retail pharmacies	429	287	268	116	114	51	na	10	1,275
Approved doctors <sup>(e)</sup>	20	1	12	8	15	10	na	–	66
Total									
Retail pharmacies	1,731	1,216	946	460	397	151	65	26	4,992
Approved doctors	20	1	12	8	15	10	na	–	66
<b>PBS services</b>									
Prescriptions (000s)									
General beneficiaries <sup>(f)</sup>									
Ordinary <sup>(g)</sup>	4,274	2,784	1,929	979	847	265	256	75	11,409
Safety net <sup>(h)</sup>	1,675	1,075	706	279	311	96	84	16	4,242
Entitled (free) <sup>(i)</sup>	1,369	677	538	160	211	57	53	9	3,073
Total	7,318	4,536	3,173	1,418	1,369	418	392	100	18,724
Concessional beneficiaries <sup>(j)</sup>									
Ordinary	28,049	19,412	13,447	6,296	7,012	2,265	622	245	77,349
Entitled (free)	7,423	4,207	3,105	1,186	1,412	478	113	24	17,948
Total	35,472	23,619	16,552	7,482	8,424	2,743	735	268	95,297
Total prescriptions	42,790	28,156	19,725	8,899	9,794	3,161	1,128	368	114,021
Prescriptions per person	7.1	6.3	6.3	5.3	6.7	6.7	3.8	2.2	6.5
PBS benefits (\$'000s)									
General beneficiaries									
Ordinary	85,109	55,515	36,910	19,385	16,899	5,098	5,117	1,312	225,345
Safety net	31,770	19,625	12,888	5,280	5,617	1,764	1,664	270	78,878
Entitled (free)	28,968	13,780	11,107	3,243	4,240	1,162	1,196	165	63,861
Total	145,847	88,920	60,905	27,907	26,756	8,024	7,977	1,747	368,084
Concessional beneficiaries									
Ordinary	382,180	252,366	172,395	81,962	89,668	29,694	8,940	2,935	1,020,139
Entitled (free)	126,035	69,320	50,427	19,232	22,372	7,701	2,123	375	297,586
Total	508,215	321,686	222,822	101,194	112,040	37,395	11,063	3,310	1,317,725
Total benefits	654,062	410,606	283,727	129,101	138,797	45,419	19,040	5,057	1,685,809
Benefits per person (\$)	109	92	91	77	95	96	64	30	95
<b>HACC services</b>									
Number of hours per 1,000 target population <sup>(k)</sup>									
Home help	539	914	317	709	183	791	344	873	576
Centre day care	636	466	725	556	420	172	244	28	557
Home nursing	238	300	339	281	173	284	336	0	271
Respite care	363	130	128	154	73	173	255	281	205
Personal care	247	91	27	244	88	175	138	209	147
Home maintenance	63	80	26	79	4	83	55	14	56
Paramedical	22	25	27	29	41	17	42	0	26
Total	2,108	2,007	1,590	2,052	981	1,695	1,414	1,405	1,838
Number of meals per 1,000 target population									
Home meals	995	1,075	938	1,003	914	1,224	487	1,221	996
Centre meals	107	143	110	354	81	28	20	149	133
Total meals	1,101	1,218	1,048	1,357	995	1,252	507	1,370	1,129

(a) Vocationally registered GPs.

(b) Non-vocationally registered medical practitioners (excluding specialists) providing GP Medicare services.

(c) Includes specialist medical practitioners and other practitioners providing specialist services.

(d) Services provided to private patients in public and private hospitals.

(e) Doctors in remote areas approved for PBS benefits.

(f) Beneficiaries not eligible for concessional benefits.

(g) Prescriptions covered by PBS with a fee greater than the threshold.

(h) Prescriptions covered by PBS where beneficiary has exceeded first-level safety net threshold.

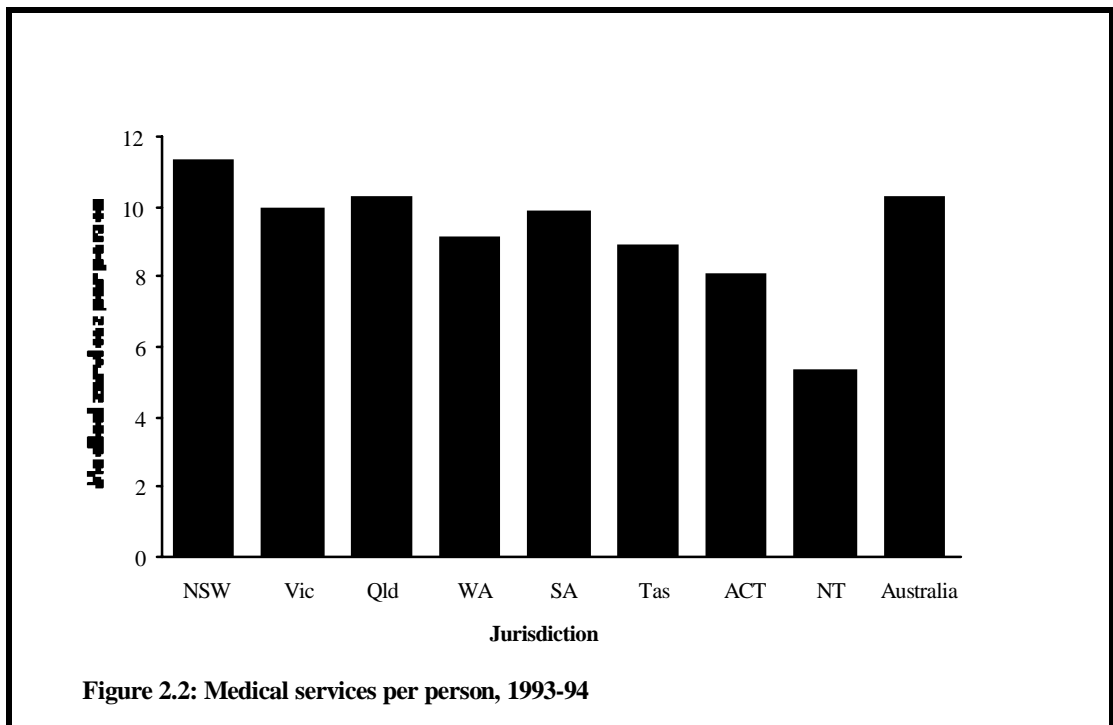
(i) Prescriptions covered by PBS where beneficiary has exceeded second-level safety net threshold.

(j) Beneficiaries entitled to concession by way of health care card, aged pension, etc.

(k) Target population is ABS estimate of persons with moderate or severe disability.

Source: HSH, unpublished data.





## AUSTRALIA'S PEOPLE

Table 2.3 provides an outline of the demography of the Australian population. Many of the measures reported in this section are related to the nature and quality of health services provided over a long period, and to some extent indicate the demand on the health system.

Key features of the demographic data include:

- Australia's population was approaching 18 million in 1993;

- the proportion of the population aged 70 years or more was 7.8%, ranging from 1.6% in the Northern Territory to 9.0% in South Australia;
- a male born in 1993 can expect to live for 75 years, and a female for almost 81 years; and
- a male Aborigine or Torres Strait Islander can expect to live 57 years, and a female slightly more than 64 years.

**Table 2.3: Key demographic statistics, 1993**

Variable and region	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Population ('000s)</b>									
Metropolitan <sup>(a)</sup>									
Males	2,290.5	1,649.3	704.4	604.7	526.4	142.6	150.2	40.3	6,108.4
Females	2,327.1	1,691.8	717.2	616.5	544.6	148.1	148.9	37.6	6,231.8
Persons	4,617.5	3,341.1	1,421.6	1,221.2	1,071.1	290.7	299.0	77.9	12,340.2
Non-metropolitan									
Males	691.8	562.4	857.2	237.8	199.8	91.2	na	47.6	2,687.8
Females	688.3	561.0	837.3	217.4	192.0	89.5	na	43.8	2,629.4
Persons	1,380.1	1,123.4	1,694.5	455.2	391.8	180.7	na	91.4	5,317.2
Capital city									
Males	1,839.0	1,574.8	704.4	604.7	526.4	94.7	149.5	40.3	5,533.9
Females	1,874.5	1,614.4	717.2	616.5	544.6	98.5	148.4	37.6	5,651.8
Persons	3,713.5	3,189.2	1,421.6	1,221.2	1,071.1	193.2	297.9	77.9	11,185.7
Rest of State/Territory									
Males	1,143.3	636.9	857.2	237.8	199.8	139.1	0.6	47.6	3,262.3
Females	1,140.9	638.4	837.3	217.4	192.0	139.1	0.5	43.8	3,209.4
Persons	2,284.2	1,275.3	1,694.5	455.2	391.8	278.2	1.1	91.4	6,471.7
Total									
Males	2,982.3	2,211.7	1,561.6	842.5	726.2	233.8	150.2	87.8	8,796.2
Females	3,015.4	2,252.8	1,554.5	833.9	736.6	237.6	148.9	81.5	8,861.2
Persons	5,997.7	4,464.5	3,116.2	1,676.4	1,462.9	471.4	299.0	169.3	17,657.4
<b>Proportion of population &gt; 70 yrs (%)</b>									
Males	6.6	6.4	6.2	5.5	7.3	6.8	3.3	1.5	6.3
Females	9.7	9.4	8.6	7.9	10.6	9.6	5.0	1.8	9.2
Persons	8.1	7.9	7.4	6.7	9.0	8.2	4.2	1.6	7.8
<b>Standardised mortality rate <sup>(b)</sup></b>									
Males	8.7	8.4	8.4	8.5	8.7	9.4	7.9	12.3	8.6
Females	5.2	5.1	4.9	5.1	5.3	5.6	4.4	8.2	5.1
Persons	6.7	6.5	6.5	6.6	6.8	7.2	5.9	10.0	6.6
<b>Crude birth rate <sup>(c)</sup></b>									
Males	15.4	14.8	15.4	15.3	14.1	15.1	14.9	21.5	15.2
Females	14.4	13.9	14.6	14.6	13.4	13.9	14.6	21.1	14.3
Persons	14.9	14.3	15.0	15.0	13.7	14.5	14.8	21.3	14.7
<b>Life expectancy <sup>(d)</sup></b>									
Males									
At birth	74.8	75.4	75.1	75.1	75.0	73.9	76.2	69.2	75.0
At age 65	15.6	15.8	16.0	15.8	15.6	15.3	16.0	14.8	15.7
Females									
At birth	80.8	81.1	81.0	81.2	80.5	80.1	82.3	73.8	80.9
At age 65	19.4	19.5	19.8	19.6	19.3	19.1	20.1	16.7	19.5
<b>ATSI life expectancy <sup>(e)</sup></b>									
Males at birth	58.7	60.1	56.0	55.7	56.4	na	na	55.1	56.9
Females at birth	66.4	71.0	63.8	63.1	66.4	na	na	61.8	64.4

(a) Metropolitan includes capital cities plus the major urban areas of Newcastle, Wollongong, Geelong and Launceston.

(b) The overall death rate that would have prevailed in a standard population if it had experienced at each age the death rates observed. The standard population was all persons in the 1991 Australian population.

(c) The number of live births registered per 1,000 estimated resident population.

(d) The average number of additional years a person of a given age and sex might expect to live if the age-specific death rates of the given period continued throughout his or her lifetime.

(e) Estimated life expectancy for Aborigines and Torres Strait Islanders, 1986–91; Note: ACT included in NSW, Tas included in Vic; from Gray & Tesfaghiorghis 1993.

Sources: ABS, Cat. Nos. 3101.0, 3301.0, 3302.0, unpublished data; Gray & Tesfaghiorghis 1993.

# 3 HOSPITAL PERFORMANCE INDICATORS

## FRAMEWORK AND DEVELOPMENT

### Framework and agreed indicators

As noted in Chapter 1, the Commonwealth Department of Human Services and Health in liaison with the COAG Hospitals Working Group had proposed a set of performance indicators for the hospital sector prior to the establishment of the NHMBWG. These indicators addressed directly three of the seven areas specified in the NHMBWG's terms of reference, and addressed indirectly the

remaining areas. The agreed indicators are summarised in Table 3.1, and discussed in detail from page 25 onwards. In October 1994 a working party common to both groups proposed a framework for health sector indicators that was subsequently endorsed by the NHMBWG. The framework's hierarchical structure enabled the Working Group to focus on those higher-level indicators that would give the best insight into hospital performance, and illustrated the relationships between groups of indicators.

**Table 3.1: Summary of hospital performance indicators**

Category	Indicator
Efficiency	Cost per casemix-adjusted separation
	Cost of treatment per outpatient
	Average length of stay for top twenty Australian National-Diagnosis Related Groups (AN-DRGs)
Productivity	User cost of capital (depreciation + opportunity cost) per casemix-adjusted separation
	Ratio of depreciated replacement value to total replacement value
	Total replacement value per casemix-adjusted separation
Quality	Rate of emergency patient readmission within 28 days of separation
	Rates of hospital-acquired infection
	Rate of unplanned return to theatre
	Patient satisfaction
	Proportion of beds accredited by Australian Council on Healthcare Standards (ACHS)
Access	Waiting times for elective surgery
	Accident and emergency waiting times
	Outpatient waiting times
	Variations in intervention rates
	Separations per 1,000 population

Source: National Health Ministers' Benchmarking Working Group.

The framework is an evolving document, becoming more comprehensive as other aspects of the health system and more levels are included. A copy of the framework as at October 1995 is included as Appendix C.

### **Development of definitions**

The original set of indicators was conceptually sound but lacked development. Many of the indicators had not had data elements identified, or readily available data to illustrate the concept.

In some cases, data items were already provided to the Institute or other Commonwealth agencies, and were collected according to definitions published in the NHDD.

The Institute, working with NHMBWG members, furthered the development of indicator definitions and their underlying data items. Part of this work involved defining the scope and other collection parameters.

In some cases, development work was being undertaken by other groups and it was appropriate to monitor progress in liaison with these groups:

- following AHMAC endorsement of the development of a national set of quality of care indicators, the National Hospital Quality Management Program was developing some indicators in conjunction with the States and Territories;
- the Ambulatory Care Branch in HSH was coordinating projects to develop casemix and performance measurement systems in hospital Accident and Emergency and Outpatient departments;

- various State and Territory health authorities were conducting patient satisfaction questionnaires; and
- the Institute was finalising definitions and collection protocols for data on elective surgery waiting times.

A set of indicators relating to assets and cost of capital was the subject of a study undertaken by Dr Penny Burns. Dr Burns surveyed State and Territory health authorities to identify possible data sources for capital indicators. Following analysis of the survey results, Dr Burns was able to recommend a revised set of capital indicators. A subset of these indicators was selected by the NHMBWG for reporting. Although there appears to be a degree of consistency among the health authorities with respect to asset valuations, this report brings such data together for the first time, and some caution is required in interpreting the data.

Other definitional development work is discussed for each indicator in the sections below, and a general development plan is outlined in Chapter 5.

### **Validity and reliability**

Two important attributes of performance indicators are their validity and reliability. Validity in this context refers to the degree to which the indicator reflects the truth of the phenomenon of interest, and reliability refers to the stability of an indicator when applied by different observers in different places at different times.

It is very difficult to assess the validity of indicators because, as noted above, they are only indicators or pointers to a

performance aspect (or group of aspects) of a provider. An indicator can be considered valid if differences in the value of the indicator correspond with the direction and magnitude of differences in the phenomena of interest. The assessment of validity in this way requires a comparison of the behaviour of the indicator with some external or reference measure of the underlying phenomena. Such analysis may not be possible with the data in hand and will require further research.

Reliability is an easier concept to test, though it still may not be possible to test without additional research. The stability of an indicator will be more certain where data are collected according to agreed, well-tested definitions.

### **Indicators should not be used in isolation**

Superior performance in one area may compromise performance in another area. For example, the most efficient hospital may not be providing care of appropriate quality, as some efficiency measures may lead to poorer care outcomes. Fleming (1991), on the other hand, demonstrated that although the relationship between cost and quality is not simple, quality improvements can be associated with cost savings (under certain conditions).

Indicators should be used in sets, so performance evaluation must consist of analysis of a range of indicators covering multiple aspects of an organisation's activities.

## EFFICIENCY

Efficiency describes the relationship between the cost of various inputs and the output produced.

### Cost per casemix-adjusted separation

This indicator is defined by the following expression:

$$\frac{\text{recurrent expenditure} \times \text{IFRAC}}{\text{total separations} \times \text{average case weight}}$$

where IFRAC (inpatient fraction) is the estimated proportion of total hospital costs related to admitted patients and average case weight is a single number representing the relative costliness of cases for a particular provider (or a group of providers, for example teaching hospitals). The average case weight concept is described more fully in the section ‘Adjusting for casemix’ below.

This indicator deals with the costs associated with acute admitted patients. The term ‘admitted patient’ is synonymous with inpatient. Acute in this sense is defined in the NHDD as follows:

‘An episode of acute care for an admitted patient is one in which the principal clinical intent is to do one or more of the following:

- manage labour (obstetric);
- cure illness or provide definitive treatment of injury;
- perform surgery;
- relieve symptoms of illness or injury (excluding palliative care);
- reduce severity of illness or injury;
- protect against exacerbation and/or complications of an illness and/or

injury which could threaten life or normal functions;

- perform diagnostic or therapeutic procedures.’

### Definitions for basic data items

Recurrent expenditure for this indicator is defined by NHDD items E8–E18 and E20.

Total separations are defined by NHDD item A1. Extracts of the Dictionary are included as Appendix D. In short, a separation is counted when a patient completes an episode of hospital care, whereas an admission is counted when a patient commences an episode of care.

### Determining costs for acute admitted patients

Ideally, costs for acute admitted patients only would be used for this indicator. There are two dimensions to this scope: *admitted* patients and *acute* admitted patients.

### Costs for admitted patients

On the first dimension, it is necessary to exclude costs not directly associated with admitted patient care, notably teaching and research costs and non-inpatient (outpatient) costs.

The data currently available for the indicator do not allow teaching costs to be separated out. This is controlled in part by grouping teaching hospitals together and non-teaching hospitals together. However, this approach does not allow for variations in the proportion of teaching and research costs between teaching hospitals. Nor can it be assumed that the difference in patient costs between teaching and non-teaching

hospitals is due solely to teaching and research functions.

To determine the costs associated with admitted patients, an inpatient fraction (IFRAC) is used. The IFRAC is an expression of the ratio of inpatient costs to total hospital costs. The IFRAC is generally estimated at a hospital level from the results of surveys.

For hospitals where no IFRAC is available, the inpatient costs are estimated by the so-called HASAC conversion (HASAC is an acronym for Health and Allied Services Advisory Council; the full methodology and a discussion of its validity appears in the *Hospital Utilisation and Costs Study* report (Cooper-Stanbury, Solon & Cook 1994, pp. 73–4)). This method equates the cost of 5.753 non-admitted patient services to the cost of one admitted patient bed-day, generating a number of ‘extra’ bed-days. The ratio of the original number of bed-days to the new total is effectively the inpatient fraction. The HASAC method is used in this report to estimate IFRACs for New South Wales, Tasmania, the Northern Territory and two hospitals in the Australian Capital Territory. Appendix E contains a brief analysis of the use of the HASAC ratio for all jurisdictions. As there are reasons to question the applicability of the HASAC ratio, and because the results are sensitive to the ratio used, the analysis in Appendix E also examines the use of different ratios.

Ideally, different IFRACs would be used for different cost categories. In the absence of comprehensive sets of IFRACs, a single hospital-wide IFRAC was applied to all cost categories. In the case of visiting medical officer (VMO)

payments (a component of medical costs), no IFRAC was applied, as it has been assumed that all VMO services relate to admitted patients only. This assumption may not hold for all jurisdictions, as VMOs may run outpatient clinics.

### **Costs for acute admitted patients**

It was not possible to isolate the costs of acute admitted patients from all admitted patient costs. Because costs are being estimated per hospital stay—and not per bed-day—most of the non-acute admitted patients (these include rehabilitation and long-stay nursing home type patients) will have higher costs per separation, as these patients typically have longer lengths of stay, even though their daily costs are lower. These patients make up less than 5% of total admitted patient episodes—and account for approximately 5% of total recurrent expenditure—so the effect on the results of including them is likely to be not significant.

### ***Adjusting for casemix***

#### **Casemix described**

Casemix refers to the numbers of each type of patient category a hospital treats. Hospitals collect data that allow admitted patient episodes to be classified using the Australian National-Diagnosis Related Groups (AN-DRG) casemix classification system. This system groups episodes of similar clinical condition and resource use into some 500 categories or AN-DRGs.

Using casemix data, it is possible to model the total costs against the casemix, producing a set of ‘cost weights’. The set of cost weights is a relative value scale for all AN-DRGs, calculated so that the

average cost weight across all episodes used to produce the set of weights is 1.00.

Once a set of cost weights has been produced, it is possible to determine the average case weight for a hospital or group of hospitals. The average case weight is calculated as follows:

$$\text{average case weight} = \frac{\sum_{i=1}^n (CW_i \times \text{cases}_i)}{\text{total no. of cases}}$$

where  $i$  represents each of  $n$  AN-DRGs (the three versions of the classification system released to date have different numbers of AN-DRGs), and  $CW$  is the cost weight for the  $i$ th AN-DRG.

The average case weight is useful because it represents in a single number the overall complexity of cases treated by a hospital. If the national cost weights are used in the calculation of an average case weight, then the resultant weight is an indicator of the relative costliness of the hospital's casemix with respect to the national average. For example, a hospital with an average case weight of 1.08 has an 8% more costly casemix than the national average (by design equal to 1.00).

The average case weight is used in this report to adjust for differences in the relative costliness of all patients treated in a hospital compared with another hospital or group. The value for a group of hospitals is multiplied by the total number of cases for that group to produce the number of case-weighted separations. The term 'cost per *casemix-adjusted separation*' derives from this use of the number of separations adjusted by relative costliness.

### Parameters for case weight estimation

Hospital morbidity data provided to HSH—primarily for the purpose of casemix classification development—were used to estimate average case weights for the groups of hospitals reported here. Version 3 of the classification system was used to allocate patient episodes to AN-DRGs, as this version will be used for the 1993–94 edition of the *Australian Casemix Report* and compatibility of the reports will therefore be enhanced.

Outliers were eliminated using the inter-quartile range trimming algorithm. Outliers are patient episodes with untypical lengths of stay: either very long or very short stays. Outliers are 'trimmed' to avoid misleading results of casemix analyses. Several methods are available for dealing with outliers, and the method of choice depends on the objectives of the analysis. In this report the objective is to obtain accurate estimates of the average length of stay for high-volume AN-DRGs, so the inter-quartile range trimming algorithm was used.

### *Estimating total medical costs*

For the medical labour costs category, data are readily available only for public patients, as private patients are charged directly by their doctor for medical services. Private patients are those patients who are treated by a doctor of their choice (as opposed to a hospital-nominated doctor) or choose to be accommodated in a single room. Charges for such private medical services are reimbursed up to 100% of the Medicare schedule fee for the service through a combination of Medicare and private health fund rebates, and are not included in the recurrent expenditure figures.



Although Medicare data on in-hospital services are available, they are not sufficiently detailed to allow the allocation of costs to the groups of hospitals reported.

A proposal for dealing with medical costs was endorsed at the March meeting of the NHMBWG. In summary, the method ‘converts’ actual medical costs to those which would be required if 100% of bed-days were for public patients:

$$\text{ADJUSTED MED} = \frac{\text{ACTUAL MED}}{\text{PUBLIC DAYS}}$$

where ADJUSTED MED is the adjusted medical services expenditure, ACTUAL MED is the actual medical services expenditure, and PUBLIC DAYS is public patient bed-days as a proportion of total bed-days

This approach assumes that all identified medical costs are related to public patients. The approach overestimates the costs in jurisdictions where certain medical costs—such as junior medical officers—are spread across public and private patients.

### **Results**

The results for this indicator are presented in Table 3.2 for all public hospitals in each jurisdiction. Because average case weight estimates were available only at the State level, Table 3.3 presents the results for teaching and non-teaching hospitals without casemix adjustment.

The results were calculated using a number of sources of varying quality. The casemix database managed by HSH was incomplete and contained some anomalies. It is therefore advised that

caution be exercised when interpreting any results that use casemix data.

The source data were mapped by HSH to International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) version 12 before being grouped using the mainframe version of AN-DRG version 3.0. Cost weights developed by HSH for AN-DRG version 3.0 were used in determining average case weight.

Recurrent expenditure data were derived from the Institute’s National Minimum Data Set collection which is used to produce the *Hospital Utilisation and Costs Study* (HUCS) series. Other sources of expenditure data could have been used, and these are discussed and listed in Appendix F.

The key results shown in the tables are:

- the casemix-adjusted cost per separation for all hospitals combined ranged from \$2,208 in South Australia to \$3,237 in the Australian Capital Territory, with the national average being \$2,327;
- separations from teaching hospitals were on average about \$650 more costly than separations from non-teaching hospitals, though this could reflect the different casemix in the two groups; and
- nursing labour was the single largest cost component for all hospitals combined, and accounted for 27.5% of the total recurrent expenditure per casemix-adjusted separation.

It is interesting to note that the average case weight for Australia is 1.02, rather than the expected 1.00 by definition.

This minor anomaly derives from the use of a different set of casemix data to determine the cost weights than was used in producing these estimates.

Figure 3.1 shows the average cost per casemix-adjusted separation for public acute hospitals in 1993–94.

**Table 3.2: Cost per casemix-adjusted separation, public acute hospitals, 1993–94**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Total separations ('000s)	1,190	761	584	327	295	75	53	34	3,319
Average case weight <sup>(a)</sup>	1.07	1.06	0.90	0.94	1.05	0.97	0.93	0.91	1.02
Units of care ('000s) <sup>(b)</sup>	1,276	806	526	307	309	73	49	31	3,378
Total recurrent expenditure (\$m)	3,821	2,231	1,481	896	820	253	191	116	9,809
Inpatient fraction (%) <sup>(c)</sup>	71.7	79.3	77.0	74.8	79.8	77.4	77.4	76.9	75.5
Public patient proportion (%) <sup>(d)</sup>	70.8	76.6	86.2	83.9	81.5	79.7	77.0	94.1	76.8
Non-medical labour costs per casemix-adjusted separation (\$)									
Nursing	599	640	677	625	657	829	868	888	639
Diagnostic/allied health	168	186	149	179	159	208	295	232	173
Administrative	141	167	124	170	160	121	270	178	150
Other staff	258	205	279	271	206	325	163	370	247
Superannuation <sup>(e)</sup>	83	119	106	22	102	105	60	0	90
Total non-medical labour costs	1,250	1,317	1,334	1,266	1,283	1,587	1,656	1,668	1,299
Other recurrent costs per casemix-adjusted separation (\$)									
Domestic services	50	73	78	110	72	123	93	80	69
Repairs/maintenance	74	47	59	88	78	82	20	65	67
Medical supplies	114	112	168	130	133	230	226	135	129
Drug supplies	82	86	110	103	86	169	111	72	92
Food supplies	28	31	29	30	27	29	47	30	29
Administration	92	112	87	88	98	156	163	164	99
Other	149	116	22	28	20	15	148	270	98
Total other recurrent costs	589	576	553	577	514	804	808	817	583
<b>Total excluding medical labour costs</b>	<b>1,839</b>	<b>1,893</b>	<b>1,888</b>	<b>1,843</b>	<b>1,797</b>	<b>2,391</b>	<b>2,464</b>	<b>2,485</b>	<b>1,882</b>
Medical labour costs per casemix-adjusted separation (\$)									
Public patients									
Salaried/sessional staff	179	241	226	250	194	235	293	327	212
VMO payments	182	76	72	118	141	98	302	109	129
Private patients (estimated) <sup>(f)</sup>	148	97	48	71	76	85	178	27	103
Total medical labour costs	509	414	346	439	411	419	773	463	444
<b>Total including medical labour costs</b>	<b>2,348</b>	<b>2,307</b>	<b>2,234</b>	<b>2,283</b>	<b>2,208</b>	<b>2,809</b>	<b>3,237</b>	<b>2,948</b>	<b>2,327</b>

(a) Estimates provided by HSH using AN-DRG version 3.0.

(b) Units of care is the product of separations and average case weight.

(c) Inpatient fractions have been estimated using the HASAC method for NSW, Tas, NT and 2 hospitals in ACT. See Appendix E for further analysis of HASAC ratios.

(d) Public patient bed-days as a proportion of total bed-days.

(e) In WA and NT the major superannuation scheme is funded by Treasury and the hospitals do not contribute.

(f) Estimated private patient medical costs calculated as sum of salary/sessional and VMO payments divided by public patient proportion. This is an estimate of the medical costs for all non-public patients, including private, compensable and ineligible.

*Note:* These estimates are based on an incomplete database, so caution should be exercised in interpreting the results.

**Table 3.3: Cost per separation<sup>(a)</sup>, public acute hospitals, 1993–94**

Hospital type and variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Teaching</b>									
Total separations ('000s)	502	317	218	168	163	50	na	na	1,418
Total recurrent expenditure (\$m)	1,884	1,080	645	575	530	168	na	na	4,883
Inpatient fraction (%) <sup>(b)</sup>	71.3	78.9	79.1	73.8	77.4	77.0	na	na	75.2
Public patient proportion (%) <sup>(c)</sup>	66.6	76.0	89.3	79.6	79.2	78.1	na	na	75.1
Non-medical labour costs per separation (\$)									
Nursing	629	669	665	635	709	769	na	na	657
Diagnostic/allied health	233	266	177	267	242	215	na	na	236
Administrative	191	219	147	221	204	134	na	na	193
Other staff	307	222	303	261	213	322	na	na	273
Superannuation <sup>(d)</sup>	88	141	121	33	129	103	na	na	103
Total non-medical labour costs	1,449	1,518	1,413	1,417	1,497	1,542	na	na	1,462
Other recurrent costs per separation (\$)									
Domestic services	61	80	69	115	77	120	na	na	76
Repairs/maintenance	124	60	63	98	82	61	na	na	91
Medical supplies	173	179	203	196	189	227	na	na	185
Drug supplies	139	146	140	153	127	109	na	na	140
Food supplies	30	25	28	28	23	29	na	na	28
Administration	102	145	73	100	114	148	na	na	110
Other	178	155	7	7	11	7	na	na	103
Total other recurrent costs	808	789	584	696	623	702	na	na	732
<b>Total excluding medical labour costs</b>	<b>2,256</b>	<b>2,307</b>	<b>1,997</b>	<b>2,113</b>	<b>2,120</b>	<b>2,244</b>	<b>na</b>	<b>na</b>	<b>2,194</b>
Medical labour costs per separation (\$)									
Public patients									
Salaried/sessional staff	317	385	263	400	298	270	na	na	329
VMO payments	143	2	102	21	100	76	na	na	84
Private patients (estimated) <sup>(e)</sup>	230	122	44	108	105	97	na	na	137
Total medical labour costs	690	509	409	530	503	443	na	na	550
<b>Total including medical labour costs</b>	<b>2,947</b>	<b>2,816</b>	<b>2,406</b>	<b>2,643</b>	<b>2,623</b>	<b>2,686</b>	<b>na</b>	<b>na</b>	<b>2,744</b>
<b>Non-teaching</b>									
Total separations ('000s)	688	444	366	159	132	25	53	34	1,901
Total recurrent expenditure (\$m)	1,936	1,151	836	321	290	85	191	116	4,927
Inpatient fraction (%)	72.2	79.5	75.4	76.7	84.4	78.2	77.4	76.9	75.9
Public patient proportion (%)	73.6	76.9	84.4	88.6	83.6	82.5	77.0	94.1	78.0
Non-medical labour costs per separation (\$)									
Nursing	653	686	573	539	670	876	803	808	646
Diagnostic/allied health	141	148	108	61	67	172	273	212	130
Administrative	122	146	91	94	121	82	250	162	123
Other staff	255	213	221	250	223	300	151	337	236
Superannuation	90	115	80	8	77	101	56	0	84
Total non-medical labour costs	1,262	1,308	1,073	951	1,158	1,531	1,532	1,519	1,219
Other recurrent costs per separation (\$)									
Domestic services	48	75	71	91	75	117	86	73	66
Repairs/maintenance	47	43	47	67	82	117	19	59	50
Medical supplies	85	76	120	42	74	216	209	123	91
Drug supplies	50	53	75	36	42	277	102	66	58
Food supplies	30	38	25	29	36	26	43	27	31
Administration	96	99	81	65	90	157	151	149	94
Other	147	100	27	48	34	31	137	246	98
Total other recurrent costs	503	483	446	378	433	940	747	744	489
<b>Total excluding medical labour costs</b>	<b>1,765</b>	<b>1,791</b>	<b>1,519</b>	<b>1,329</b>	<b>1,591</b>	<b>2,472</b>	<b>2,279</b>	<b>2,263</b>	<b>1,708</b>
Medical labour costs per separation (\$)									
Public patients									
Salaried/sessional staff	99	162	169	57	78	141	271	298	131
VMO payments	233	137	43	205	206	135	280	99	167
Private patients (estimated)	119	90	39	34	56	59	165	25	84
Total medical labour costs	451	389	251	295	340	336	715	422	382
<b>Total including medical labour costs</b>	<b>2,216</b>	<b>2,179</b>	<b>1,770</b>	<b>1,625</b>	<b>1,930</b>	<b>2,807</b>	<b>2,995</b>	<b>2,685</b>	<b>2,090</b>

(continued)

**Table 3.3 (continued): Cost per separation<sup>(a)</sup>, public acute hospitals, 1993–94**

Hospital type and variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Total</b>									
Total separations ('000s)	1,190	761	584	327	295	75	53	34	3,319
Total recurrent expenditure (\$m)	3,821	2,231	1,481	896	820	253	191	116	9,809
Inpatient fraction (%)	71.7	79.3	77.0	74.8	79.8	77.4	77.4	76.9	75.5
Public patient proportion (%)	70.8	76.6	86.2	83.9	81.5	79.7	77.0	94.1	76.8
Non-medical labour costs per separation (\$)									
Nursing	642	678	609	586	688	804	803	808	650
Diagnostic/allied health	180	197	134	168	166	201	273	212	176
Administrative	151	177	112	159	167	117	250	162	153
Other staff	277	217	251	254	216	315	151	337	252
Superannuation	89	126	95	21	106	102	56	0	92
Total non-medical labour costs	1,340	1,395	1,201	1,189	1,344	1,539	1,532	1,519	1,322
Other recurrent costs per separation (\$)									
Domestic services	53	77	71	103	76	119	86	73	71
Repairs/maintenance	79	50	53	83	81	79	19	59	68
Medical supplies	123	119	151	122	139	223	209	123	132
Drug supplies	88	92	99	97	90	164	102	66	93
Food supplies	30	32	26	28	29	28	43	27	30
Administration	99	118	78	83	103	151	151	149	101
Other	160	122	20	26	21	15	137	246	100
Total other recurrent cost	632	610	498	542	539	779	747	744	593
<b>Total excluding medical labour costs</b>	<b>1,972</b>	<b>2,005</b>	<b>1,698</b>	<b>1,730</b>	<b>1,882</b>	<b>2,318</b>	<b>2,279</b>	<b>2,263</b>	<b>1,915</b>
Medical labour costs per separation (\$)									
Public patients									
Salaried/sessional staff	192	255	204	235	203	228	271	298	216
VMO payments	195	81	65	111	148	95	280	99	131
Private patients (estimated)	159	103	43	67	80	82	165	25	105
Total medical labour costs	546	439	311	412	430	406	715	422	452
<b>Total including medical labour costs</b>	<b>2,518</b>	<b>2,444</b>	<b>2,010</b>	<b>2,142</b>	<b>2,312</b>	<b>2,724</b>	<b>2,995</b>	<b>2,685</b>	<b>2,368</b>

(a) Costs have not been adjusted for casemix.

(b) Inpatient fractions have been estimated using the HASAC method for NSW, Tas, NT and 2 hospitals in ACT.

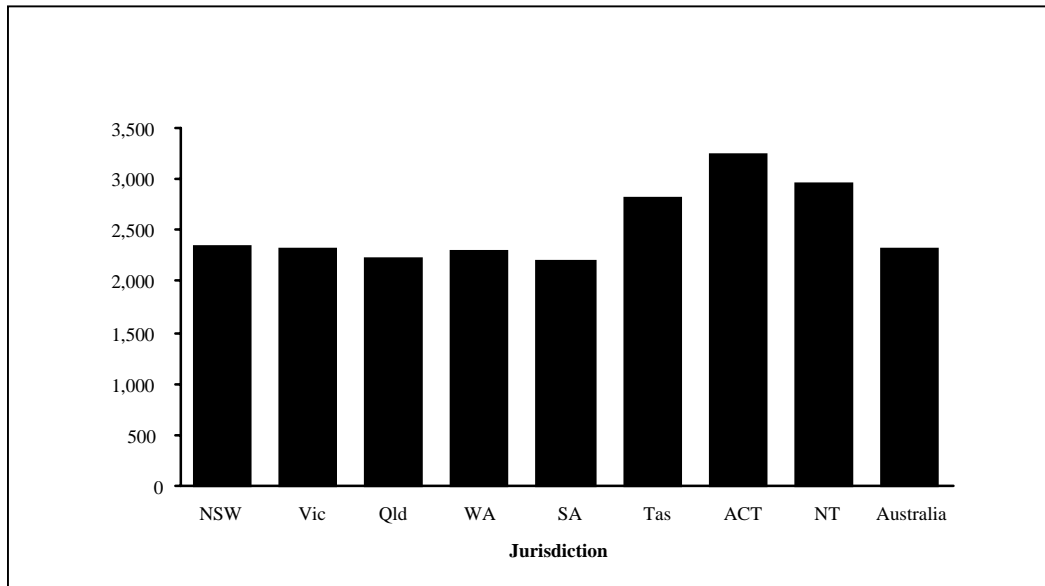
(c) Public patient bed-days as a proportion of total bed-days.

(d) In WA and NT the major superannuation scheme is funded by Treasury and the hospitals do not contribute.

(e) Estimated private patient medical costs calculated as sum of salary/sessional and VMO payments divided by public patient proportion. This is an estimate of the medical costs for all non-public patients, including private, compensable and ineligible.

*Note:* These estimates are based on an incomplete database, so caution should be exercised in interpreting the results.

*Sources:* AIHW National Minimum Data Set collection, unpublished; HSH casemix database, unpublished; HSH Medicare Agreements data, unpublished.



**Figure 3.1: Cost per casemix-adjusted separation, public acute hospitals, 1993–94**

### Cost of treatment per outpatient

This indicator is defined by the following expression:

$$\frac{\text{recurrent expenditure} \times (100 - \text{IFRAC})}{\text{total non - admitted patient services}}$$

Conceptually, this indicator is the complement of the cost per casemix-adjusted separation. For some hospitals, though, costs are not simply split between admitted patients and non-admitted patients, as other services such as an attached nursing home account for part of the total expenditure. Thus the term (100 – IFRAC) in the above expression should properly include another component for services that are neither admitted patient nor non-admitted patient.

In the NHDD, the term ‘outpatient services’ refers to a group of non-admitted patient services including pathology, radiology, dental, pharmacy and allied health services. As a group, outpatient services are only a subset of non-admitted patient services, with the full set including accident and emergency, community health, district nursing and other outreach

services that may be based at an acute hospital. The NHDD refers to the full set of services as non-admitted patient care. The term ‘occasion of service’ is used to describe a unit of non-admitted patient care (for example an X-ray, a blood test or a consultation).

Although the title of this indicator refers to outpatient, strictly speaking the cost is expressed per occasion of service, in the same way that admitted patient costs are expressed per separation, not per patient. For both admitted and non-admitted care, a patient can have multiple episodes and/or occasions of service during the collection period. Most data collection systems do not treat multiple episodes for the one patient as a single event.

For the cost per separation indicator, differences in hospital costs due to the type of cases treated are accounted for by casemix adjustment. Presently, no nationally comparable adjustment is available for non-inpatient services. It is reasonable to assume that different non-inpatient services have different treatment costs, so that the mix of services in itself

would influence the average cost per service. Several projects are currently being conducted to develop casemix classifications for non-admitted patient care (also referred to as ambulatory care). Use of such classification systems to collect activity and finance data will enable a more sophisticated indicator to be constructed, better complementing the inpatient indicator.

As can be seen, definitions for the fundamental data elements for this indicator have not been firmly established. Because of this, national data are not available to calculate results for this indicator.

### **Inpatient average length of stay for top twenty AN-DRGs**

The average length of stay (ALOS) for admitted patient episodes has long been used by health service managers as a substitute for efficiency. Length of stay is a good predictor of cost, and comparing the ALOS for similar services across two or more providers is a simple way of evaluating relative efficiency.

The ALOS is equal to the arithmetic mean of the length of stay for all patient episodes. It is usually estimated using the following formula:

$$\text{ALOS} = \frac{\text{total occupied bed - days}}{\text{total episodes}}$$

Data for this indicator are presented including and excluding same-day cases.

Same-day cases occur when the admission and separation dates are the same. Typically, same-day cases are assigned a length of stay of one day, the same value as cases that involve a stay of one night.

The top twenty AN-DRGs were determined on the basis of the total number of public and private hospital separations nationally. Two sets were calculated, including and excluding same-day cases. All results are determined after trimming using the inter-quartile range method (see page 27).

### **Results**

The results for this indicator were calculated using the casemix database managed by HSH. This database was incomplete and contained some anomalies. It is therefore advised that caution be exercised when interpreting the results.

The average lengths of stay for the top twenty AN-DRGs are shown in Table 3.4 (including same-day cases) and Table 3.5 (excluding same-day cases). Appendix G contains key statistics for the two sets of AN-DRGs.

Results are shown for public and private hospitals. Data were not available for private hospitals in Victoria, Western Australia, the Australian Capital Territory or the Northern Territory. Australian values are therefore estimated on the basis of the available data.

The main features of the results are:

- there was a high degree of consistency in ALOS among the States and Territories in both sectors for the majority of the top AN-DRGs;
- there was no systematic difference between the sectors in the ALOS across AN-DRGs;

- 10 AN-DRGs had sufficiently high same-day utilisation to promote them to the top twenty if same-day cases are included; and
- the top twenty codes accounted for 33.0% of all separations with same-day cases included, or 27.3% with same-day excluded

Table 3.4: Average length of stay (days)<sup>(a)</sup>, including same-day cases<sup>(b)</sup>, 1993–94

Rank, AN-DRG, description and hospital type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1 572 Admit for renal dialysis									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	–	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
2 674 Vaginal delivery without complicating diagnosis									
Public	3.6	3.9	3.6	3.7	4.0	4.0	3.6	3.7	3.7
Private	5.4	np	5.3	np	5.5	4.9	np	np	5.3
Total	3.8	na	3.9	na	4.4	4.3	na	na	3.9
3 780 Chemotherapy									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
4 727 Neonate, admission weight > 2499 g, without significant OR procedure, without problem									
Public	3.7	2.4	3.5	3.8	1.9	2.7	4.0	3.5	3.6
Private	5.3	np	3.5	np	2.7	2.7	np	np	5.1
Total	3.9	na	3.5	na	2.0	2.7	na	na	3.8
5 332 Other gastroscopy for non-major digestive disease, without complications									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
6 335 Other colonoscopy without complications									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
7 683 Abortion with D&C, aspiration curettage or hysterotomy									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
8 099 Lens procedure without vitrectomy, without complications									
Public	1.4	1.3	1.2	1.5	1.3	2.8	1.3	1.2	1.4
Private	1.3	np	1.3	np	1.3	1.4	np	np	1.3
Total	1.3	na	1.3	na	1.3	1.5	na	na	1.3
9 187 Bronchitis and asthma, age < 50, without complications									
Public	2.0	1.9	2.1	2.1	2.1	2.0	2.5	2.3	2.0
Private	2.1	np	2.3	np	2.7	2.4	np	np	2.3
Total	2.0	na	2.1	na	2.2	2.1	na	na	2.0
10 484 Other skin, subcutaneous tissue and breast procedures									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0

(continued)

**Table 3.4 (continued): Average length of stay (days)<sup>(a)</sup>, including same-day cases<sup>(b)</sup>, 1993–94**

Rank, AN-DRG, description and hospital type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
11 128 Dental extraction and restorations									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
12 421 Knee procedures									
Public	1.3	1.2	1.3	1.4	1.3	1.3	1.4	1.1	1.3
Private	1.2	np	1.3	np	1.3	1.3	np	np	1.3
Total	1.2	na	1.3	na	1.3	1.3	na	na	1.3
13 943 Other factors influencing health status, age < 80, without complications									
Public	1.6	1.6	1.5	1.8	1.8	1.6	1.4	2.3	1.6
Private	1.4	np	1.2	np	1.9	1.5	np	np	1.4
Total	1.5	na	1.4	na	1.8	1.6	na	na	1.6
14 455 Medical back problems, age < 75, without complications									
Public	3.2	3.0	3.2	3.1	2.9	3.4	2.5	3.5	3.1
Private	2.9	np	2.9	np	2.2	2.8	np	np	2.7
Total	3.1	na	3.1	na	2.5	3.0	na	na	3.0
15 659 Conisation, vagina, cervix and vulva procedures									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
16 660 Endoscopic procedures, female reproductive system									
Public	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Private	1.0	np	1.0	np	1.0	1.0	np	np	1.0
Total	1.0	na	1.0	na	1.0	1.0	na	na	1.0
17 122 Tonsillectomy and/or adenoidectomy									
Public	1.7	1.4	1.4	1.5	1.7	2.1	1.2	1.3	1.5
Private	1.4	np	1.2	np	1.6	1.3	np	np	1.3
Total	1.6	na	1.3	na	1.6	1.7	na	na	1.5
18 347 Abdominal pain or mesenteric adenitis, without complications									
Public	1.4	1.3	1.5	1.5	1.5	1.5	1.5	1.6	1.4
Private	1.5	np	1.6	np	1.6	1.5	np	np	1.6
Total	1.5	na	1.5	na	1.5	1.5	na	na	1.5
19 686 Other antenatal admission with moderate or no complicating diagnosis									
Public	1.9	1.7	1.8	1.9	1.8	1.9	2.0	2.3	1.8
Private	2.0	np	1.7	np	2.1	1.9	np	np	2.0
Total	1.9	na	1.8	na	1.8	1.9	na	na	1.8
20 252 Heart failure and shock									
Public	7.2	6.5	6.6	7.0	6.9	7.3	8.0	6.4	6.9
Private	9.3	np	7.5	np	9.1	8.4	np	np	8.4
Total	7.4	na	6.8	na	7.2	7.4	na	na	7.0

(a) Estimates provided by HSH using AN-DRG version 3.0; data trimmed using inter-quartile range method.

(b) Same-day cases are allocated a length of stay of 1.0 days.

*Note:* These estimates are based on an incomplete database, so caution should be exercised in interpreting the results.

*Source:* HSH casemix database, unpublished.



Table 3.5: Average length of stay (days)(a), excluding same-day cases, 1993-94

Rank, AN-DRG, description and hospital type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
1 674 Vaginal delivery without complicating diagnosis									
Public	3.6	3.9	3.6	3.7	4.0	4.1	3.7	3.7	3.7
Private	5.4	np	5.3	np	5.5	5.0	np	np	5.4
Total	3.9	na	4.0	na	4.4	4.4	na	na	3.9
2 727 Neonate, admission weight > 2499 g, without significant OR procedure, without problem									
Public	3.7	2.8	3.7	3.8	2.3	3.2	4.0	3.6	3.7
Private	5.3	np	4.2	np	2.8	2.8	np	np	5.2
Total	4.0	na	3.7	na	2.4	3.1	na	na	3.9
3 187 Bronchitis and asthma, age < 50, without complications									
Public	2.1	2.0	2.2	2.2	2.3	2.1	2.5	2.4	2.1
Private	2.2	np	2.4	np	2.8	2.9	np	np	2.5
Total	2.1	na	2.2	na	2.3	2.2	na	na	2.1
4 252 Heart failure and shock									
Public	7.2	6.6	6.4	6.9	6.7	7.2	7.9	6.4	6.9
Private	9.0	np	7.3	np	8.7	8.1	np	np	8.1
Total	7.3	na	6.7	na	7.0	7.3	na	na	7.0
5 122 Tonsillectomy and/or adenoidectomy									
Public	1.9	1.4	1.4	1.6	1.7	2.2	1.2	1.3	1.6
Private	1.4	np	1.2	np	1.6	1.4	np	np	1.4
Total	1.7	na	1.3	na	1.6	1.8	na	na	1.5
6 099 Lens procedure without vitrectomy, without complications									
Public	1.6	1.5	1.5	1.8	1.8	2.9	1.5	1.3	1.6
Private	1.4	np	1.5	np	1.5	1.6	np	np	1.5
Total	1.5	na	1.5	na	1.6	1.8	na	na	1.6
7 177 Chronic obstructive airways disease									
Public	7.2	6.5	6.7	7.2	7.1	7.6	7.7	5.9	7.0
Private	9.0	np	8.1	np	8.8	8.5	np	np	8.4
Total	7.3	na	7.0	na	7.3	7.7	na	na	7.1
8 455 Medical back problems, age < 75, without complications									
Public	4.7	4.2	4.0	4.6	4.2	4.5	3.9	4.4	4.4
Private	4.9	np	3.6	np	3.2	3.8	np	np	4.0
Total	4.8	na	3.9	na	3.7	4.0	na	na	4.3
9 367 Cholecystectomy without common duct exploration									
Public	3.9	3.5	3.1	4.1	3.8	3.5	4.3	4.3	3.6
Private	3.2	np	3.1	np	3.6	3.3	np	np	3.2
Total	3.6	na	3.1	na	3.7	3.4	na	na	3.5
10 347 Abdominal pain or mesenteric adenitis, without complications									
Public	2.0	1.9	1.9	2.0	2.1	2.0	2.0	2.3	2.0
Private	2.2	np	2.1	np	2.3	1.9	np	np	2.1
Total	2.0	na	2.0	na	2.1	2.0	na	na	2.0
11 670 Caesarean delivery, without complicating diagnosis									
Public	6.0	6.2	5.8	6.1	6.3	6.5	6.3	6.6	6.1
Private	7.5	np	7.2	np	8.1	7.2	np	np	7.5
Total	6.3	na	6.3	na	7.1	6.7	na	na	6.4
12 320 Hernia procedures except inguinal and femoral, age > 9									
Public	3.3	2.6	2.3	3.0	3.1	2.8	2.8	2.3	2.9
Private	3.0	np	2.3	np	3.5	3.1	np	np	2.9
Total	3.2	na	2.3	na	3.3	3.0	na	na	2.9
13 686 Other antenatal admission with moderate or no complicating diagnosis									
Public	2.2	2.2	2.0	2.1	2.1	2.1	2.2	2.4	2.1
Private	2.3	np	2.2	np	2.5	2.2	np	np	2.3
Total	2.2	na	2.1	na	2.2	2.1	na	na	2.2
14 274 Cardiac disorder, without AMI, with invasive cardiac investigative procedure, without complicating diagnosis, with major comorbidities									
Public	1.3	1.5	1.8	1.6	1.4	1.8	1.7	-	1.5
Private	1.4	np	1.8	np	1.3	1.7	np	np	1.5
Total	1.4	na	1.8	na	1.4	1.8	na	na	1.5
15 656 Uterus/adnexa procedure, without malignancy, age > 39 without complications or age < 40 with complications									
Public	6.0	5.3	4.9	5.8	5.9	5.4	6.2	5.6	5.6
Private	5.7	np	5.2	np	6.3	5.4	np	np	5.6
Total	5.9	na	5.1	na	6.1	5.4	na	na	5.6

(continued)

Table 3.5 (continued): Average length of stay (days)<sup>(a)</sup>, excluding same-day cases, 1993–94

Rank, AN-DRG, description and hospital type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
16 421 Knee procedures									
Public	2.5	2.3	1.9	1.9	2.4	2.0	2.0	1.9	2.2
Private	1.8	np	1.8	np	2.1	1.8	np	np	1.9
Total	2.0	na	1.8	na	2.1	1.8	na	na	2.0
17 943 Other factors influencing health status, age < 80, without complications									
Public	3.9	3.4	3.1	2.3	4.3	3.5	2.3	4.1	3.1
Private	3.6	np	2.6	np	5.6	5.0	np	np	4.1
Total	3.8	na	3.0	na	4.7	3.7	na	na	3.2
18 349 Oesophagitis, gastroenteritis and other miscellaneous digestive disorders, age 10–74, without complications									
Public	2.3	2.1	2.1	2.2	2.2	2.5	2.6	2.5	2.2
Private	2.7	np	2.4	np	2.8	2.7	np	np	2.6
Total	2.3	na	2.2	na	2.3	2.5	na	na	2.2
19 941 Rehabilitation									
Public	21.4	23.4	20.0	19.0	21.4	17.8	23.4	14.5	22.5
Private	18.9	np	12.5	np	21.1	14.3	np	np	18.5
Total	20.7	na	16.4	na	21.3	17.4	na	na	21.8
20 261 Chest pain									
Public	2.2	2.0	2.3	2.1	2.1	2.5	2.1	2.3	2.2
Private	2.4	np	2.2	np	1.9	2.0	np	np	2.2
Total	2.2	na	2.3	na	2.1	2.4	na	na	2.2

(a) Estimates provided by HSH using AN-DRG version 3.0; data trimmed using inter-quartile range method.

*Note:* These estimates are based on an incomplete database, so caution should be exercised in interpreting the results.

*Source:* HSH casemix database, unpublished.

## PRODUCTIVITY

Productivity refers to the relationship between the mix of inputs and mix of outputs. It is related to efficiency in that efficiency describes the actual cost of the inputs for a given unit of output.

In developing productivity indicators, the Working Group focused on measures of capital productivity. The labour component of productivity is reported as part of the 'Cost per casemix-adjusted separation' indicator above.

### Consultancy on asset valuation

The productivity indicators are, as a group, underdeveloped both in terms of definitions for basic data items and established data collections. This was acknowledged early in the program and a consultancy to examine the issues was let by HSH to Dr Penny Burns of Infrastructure Economics. The terms of reference for the study appear in Appendix B.

### Major findings

Major findings of this study were:

- the degree of consistency already achieved by State and Territory health authorities (and indirectly the respective Treasuries) is sufficient for the introduction of benchmarking comparisons;
- States and Territories generally agree on the use of 'deprival value' as the valuation approach for assets. This reduces to 'depreciated replacement value' for most assets which will continue in use;

- the major changes required to available asset information are adjustment for inflation between revaluation periods and bringing the 'equipment' valuations to current values, adjustments for the treatment of leased assets and the separation of capital funding for charitable hospitals; and
- valuation policies are generally consistent, but valuation practices differ both among and within jurisdictions (for example, differences in scope and coverage among jurisdictions, differing practices among hospitals in the same jurisdiction, different approaches to valuing the major asset classes, differing intervals between revaluations and differing depreciation assumptions). Most jurisdictions claim asset registers are not as complete or as accurate as they would like. For these reasons, the estimates need to be considered as indicative only.

### Suggested indicators

Doctor Burns suggested a suite of indicators covering condition, capital intensity, capital investment, capital growth and usage, and advised that the indicators should be used in conjunction with each other rather than in isolation.

The NHMBWG considered the proposals in the light of the objectives of the program and the available data, and agreed on three indicators representing the usage, condition and intensity groups, namely:

- user cost of capital per casemix-adjusted separation;
- ratio of depreciated replacement value to total replacement value; and

- total replacement value per casemix-adjusted separation.

These indicators are discussed below.

### **Definitions and treatment of data**

Officers of the State and Territory health authorities were requested to provide data according to basic guidelines prepared by Dr Burns. Where different policies and systems were in place it was not possible to adhere to these guidelines, although efforts have been made to improve the comparability of data after the fact. The definitions outlined below, therefore, lack detail because general concepts are being described rather than precise definitions of the data elements.

Data were requested for the asset classes of buildings and equipment. Land was excluded because of the considerable variations in its value, control and use. Other asset classes such as intangibles were excluded because of the lack of consistency in their valuation and problems in the calculation of depreciation.

### **User cost of capital per casemix-adjusted separation**

This indicator is a measure of capital usage, and is defined as:

$$\frac{\text{depreciation} + \text{opportunity cost}}{\text{casemix - adjusted separations}}$$

Depreciation represents the service potential of an asset consumed during a financial period. Opportunity cost in relation to an asset is the value of the next best alternative that is sacrificed by retaining the asset. Opportunity cost is usually estimated by applying an arbitrary percentage rate—such as the long-term government bond rate—to the depreciated

value of the asset. Where results are to be compared, the same rate needs to be used for all jurisdictions. For this report, the rate of 7.0% was used, as it was the rate used most commonly by the State health authorities.

The denominator—casemix-adjusted separations—is discussed on page 26.

Some definitions of the cost of capital include a maintenance component, but this is omitted in this indicator to avoid double counting. In some States, large-scale maintenance is capitalised and hence depreciated. Other maintenance is included in recurrent expenditure.

### **Results**

Indicative values for user cost of capital are shown in Table 3.6. Results are not shown for Australia as the State and Territory values could not be reliably summed.

The results shown for this and the following two indicators represent the first attempt to collect nationally comparable data on the value of hospital assets. Because the items were defined after the collection period, there was only moderate success in achieving consistency.

It was inappropriate to include data for Queensland and the Northern Territory as these jurisdictions are yet to measure assets in current replacement values.

Notes on the data for each State and Territory providing data follow. For all jurisdictions it was likely that asset registers were incomplete, so the data reported should be considered indicative only.

### **New South Wales**

NSW Health financial and accounting policy does not require the separation of plant and equipment, so plant has been reported with equipment in this report.

Physical assets costing less than \$5,000 are expended in the year of acquisition. Donated physical assets are capitalised and brought into account at fair market value if the value is \$5,000 or more.

The data include facilities under the Area and District Health Services, the NSW ambulance service, the Corrections Health Service and the Central Office of the Department. These facilities are estimated to amount to 1.5–2.0% of the value of buildings, and around 10% of the value of plant and equipment.

The data include the value and depreciation of buildings leased to other entities for the operation of hospital services.

### **Victoria**

Data are based on a survey of all Victorian tertiary, referral, metropolitan and rural base hospitals and a sample of smaller country hospitals that together provided 96% of casemix funded separations.

The values are estimated replacement cost in 1994. Depreciation has been calculated by the straight-line method on the total replacement value.

The scope covers acute care hospitals only—nursing homes are excluded—and includes hospitals providing public beds, including religious and charitable hospitals.

The data include hospital-owned buildings including commercial and leased space;

excluded are university-owned buildings, independent research institutes and car parks operated by the private sector.

Data on equipment were collected on items with a value down to \$1,000 with estimates made for each item below that value.

### **Western Australia**

Information provided for replacement value for equipment is historical cost.

### **South Australia**

South Australia provided estimates of the total replacement value of all buildings and equipment based on values provided by the SA Audit Commission which estimated that 75% of the total assets value is represented by building assets including plant. The estimates assume that the vast majority of assets are related to hospitals.

Estimates of the depreciated replacement value of buildings were based on the results of a recent valuation exercise showing that the depreciated value was 31% of the total value.

A useful life of 50 years was used for buildings to determine depreciation. Due to the difficulties in estimating the useful life and residual value of equipment, no estimates of depreciated value or depreciation were provided.

### **Tasmania**

Depreciated replacement values were based on the Valuer General's most recent valuation, or, for recent buildings, on actual building costs. No estimates of total replacement value were available for the whole State.

## Australian Capital Territory

The information provided in relation to equipment is based on historical cost rather than current replacement values.

Data were not available for one small community hospital.

## Ratio of depreciated replacement value to total replacement value

The ratio of depreciated replacement value (DRV) to total replacement value (TRV) is

an indicator of the condition of an asset or asset holdings.

Total replacement value is the current replacement cost of an asset. In the case of buildings it is the current building costs with current materials and methods on a greenfield site. Depreciated replacement value is the total replacement value less accumulated depreciation that would have applied from the date of acquisition to the current financial period.

**Table 3.6: User cost of capital, public acute hospitals, 1993–94 (indicative)**

Asset class	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Buildings</b>									
Depreciated replacement value (\$m)	3,896	1,700	np	1,057	605	277	254	np	na
Opportunity cost (\$m) <sup>(a)</sup>	273	119	na	74	42	19	18	na	na
Depreciation (\$m)	121	102	np	34	39	6	6	np	na
Case-mix-adjusted separations ('000s)	1,276	806	na	307	309	73	49	na	na
User charge/separation (\$)	309	274	na	351	263	345	473	na	na
<b>Equipment</b>									
Depreciated replacement value (\$m)	663	251	np	76	np	39	23	np	na
Opportunity cost (\$m)	46	18	na	5	na	3	2	na	na
Depreciation (\$m)	97	42	np	11	np	7	3	np	na
Case-mix-adjusted separations ('000s)	1,276	806	na	307	na	73	49	na	na
User charge/separation (\$)	112	74	na	52	na	137	99	na	na

(a) Calculated as depreciated replacement value x 7.0%.

*Note:* These data are not based on nationally consistent definitions or methodologies, and can be considered indicative only.

*Sources:* State and Territory health authorities, mostly unpublished.

The DRV is sometimes used to indicate the condition of an asset, but it is ambiguous: a low DRV may represent a large but old (hence more depreciated) asset holding, or a smaller but almost new asset holding. The ratio DRV:TRV gives a better approximation of condition.

## Results

Indicative results of the asset condition measure are shown in Table 3.7. Results are not shown for Australia as the State and Territory values could not be reliably summed.

**Table 3.7: Asset condition, public acute hospitals, 1993–94 (indicative)**

Asset class	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Buildings</b>									
Depreciated replacement value (\$m)	3,896	1,700	np	1,057	605	277	254	np	na
Total replacement value (\$m)	4,738	3,654	np	2,001	1,950	np	348	na	na
Ratio DR V:TRV	0.82	0.47	np	0.53	0.31	na	0.73	np	na
<b>Equipment</b>									
Depreciated replacement value (\$m)	663	251	np	76	np	39	23	np	na
Total replacement value (\$m)	1,028	568	np	149	262	np	41	na	na
Ratio DR V:TRV	0.64	0.44	np	0.51	na	na	0.57	np	na

*Note:* These data are not based on nationally consistent definitions or methodologies, and can be considered indicative only.

*Sources:* State and Territory health authorities, mostly unpublished.

### Total replacement value per casemix-adjusted separation

This indicator is a measure of capital intensity.

Total replacement value is defined directly above; casemix-adjusted separation is discussed in the section on the first efficiency indicator above.

Indicative results of the capital intensity measure are shown in Table 3.8. Results are not shown for Australia as the State and Territory values could not be reliably summed.

### Labour costs per casemix-adjusted separation

This indicator is a measure of labour productivity, and is reported as a component of the cost per separation indicator shown above.

Labour costs for this indicator are defined as the sum of NHDD items E8–E10:

- salaries and wages (including contract staff);
- payments to visiting medical officers; and
- superannuation employer contributions.

**Table 3.8: Capital intensity, public acute hospitals, 1993–94 (indicative)**

Asset class	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Buildings</b>									
Total replacement value (\$m)	4,738	3,654	np	2,001	1,950	np	348	np	na
Casemix-adjusted separations ('000s)	1,276	806	na	307	309	na	49	na	na
TRV/separation (\$)	3,714	4,534	na	6,514	6,314	na	7,058	na	na
<b>Equipment</b>									
Total replacement value (\$m)	1,028	568	np	149	262	np	41	np	na
Casemix-adjusted separations ('000s)	1,276	806	na	307	309	na	49	na	na
TRV/separation (\$)	806	705	na	484	849	na	832	np	na

*Note:* These data are not based on nationally consistent definitions or methodologies, and can be considered indicative only.

*Sources:* State and Territory health authorities, mostly unpublished.

This indicator was proposed as a productivity measure as labour costs are a substantial component of the total expenditure. The Working Group noted that it would be desirable for contract staff

to be separately identified, but this was not possible under the current definitions. The definitions will need to be amended if such data are to be collected in the future.



## QUALITY

### Definitions and treatment of data

Quality is a difficult concept to define. In general it relates to the clinician's and patient's perception that care was of a high standard and resulted in desirable outcomes.

The first three indicators in this section relate to the clinical process of care and measure potential adverse outcomes of care. The definitions were developed by the National Hospital Quality Management Program Quality of Care Data Working Party and are presented as drafts only pending the results of validity and reliability testing.

The patient satisfaction indicator is intended to measure the consumer's perception that care was of a high standard.

### Rate of emergency patient readmission within 28 days

This indicator is defined by the following expression:

$$\frac{\text{EMERG READM}}{\text{TOTAL ADM}}$$

during the collection period, where EMERG READM is the number of emergency readmissions within 28 days of a previous separation, and TOTAL ADM is the total number of admissions excluding deaths.

For the purposes of this indicator, an emergency admitted patient is defined as a patient requiring immediate treatment (that is, within 24 hours), regardless of the

source of referral. Restricting the scope to emergency admitted patients will help filter out unplanned readmissions that may not have been unexpected, such as for some chronic illnesses.

Readmission implies admission to the same hospital from which the patient was separated. The data collection does not require determining whether the readmission is for the same condition, a related condition or a complication of the condition for which the patient was previously admitted. Any readmission to a hospital other than the one from which the earlier discharge occurred is not counted in this indicator.

### Results

Table 3.9 presents illustrative results for this indicator, reproduced from the ACHS report on hospital-wide medical indicators data (ACHS 1994). Hospitals that departed from the definitions were excluded from any analyses in that report. The results shown for the Northern Territory were provided by Northern Territory Department of Health and Community Services, based on the ACHS definitions.

Note that the data shown in this section have been collected on the basis of the ACHS definitions, not on the basis of the definitions described in this report. However, the definitions described have been developed from the ACHS definitions, and in most cases the two sets of definitions would produce similar results.

**Table 3.9: Rate of unplanned readmission within 28 days, public and private acute hospitals, 1993<sup>(a)</sup>**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT <sup>(b)</sup>
Number of facilities	34	16	8	5	12	–	1	1
Number of unplanned readmissions	2561	749	274	263	322	–	18	np
Rate <sup>(c)</sup>	3.4	3.7	2.0	2.5	3.7	–	0.8	6.3

(a) Hospitals participating in ACHS accreditation program in 1993.

(b) Northern Territory results for 1994–95 were provided by the NT Department of Health and Community Services.

(c) Number of unplanned readmissions per 100 admissions.

Sources: Australian Council on Healthcare Standards, Care Evaluation Program; NT Department of Health and Community Services, unpublished.

### Rate of unplanned return to operating room

This indicator is defined as:

$$\frac{\text{UNPLANNED THEATRE RETURNS}}{\text{THEATRE SEPS}}$$

during the collection period, where UNPLANNED THEATRE RETURNS is the number of separations with one or more unplanned visits to an operating room subsequent to a previous procedure during the same admission, and THEATRE SEPS is the total number of separations where one or more procedures were performed.

The number of patients having more than one unplanned return to an operating room would be small. Therefore, the total number of separations where the patient has had one or more unplanned returns to the operating room would be close to the total number of unplanned returns. Also, recording multiple unplanned returns

subsequent to a single procedure provides no further useful information.

This indicator has been tailored to capture all visits to an operating room subsequent to complications arising from any procedure/operation whether or not it was performed in an operating room. As such it may not measure actual ‘returns’ to an operating room in some hospitals, but it helps to standardise data across hospitals where the definition of ‘operating room’ may differ.

### Results

Table 3.10 presents illustrative results for this indicator, reproduced from the ACHS report on hospital-wide medical indicators data (ACHS 1994). Hospitals that departed from the definitions were excluded from any analyses in that report. The results shown for the Northern Territory were provided by Northern Territory Department of Health and Community

**Table 3.10: Rate of return to operating room, public and private acute hospitals, 1993<sup>(a)</sup>**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT <sup>(b)</sup>
Number of facilities	28	16	9	4	14	1	1	1
Number of returns to operating room	184	151	83	33	46	2	16	np
Rate <sup>(c)</sup>	0.5	0.7	0.6	0.9	0.5	0.1	0.7	4.2

(a) Hospitals participating in ACHS accreditation program in 1993.

(b) Northern Territory results for 1994–95 were provided by the NT Department of Health and Community Services; there was a definitional problem surrounding the term ‘unplanned’ that may affect this result.

(c) Number of patients with unplanned return to operating room during the same admission per 100 separations where one or more procedures were performed.

Sources: Australian Council on Healthcare Standards, Care Evaluation Program; NT Department of Health and Community Services, unpublished.

Services, based on the ACHS definitions.

### **Rates of hospital-acquired infection**

Hospital-acquired infection can fall into two categories: rate of post-operative wound infection and hospital-acquired bacteraemia. The following terminology relates to the definitions for these indicators.

*Clean operations* are those performed in a sterile field, that is, uncontaminated by bacteria.

*Contaminated operations* include:

- those which breach the gastrointestinal, respiratory and genito-urinary tracts;
- those in which a break in aseptic technique occurs; or
- traumatic wounds.

*Dirty operations* are those in which a perforated viscus or pus is found. The definition of dirty operations is used to distinguish contaminated from dirty operations. Infections from dirty operations cannot be considered hospital-acquired.

*Wound infection* is any surgical wound from which purulent material drains or is obtained. Microbiological confirmation is not necessary for the purposes of the indicator 'Rate of post-operative wound infection'. A reaction around suture material is excluded.

Patients having multiple incisions in the same operation (e.g. chest and leg for coronary artery graft surgery) are counted as one patient.

Patients having a separate incision in separate/subsequent operations count as two patients.

### ***Rate of post-operative wound infection***

This indicator has two components: wound infection following clean surgery and infection following contaminated surgery.

The date of the principal procedure is used for the date of procedure for this

indicator. Where an earlier procedure is not the principal procedure, the condition is likely to be sufficiently severe to require an extended stay in hospital. This allows capture of most post-operative wound infections for this indicator.

No attempt is made to collect data on patients developing a wound infection following discharge. In the future, links may be built with community facilities to allow this collection to take place.

The calculation of the rate of wound infection following clean surgery is defined as:

$$\frac{\text{DAY 5 INFECTION (CLEAN)}}{\text{CLEAN SURGERY SEPS}}$$

during the collection period, where DAY 5 INFECTION (CLEAN) is the number of patients having evidence of wound infection on or after the fifth post-operative day following clean surgery, and CLEAN SURGERY SEPS is the number of patients undergoing clean surgery with a post-operative length of stay equal to or greater than 5 days.

The calculation of the rate of wound infection following contaminated surgery is defined as:

$$\frac{\text{DAY 5 INFECTION (CONTAM)}}{\text{CONTAM SURGERY SEPS}}$$

during the collection period, where DAY 5 INFECTION (CONTAM) is the number of patients having evidence of wound infection on or after the fifth post-operative day following contaminated surgery, and CONTAM SURGERY SEPS is the number of patients undergoing contaminated surgery with a post-operative length of stay equal to or greater than 5 days.

### ***Rate of hospital-acquired bacteraemia***

Hospital-acquired bacteraemia is defined as positive blood culture for patients who were afebrile on admission, that is, temperature less than 37.4°C, who become febrile 48 hours or more after admission.

There is currently no attempt to collect data on patients who develop hospital-acquired bacteraemia following separation. In the future, links may be built with community facilities to allow this collection to take place.

The rate is calculated as:

$$\frac{\text{BACTERAEMIA SEPS}}{\text{SEPS} > 48 \text{ HRS}}$$

during the collection period, where BACTERAEMIA SEPS is the number of separated patients who acquire bacteraemia during a hospital stay, and SEPS > 48 HRS is the number of separations with length of stay of 2 days or more.

### ***Results***

Table 3.11 presents illustrative results for this indicator, reproduced from the ACHS report on hospital-wide medical indicators data (ACHS 1994). Hospitals that departed from the definitions were excluded from any analyses in that report. The results shown for the Northern Territory were provided by Northern Territory Department of Health and Community Services, based on the ACHS definitions

**Table 3.11: Hospital-acquired infection rates, public and private acute hospitals, 1993<sup>(a)</sup>**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT <sup>(b)</sup>
Clean wound infection								
Number of facilities	19	8	9	2	10	1	–	1
Number of clean wound infections	43	37	65	2	9	3	–	np
Rate <sup>(c)</sup>	1.9	1.8	2.3	3.0	2.5	1.7	–	3.0
Contaminated wound infection								
Number of facilities	17	7	8	2	8	1	–	1
Number of contaminated wound infections	53	31	47	3	23	6	–	np
Rate <sup>(d)</sup>	2.2	3.7	4.7	3.6	1.8	4.4	–	5.5
Hospital-acquired bacteraemia								
Number of facilities	26	16	7	2	11	2	2	1
Number of hospital-acquired bacteraemia	37	47	31	2	6	4	77	np
Rate <sup>(e)</sup>	0.04	0.10	0.07	0.10	0.03	0.30	0.20	0.23

(a) Hospitals participating in ACHS accreditation program in 1993.

(b) Northern Territory results for 1994–95 were provided by the NT Department of Health and Community Services.

(c) Number of patients with wound infection on or after fifth post-operative day following clean surgery per 100 patients undergoing clean surgery with post-operative length of stay of 5 or more days.

(d) Number of patients with wound infection on or after fifth post-operative day following contaminated surgery per 100 patients undergoing contaminated surgery with post-operative length of stay of 5 or more days.

(e) Number of separated patients who acquire bacteraemia during a hospital stay per 100 separated patients with length of stay of 48 hours or more.

Sources: Australian Council on Healthcare Standards, Care Evaluation Program; NT Department of Health and Community Services, unpublished.

### ***Patient satisfaction***

No agreed definitions currently exist for this indicator. A project concerned with the conceptual development of the area is outlined in Chapter 5.

Illustrative results are shown in Tables 3.12 to 3.15 for New South Wales,

Western Australia and the Australian Capital Territory, and for Queensland accident and emergency departments. Because different survey methods were used at different times, these results are not comparable

**Table 3.12: Selected patient satisfaction results, New South Wales, 1993–94<sup>(a)</sup>**

<b>Variable</b>	<b>General hospitals</b>	<b>All service areas<sup>(b)</sup></b>
<b>General indicators</b>		
Customer satisfaction index (0–100 scale)	84	85
% customers/clients satisfied	94	94
% customers/clients very satisfied	61	62
% 'definitely recommend' to others	72	73
% saying 'worse than expected'	5	5
<b>Care, treatment and communication (0–100 scale)</b>		
Quality of care and treatment	89	90
Compassionate, reassuring attitude	82	82
Knowing you as an individual person	72	72
Information and instructions	77	79
Introductions	69	72
<b>Staff (0–100 scale)</b>		
Doctors—overall	84	84
Doctors—information and communication	79	79
Nurses—overall	90	90
Nurses—information and communication	82	82
<b>Comfort/meals (0–100 scale)</b>		
Condition/look of room	75	76
Cleanliness of ward toilet/showers	79	79
Restful atmosphere	68	68
Comfort of bedding	69	70
Meals	75	75

(a) Based on 7,722 responses from 34 sites over summer 1993–94.

(b) Includes mental health units and community health centres.

Source: NSW Health Department.

**Table 3.13: Selected patient satisfaction results, Western Australia, 1995<sup>(a)</sup>**

<b>Variable</b>	<b>Tertiary</b>	<b>Secondary</b>	<b>All hospitals</b>
Overall satisfaction index (maximum 5.00)	4.42	4.58	4.51

(a) Based on 2,332 responses from a State-wide survey of public hospitals in May 1995.

Source: Health Department of Western Australia.

**Table 3.14: Selected patient satisfaction results, Australian Capital Territory, 1995<sup>(a)</sup>**

Variable	Total
Overall satisfaction	
% very satisfied	60
% fairly satisfied	36
% not too satisfied	1
% not at all satisfied	3
Satisfaction index by area of activity (0–100 scale)	
Inpatients	82
Same day	87
Emergency	83
Outpatients	88

(a) Based on survey at principal hospital.

Source: ACT Department of Health and Community Care.

**Table 3.15: Selected patient satisfaction results, Queensland accident and emergency departments, 1994<sup>(a)</sup>**

Variable	Total
Overall satisfaction	
% very satisfied	51
% fairly satisfied	36
% not too satisfied	8
% not at all satisfied	5
Overall satisfaction index (0–100 scale)	77
Satisfaction with quality of care and treatment	
% very satisfied	63
% fairly satisfied	28
% not too satisfied	6
% not at all satisfied	3

(a) Based on 1,898 responses across 20 public hospital accident and emergency departments during part of 1994.

Source: Queensland Health Department.

### Proportion of facilities accredited by ACHS

This indicator is a stand-in general measure of the quality of care processes, in that success in the ACHS program requires demonstrated adherence to quality assurance practices.

The indicator is calculated as the ratio of accredited hospitals to all hospitals in the jurisdiction. For this indicator, private hospital data are reported to complement the public hospital data.

Because participation in the ACHS program is voluntary, this indicator may

merely reflect the policy or resources of hospitals regarding participation. An improvement on this indicator would be a comparison of the number of facilities achieving accreditation with the number applying.

In 1993–94 the ACHS awarded accreditation for 1 year, 3 years or 5 years, with the longer duration reflecting the confidence of the ACHS survey team in the ability of the hospital to maintain the quality of care processes. The results for this indicator are shown by duration of accreditation.

## Results

Table 3.16 presents results provided by ACHS on the proportion of hospital facilities awarded accreditation. Figure 3.2 shows the proportion of all facilities accredited.

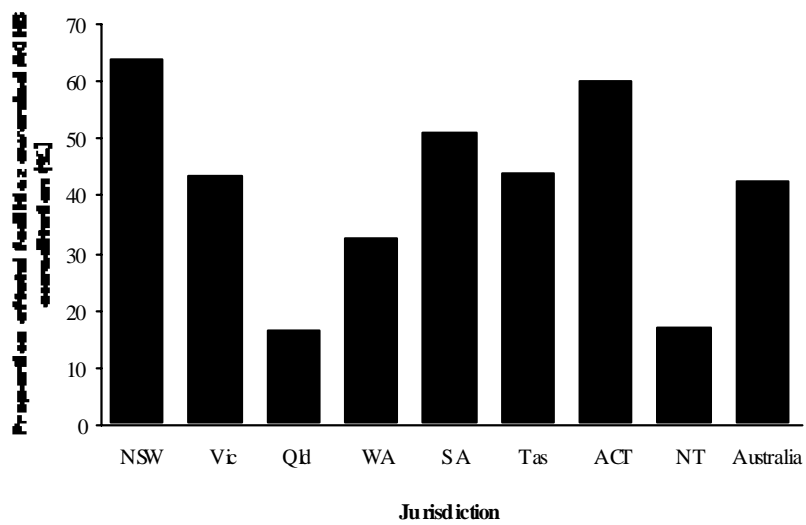
In general, the proportions are higher in the private sector. This probably reflects the fact that in some jurisdictions accredited private hospitals can attract higher health insurance fund rebates than non-accredited facilities.

**Table 3.16: Proportion of facilities accredited by ACHS (%), public and private acute hospitals, as at 30 June 1994**

Hospital type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Public</b>									
Metropolitan	64	68	19	47	71	67	100	–	58
Non-metropolitan	49	31	2	22	33	–	na	–	25
Total public	53	43	4	26	40	24	100	–	32
1 year <sup>(a)</sup>	4	2	1	3	3	12	–	–	3
3 years	46	36	3	23	37	12	100	–	28
5 years	3	4	–	–	–	–	–	–	2
Total	53	43	4	26	40	24	100	–	32
<b>Private</b>									
Metropolitan	81	54	50	47	84	100	–	100	66
Non-metropolitan	100	24	65	150	29	75	na	na	58
Total private	86	45	59	57	74	88	–	100	64
1 year	7	2	6	5	5	–	–	–	4
3 years	69	40	49	52	64	88	–	100	54
5 years	10	4	4	–	5	–	–	–	5
Total	86	45	59	57	74	88	–	100	64
<b>Total acute hospitals</b>									
Metropolitan	73	59	33	47	80	80	60	50	63
Non-metropolitan	56	29	12	25	32	20	na	–	30
Total acute	64	44	16	32	51	44	60	17	42
1 year	5	2	2	4	3	8	–	–	3
3 years	54	38	13	28	46	36	60	17	36
5 years	5	4	1	–	2	–	–	–	3
Total	64	44	16	32	51	44	60	17	42

(a) 1 year, 3 years or 5 years is the duration of accreditation awarded.

Source: Australian Council on Healthcare Standards, unpublished.



**Figure 3.2: Proportion of facilities accredited by ACHS (%), public and private acute hospitals, as at 30 June 1994**



## ACCESS

Access relates to the capability of the health system to provide appropriate, affordable and timely care according to need.

### Waiting times for elective surgery

The data used for this indicator have been extracted from the waiting times data set prepared by the Institute for the *National Report on Elective Surgery Waiting Lists for Public Hospitals 1994* (Mays 1995).

The waiting times collection in 1994 represented the first attempt to collect data in a nationally consistent manner. Health authorities were not able to apply all draft definitions in a similar way, so the 1994 data set has some anomalies. Many issues regarding the definitions and their application have been debated following the publication of those data. Changes to definitions effective July 1995 should see more consistent waiting times data available after the completion of the 1995–96 collection.

This indicator comprises three sets of performance measures regarding waiting times for elective surgery:

- clearance time;
- proportion of patients waiting inappropriately at census; and
- proportion of patients admitted after waiting inappropriately.

Clearance time is defined as the number waiting at a point in time (the census count) divided by the mean number cleared (admitted and removed) from the waiting list per month. It can be conceived as the length of time that it would take to clear all patients from the waiting list if the rate of clearance remained constant and no more patients were added to the list. Clearance time is a

prospective measure, and should not be considered as equal to the average waiting time.

An inappropriate wait is described as waiting longer than considered appropriate for the urgency categorisation of the patient. At the time the data for this indicator were collected, there was national consensus to use two levels of urgency:

- category 1: admission desirable within 30 days; and
- category 2: admission desirable within 31 days or more (there is no time limit on category 2 patients).

There is an in-principle agreement by all States and Territories to the adoption of a nationally consistent three-tier urgency categorisation system. It is anticipated that this system will be used in the 1996 national report on elective surgery waiting lists.

An inappropriate wait for category 1 patients is therefore 31 days or more. Because there is no time limit on category 2 patients, it is difficult to define an inappropriate waiting time. A period of 12 months was selected as it represented a compromise between the differing views on the subject. In this report, category 2 patients are reported together with category 1 patients.

The formula for inappropriate wait at census for category 1 patients is:

$$\frac{\text{CAT1} > 30 \text{ DAYS (CENSUS)}}{\text{CAT1 (CENSUS)}}$$

where CAT 1 > 30 DAYS (CENSUS) is the number of category 1 patients waiting over 30 days at census, and CAT 1 (CENSUS) is the number of category 1 patients on the waiting list on the census date.

The formula for category 2 patients is similar, substituting waiting > 12 months on the census date.

The formula for category 1 patients admitted after waiting inappropriately is:

$$\frac{\text{CAT1 > 30 DAYS (ADM)}}{\text{CAT1 (ADM)}}$$

where CAT 1 > 30 DAYS (ADM) is the number of category 1 patients admitted who waited over 30 days, and CAT 1 (ADM) is the number of category 1 patients admitted.

The formula for category 2 patients is similar, substituting admitted after waiting > 12 months.

The clinical specialty groups reported were determined by consensus during the development of the waiting times definitions. Specialty is the area of clinical expertise held by the doctor who will perform or has performed the elective surgery.

### Results

The results of a one-month data collection in 1994 are presented in this section. Several caveats apply to these data:

- the survey period was only one month—the numbers and attributes of patients admitted during this period may not be typical of patients admitted over a longer

period;

- categorisation of patients by clinical urgency was implemented to varying degrees and with variable consistency; and
- the data do not cover all public hospitals in each State and Territory. Table 3.17 indicates the coverage of waiting list data in this period. Data for Queensland were not available for the original collection.

### Clearance time

Table 3.18 and Figure 3.3 show average clearance time by clinical specialty for each jurisdiction reporting in 1994.

The main features of this table are:

- the average clearance time for Australia was estimated as 2.3 months. This is the average time it would take to treat all patients on the waiting list if the present rate of clearance prevailed and no more patients were added to the list;
- the average clearance time for all patients ranged from 1.8 months in New South Wales to 9.9 months in the Northern Territory; and
- there was a high degree of variation in clearance time for clinical specialties among the jurisdictions.

**Table 3.17: Coverage of waiting times data, public acute hospitals, 1994**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Proportion of total separations provided by hospitals which contributed waiting times data	99	67	na	50	62	99	100	100	na

Source: Mays 1995.

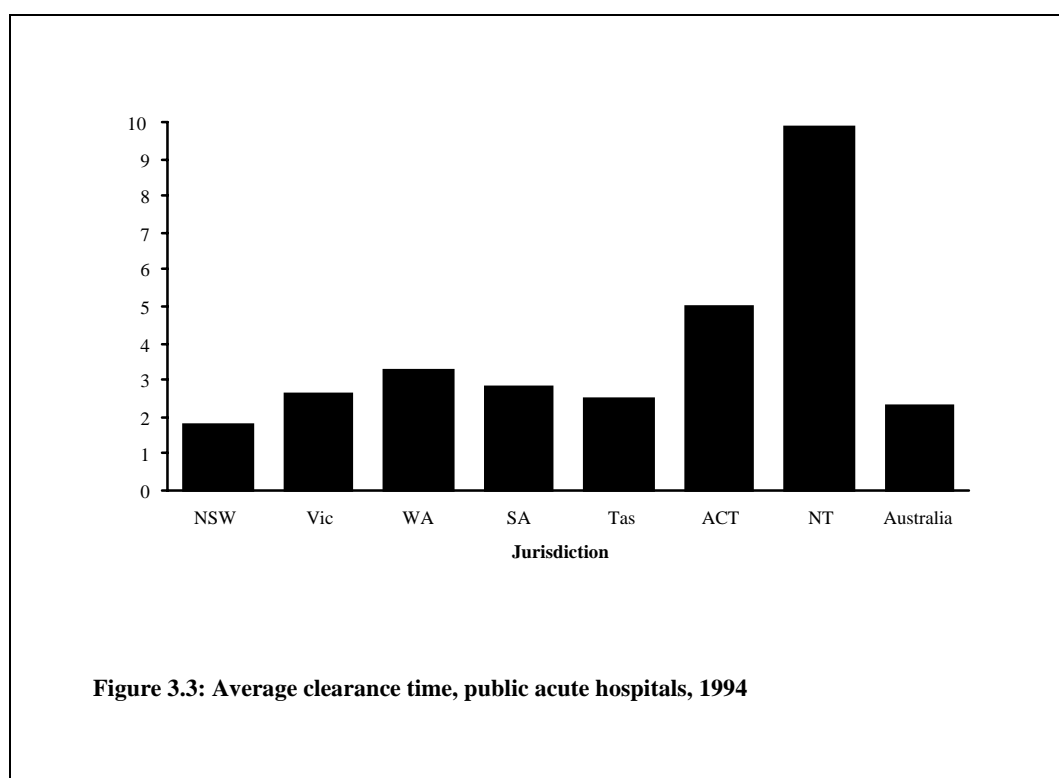
**Table 3.18: Average clearance time (months), public acute hospitals, 1994**

Clinical specialty	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Cardio-thoracic surgery	1.1	1.0	np	1.1	1.1	2.0	0.4	np	1.1
Ear, nose and throat	2.9	3.2	np	5.0	4.8	4.6	4.9	np	3.6
General surgery	1.3	1.9	np	2.6	2.6	2.1	4.9	np	1.7
Gynaecology	1.2	1.9	np	1.0	1.9	2.8	3.0	np	1.6
Neurosurgery	0.8	1.4	np	0.8	0.9	1.4	8.7	np	1.1
Ophthalmology	3.3	2.7	np	5.5	2.1	3.4	4.8	np	3.2
Orthopaedic surgery	2.7	3.3	np	5.0	3.9	6.0	5.4	np	3.3
Plastic surgery	1.6	5.1	np	4.0	3.5	5.8	5.2	np	3.4
Urology	2.0	2.9	np	4.5	2.2	3.3	11.0	np	2.7
Vascular surgery	1.5	2.6	np	1.3	2.0	1.5	7.4	np	1.9
Other	–	1.6	np	1.8	2.5	0.4	–	np	1.0
All patients	1.8	2.6	np	3.3	2.8	2.5	5.0	9.9	2.3

*Notes:*

1. Clearance time is a prospective measure of the capacity of the system to remove patients from waiting lists. It should not be considered as the average waiting time.
2. The survey period was only one month—the numbers and attributes of patients admitted during this period may not be typical of patients admitted over a longer period of time.
3. Categorisation of patients by clinical urgency was implemented to varying degrees and with variable consistency.
4. The data do not cover all public hospitals in each State and Territory.

Source: Mays 1995.



**Figure 3.3: Average clearance time, public acute hospitals, 1994**

**Inappropriate waits**

Tables 3.19 and 3.20 present data on inappropriate waiting times, determined at census or on admission. Data for Victoria are not comparable, as a different method for

calculating waiting times was used in that State.

Key results in these tables are:

- at the time of census, 9% of patients had waited more than 12 months;

- 20% of plastic surgery patients nationally had waited more than 12 months at census, and less than 1% of cardiac surgery patients had waited more than 12 months at census;
- across all specialties the highest proportion of long-wait patients at census was in the Australian Capital Territory (26%) and the lowest in New South Wales (5%);

- of all patients admitted from waiting lists, only 2% had waited more than 12 months;
- 40% of category 1 patients nationally had waited more than 30 days, ranging from 27% in the Australian Capital Territory to 67% in Western Australia; and
- of all category 1 patients admitted from waiting lists, 13% had waited more than 30 days.

**Table 3.19: Performance measures for all elective surgery patients, public acute hospitals, 1994**

Variable and clinical specialty	NSW	Vic <sup>(a)</sup>	Qld	WA	SA	Tas	ACT	NT	Australia
Proportion of patients waiting over 12 months at census									
Cardio-thoracic surgery	–	2	np	3	2	–	np	np	–
Ear, nose and throat	8	8	np	25	16	32	np	np	11
General surgery	3	8	np	20	7	19	np	np	7
Gynaecology	–	4	np	4	5	14	np	np	5
Neurosurgery	2	3	np	12	3	18	np	np	6
Ophthalmology	6	3	np	22	2	15	np	np	6
Orthopaedic surgery	7	9	np	17	10	13	np	np	8
Plastic surgery	13	16	np	29	20	32	np	np	20
Urology	3	7	np	24	17	30	np	np	11
Vascular surgery	12	7	np	6	28	22	np	np	17
Other	–	8	np	22	20	2	np	np	2
All patients	5	8	np	21	12	20	26	23	9
Proportion of patients admitted after waiting over 12 months									
Cardio-thoracic surgery	–	–	np	–	–	–	np	np	–
Ear, nose and throat	2	2	np	13	6	23	np	np	4
General surgery	–	2	np	4	2	4	np	np	1
Gynaecology	–	1	np	–	2	6	np	np	1
Neurosurgery	–	–	np	1	1	6	np	np	1
Ophthalmology	1	1	np	13	1	1	np	np	1
Orthopaedic surgery	2	6	np	7	4	9	np	np	2
Plastic surgery	1	5	np	4	5	12	np	np	6
Urology	–	3	np	–	3	15	np	np	2
Vascular surgery	1	6	np	–	2	–	np	np	1
Other	–	–	np	4	–	1	np	np	–
All patients	1	3	np	5	3	6	26	8	2

(a) Victorian data are not comparable because of a different method of calculating waiting time.

*Notes:*

1. The survey period was only one month—the numbers and attributes of patients admitted during this period may not be typical of patients admitted over a longer period of time.
2. Categorisation of patients by clinical urgency was implemented to varying degrees and with variable consistency.
3. The data do not cover all public hospitals in each State and Territory.

Source: Mays 1995.

**Table 3.20: Performance measures for category 1 patients, public acute hospitals, 1994**

Variable	NSW	Vic <sup>(a)</sup>	Qld	WA	SA	Tas	ACT	NT	Australia
Proportion of patients waiting over 30 days at census (%)									
All patients	36	1	np	67	np	45	27	52	40
Proportion of patients admitted after waiting over 30 days (%)									
All patients	13	0.3	np	17	np	11	np	25	13

(a) Victorian data are not comparable because of a different method of calculating waiting time.

*Notes:*

1. The survey period was only one month—the numbers and attributes of patients admitted during this period may not be typical of patients admitted over a longer period of time.
2. Categorisation of patients by clinical urgency was implemented to varying degrees and with variable consistency.
3. The data do not cover all public hospitals in each State and Territory.

Source: Mays 1995.

**Accident and emergency waiting times**

No national definition exists for this indicator, though a number of hospitals are collecting waiting times data using the triage system developed by the Australasian College of Emergency Medicine. As part of this system, indicator thresholds have been nominated. These thresholds suggest the proportion of patients within each urgency category that should be attended within the prescribed waiting time.

Table 3.21 summarises the triage categories, waiting times and indicator thresholds.

**Results**

No national data were available for this indicator. Results for the fourth quarter of 1994–95 from a sample of hospitals were available for New South Wales (45 hospitals) and Tasmania (1 hospital). These results are shown in Table 3.22.

**Outpatient waiting times**

No national definition exists for this indicator. Notionally, outpatient waiting time refers to the interval between being referred for treatment in an outpatient unit and the date an appointment is available.

This indicator will complement the data collected on waiting times for elective surgery. Part of the development of definitions in this area involves the

**Table 3.21: Accident and emergency waiting time categories**

Triage category	Waiting time	Threshold
Resuscitation	immediately	98
Emergency	within 5 minutes	95
Urgent	within 30 minutes	90
Semi-urgent	within 60 minutes	90
Non-urgent	within 2 hours	85

Source: Australasian College of Emergency Medicine.

**Table 3.22: Accident and emergency waiting times, public acute hospitals, fourth quarter 1994–95**

Triage category	Percentage of patients attended within recommended time period	
	NSW <sup>(a)</sup>	Tas <sup>(b)</sup>
Resuscitatio	68	99
Emergency	47	100
Urgent	55	81
Semi-urgent	68	78
Non-urgent	90	92

(a) Sample of 45 hospitals.

(b) One hospital only.

Sources: State health authorities, unpublished.

development of a nationally consistent classification system for outpatient occasions of service. Until such a system exists, there is no way of determining what is a clinically appropriate waiting time for an outpatient service. Development projects in this field are currently being undertaken by HSH and various State health authorities.

### Variations in intervention rates

This indicator is a measure of access, insofar as variations in intervention rates for small geographical areas reflect the collective decisions of medical practitioners who refer patients for surgical treatment in hospital.

The intervention rate is defined as:

$$\frac{\text{HOSP SEPS}}{1,000 \text{ persons}}$$

where HOSP SEPS is the number of hospital separations for the selected procedure. The number of hospital separations is based on the location of the patient's usual residence and not where the hospital is located. Similarly, the population used in the denominator is the population of the area where the patient usually resides. The use of patient's usual residence assumes that the doctor referring

the patient for surgical treatment is also located in the same area.

Intervention rates are calculated by combining public and private hospital data, as a low rate of public hospital separations may simply reflect the service arrangements of public and private hospitals in the area.

### Sentinel procedures

Sentinel procedures are common, mostly elective, and considered to be discretionary, that is, there are often conservative or non-surgical treatment alternatives. The sentinel procedures selected for this indicator were proposed by the Hospitals Working Group when the indicators were first being developed.

Procedures performed in Australian hospitals are coded using the International Classification of Diseases, Version 9, Clinical Modification (ICD-9-CM). This system is also used in hospitals in a number of other countries, allowing international comparisons of morbidity and other aspects of hospital activity.

Appendix H contains a table of ICD-9-CM procedure codes for each of the sentinel procedures in this report.

### ***Principal and other procedures***

Hospitals may record up to 16 procedures for any one patient episode. Usually the first listed procedure is known as the principal procedure (the procedure accounting for the most resources). For most of the sentinel procedures, the vast majority of separations had the sentinel procedure coded as the principal procedure.

The notable exception to this is the lens insertion procedure. An artificial lens is usually inserted following a cataract extraction. The insertion can take place at the same time as the cataract extraction – in which case the cataract operation is the principal procedure – or at a later time, in which case the lens insertion is the principal procedure. Approximately 5% of lens insertions in the analysis data set were coded as the principal procedure.

It was not feasible to consider all additional procedures recorded for the episode: only the second procedure in each morbidity record was analysed. While this will underestimate the true intervention rate, it should not affect the comparisons, as there is no expectation that different practices exist in the States and Territories with respect to the order of coded procedures.

For all States and Territories, data for principal and second procedures were added before calculating rates.

### ***Age and sex standardisation***

It is possible that variations in intervention rates are due to differences in the age and sex structure of the populations being analysed. To account for this the rates are age- and sex-standardised against a reference population.

The rates presented in this report were adjusted using direct standardisation, by applying age- and sex-specific rates to a standard population. The standard population used was the total Australian population as at 30 June 1991. The usual convention of using age- and sex-specific rates for five-year age groups has been followed according to the following formula:

$$\text{standardised rate} = \frac{\sum (R_i \times P_i)}{\sum P_i}$$

where  $R_i$  is the age- and sex-specific rate for age group  $i$ , and  $P_i$  is the standard population in age group  $i$ .

If the same reference population is used each time the analysis is done (say over a number of years or for different regions in the same year, as in this report) then the rates are directly comparable and any differences in the rates will be independent of differences in the population structure.

### ***Test of significance***

Intervention rates for a region may appear to be considerably different from the rates for another region, but these differences may just be due to random variation. To determine whether the rate for a particular region was significantly different from the rate for another region, a measure of statistical significance was applied (see Appendix I).

Rates were calculated for each region and for all other regions combined. For example, the rate for tonsillectomy for New South Wales was calculated as 1.8 separations per 1,000 population, and the rate for Australia excluding New South Wales was 2.3. The difference is represented as a percentage: the rate for New South Wales was 22.0% lower than

the rate for the other regions combined. The \* symbol in Table 3.23 indicates that the difference is significant at the 1% significance level. Where no such symbol is shown, it indicates that there is no evidence to suggest that the rates are different.

### Results

Table 3.23 presents the results for the five jurisdictions that provided consistent data for the public and private sectors in 1992–93. Private hospital data were not available for the Northern Territory, and morbidity data for Victorian private hospitals were not sufficiently complete to permit reliable estimation of rates for these procedures. Rates for these jurisdictions are therefore not reported. Queensland private hospital data were available to the Institute under a different coding system for half the period, so rates were calculated by the Queensland Health Department using the same methodology. Queensland data have not been used in the calculation of comparison rates. The results in the table show the age-standardised rates for each jurisdiction compared with the rate for all other jurisdictions combined. The \* symbol indicates that the difference is significant at the 1% significance level.

When this indicator was proposed, it was expected that sufficiently detailed and uniform data would be available to enable the calculation of intervention rates for small geographical areas (namely statistical subdivisions – an intermediate level in the ABS Australian Standard Geographical Classification system). Unfortunately, the data provided to the Institute were not uniformly coded for area of usual residence, hence rates have been calculated only at the State and Territory level. Related to this, rates have been

calculated by location of service provider, not by location of patient’s residence. This will affect those jurisdictions that experience a high degree of cross-border flow of patients.

Notable results in the table include:

- no State or Territory had rates significantly different from the comparison rates for all selected procedures;
- the greatest percentage difference above the comparison rate was for hip replacements in the Australian Capital Territory (72.8%); and
- the greatest percentage difference below the comparison rate was for lens insertion in Western Australia (43.7% below).

### Separations per 1,000 population

This indicator is defined as:

$$\frac{\text{total number of separations}}{1,000 \text{ persons}}$$

where separations are defined by NHDD item A1.

Rates have been calculated for public and private hospitals, and it is assumed that each sector serves the whole of the State or Territory population.

The results are also disaggregated by patient accommodation status (based on NHDD item P16). The groups used are public patients, private patients and other patients. The ‘other’ category includes nursing home type patients, Department of Veterans’ Affairs patients, and compensable and ineligible patients.

Data were not available to adjust for cross-border flows or for the age and sex structure of the populations.



**Table 3.23: Separation rates for sentinel procedures, public and private hospitals combined, 1992–93**

Sentinel procedure and variable	NSW	Vic <sup>(a)</sup>	Qld <sup>(b)</sup>	WA	SA	Tas	ACT	NT <sup>(c)</sup>	Australia <sup>(d)</sup>
<b>Appendicectomy</b>									
Separations <sup>(e)</sup>	9,780	na	4,324	2,860	2,442	665	354	na	16,101
Standardised separation rate <sup>(f)</sup>	1.7	na	1.4	1.7	1.7	1.4	1.1	na	1.7
Standardised rate for other States <sup>(g)</sup>	1.6	na	na	1.7	1.7	1.7	1.7	na	na
Difference (% <sup>(h)</sup> )	3.1	na	na	2.7	5.5	-13.6	-32.7	na	na
Significance of difference <sup>(i)</sup>	–	na	na	–	–	*	*	na	na
<b>Coronary artery bypass graft</b>									
Separations	8,229	na	2,067	1,581	2,235	552	–	na	12,597
Standardised separation rate	1.3	na	0.7	1.0	1.4	1.1	–	na	1.3
Standardised rate for other States	1.1	na	na	1.3	1.2	1.3	–	na	na
Difference (%)	16.6	na	na	-20.1	15.6	-8.6	–	na	na
Significance of difference	*	na	na	*	*	–	–	na	na
<b>Caesarean</b>									
Separations	14,930	na	9,513	4,722	4,387	1,143	1,071	na	26,253
Standardised separation rate	2.6	na	3.1	2.8	3.1	2.6	3.3	na	2.7
Standardised rate for other States	3.0	na	na	2.7	2.7	2.7	2.7	na	na
Difference (%)	-13.3	na	na	5.5	18.4	-5.1	23.0	na	na
Significance of difference	*	na	na	*	*	–	*	na	na
<b>Cholecystectomy</b>									
Separations	13,604	na	6,349	3,253	3,723	962	550	na	22,092
Standardised separation rate	2.2	na	2.1	2.0	2.4	2.0	2.1	na	2.2
Standardised rate for other States	2.2	na	na	2.2	2.1	2.2	2.2	na	na
Difference (%)	1.2	na	na	-9.4	12.5	-7.8	-4.1	na	na
Significance of difference	–	na	na	*	*	–	–	na	na
<b>Endoscopy</b>									
Separations	130,408	na	55,534	25,006	25,285	10,419	4,808	na	195,926
Standardised separation rate	21.0	na	18.0	15.5	16.2	21.5	19.6	na	19.4
Standardised rate for other States	16.8	na	na	20.1	20.0	19.3	19.4	na	na
Difference (%)	25.4	na	na	-22.7	-19.0	11.7	1.2	na	na
Significance of difference	*	na	na	*	*	*	–	na	na
<b>Hip replacement</b>									
Separations	5,255	na	1,864	1,591	1,600	537	279	na	9,262
Standardised separation rate	0.8	na	0.6	1.0	0.9	1.0	1.5	na	0.9
Standardised rate for other States	1.0	na	na	0.8	0.9	0.9	0.9	na	na
Difference (%)	-20.3	na	na	18.8	8.0	22.7	72.8	na	na
Significance of difference	*	na	na	*	*	*	*	na	na
<b>Hysterectomy</b>									
Separations	11,149	na	5,684	4,020	3,509	873	592	na	20,143
Standardised separation rate	1.8	na	1.8	2.4	2.3	1.8	2.0	na	2.0
Standardised rate for other States	2.2	na	na	1.9	1.9	2.0	2.0	na	na
Difference (%)	-19.6	na	na	24.8	18.9	-8.1	-0.7	na	na
Significance of difference	*	na	na	*	*	–	–	na	na
<b>Lens insertion</b>									
Separations	23,949	na	7,313	3,185	6,416	2,164	675	na	36,389
Standardised separation rate	3.7	na	2.4	2.1	3.7	4.1	3.8	na	3.5
Standardised rate for other States	3.1	na	na	3.7	3.4	3.4	3.4	na	na
Difference (%)	17.1	na	na	-43.7	9.0	21.0	9.6	na	na
Significance of difference	*	na	na	*	*	*	–	na	na
<b>Tonsillectomy</b>									
Separations	10,476	na	5,462	3,655	4,039	685	577	na	19,432
Standardised separation rate	1.8	na	1.7	2.1	2.9	1.5	1.8	na	2.0
Standardised rate for other States	2.3	na	na	2.0	1.9	2.0	2.0	na	na
Difference (%)	-22.0	na	na	8.2	58.7	-28.2	-7.9	na	na
Significance of difference	*	na	na	*	*	*	–	na	na

(a) Morbidity data for Victorian private hospitals for 1992–93 were not sufficiently complete to permit reliable estimation of rates for these procedures.

(b) Comparison rates were not able to be calculated; private hospital data are estimated on the basis of 6 months collection to 30 June 1993.

(c) Morbidity data for the NT private hospital were not available.

(d) Total of NSW, WA, SA, Tas and ACT only.

(e) Number of separations from public and private acute hospitals, for principal and second procedure.

(f) Age-standardised rate per 1,000 population.

(g) Age-standardised rate for other States and Territories combined.

(h) Difference between State rate and comparison rate, expressed as a ratio of the rate to the comparison rate.

(i) Measure of statistical significance: \*= 1%, –= rates not statistically different.

Sources: AIHW National Minimum Data Set survey program, unpublished; Qld Health Department, unpublished.

## **Results**

Table 3.24 presents the admission rates for public and private hospitals for same-day and overnight patients.

Detailed data on the numbers of separations by accommodation status were not available, but will be close to the numbers of admissions for acute hospitals.

Highlights of the table include:

- nationally there were 257.6 total admissions per 1,000 population, comprising 89.4 same-day admissions per 1,000 population and 168.2 overnight admissions;
- approximately 73% of total admissions were to public hospitals;

- total admissions per 1,000 population ranged from 226.5 in the Australian Capital Territory to 283.4 in South Australia;
- the highest private sector share was in Tasmania (34.6%) and the lowest in the Northern Territory (19.6%); and
- for public acute hospitals, the highest rate of public patient admissions was in the Northern Territory (73.3%) and the lowest in Tasmania (53.2%).

Figure 3.4 shows the number of admissions to acute hospitals per 1,000 population by patient accommodation status

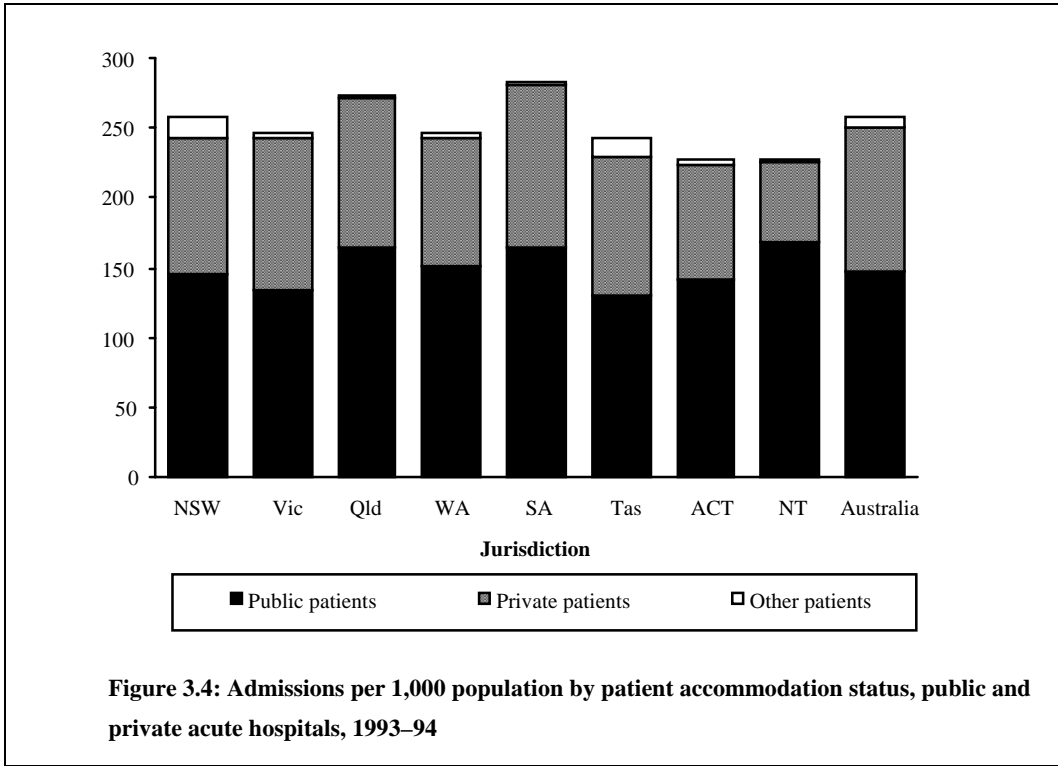
**Table 3.24: Admissions per 1,000 population by patient accommodation status<sup>(a)</sup>, public and private acute hospitals, 1993–94**

Hospital type and region	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Same-day admissions</b>									
Public hospitals									
Metropolitan									
Public patients	46.3	51.5	71.1	56.8	63.5	48.0	66.3	36.3	53.6
Private patients	14.1	10.5	9.4	10.5	15.0	6.4	11.1	4.7	12.0
Other patients	4.8	1.3	0.4	1.1	0.7	4.7	0.5	0.4	2.5
All patients	65.3	63.2	81.0	68.4	79.2	59.1	78.0	41.3	68.1
Non-metropolitan									
Public patients	45.6	47.5	44.5	32.0	41.3	28.7	na	22.8	43.2
Private patients	8.5	12.2	5.6	5.0	8.4	0.6	na	6.0	7.8
Other patients	9.8	1.0	0.3	0.8	1.3	2.1	na	0.9	3.1
All patients	63.8	60.7	50.5	37.9	51.0	31.3	na	29.7	54.1
All public hospitals									
Public patients	46.2	50.5	56.7	50.1	57.6	40.6	66.3	29.0	50.5
Private patients	12.8	10.9	7.4	9.0	13.3	4.2	11.1	5.4	10.7
Other patients	6.0	1.2	0.4	1.0	0.8	3.7	0.5	0.6	2.7
All patients	65.0	62.6	64.4	60.1	71.7	48.5	78.0	35.1	63.9
Private hospitals <sup>(b)</sup>	22.5	30.7	29.3	17.3	26.5	27.6	20.1	13.0	25.6
All same-day admissions	87.4	93.3	93.7	77.4	98.2	76.1	98.1	48.0	89.4
<b>Overnight admissions</b>									
Public hospitals									
Metropolitan									
Public patients	80.5	77.0	110.5	87.5	100.9	97.4	74.4	136.1	86.1
Private patients	25.3	19.5	15.7	14.7	20.0	17.5	24.1	5.5	20.8
Other patients	9.2	2.4	0.8	3.4	2.4	11.9	2.0	3.2	5.1
All patients	114.9	98.9	127.0	105.6	123.3	126.8	100.6	144.8	111.9
Non-metropolitan									
Public patients	158.9	103.1	104.6	136.6	119.8	74.2	na	140.2	121.8
Private patients	30.2	30.2	18.6	20.4	27.8	2.8	na	9.0	24.2
Other patients	12.4	3.1	1.5	4.7	3.0	6.4	na	2.6	5.3
All patients	201.5	136.4	124.8	161.7	150.7	83.4	na	151.8	151.3
All public hospitals									
Public patients	98.5	83.6	107.3	100.8	106.0	88.5	74.4	138.3	96.8
Private patients	26.4	22.2	17.3	16.3	22.1	11.9	24.1	7.4	21.8
Other patients	10.0	2.6	1.2	3.8	2.6	9.8	2.0	2.9	5.1
All patients	134.9	108.4	125.8	120.8	130.7	110.1	100.6	148.6	123.8
Private hospitals	36.0	44.6	53.6	49.2	54.6	56.3	27.9	31.7	44.4
All overnight admissions	170.9	152.9	179.4	170.0	185.3	166.4	128.4	180.3	168.2
<b>Total admissions</b>									
By type of hospital									
Public hospitals	199.8	171.0	190.2	180.9	202.3	158.6	178.6	183.7	187.6
Private hospitals	58.5	75.3	82.9	66.5	81.1	83.9	47.9	44.7	70.0
All hospitals	258.3	246.2	273.1	247.4	283.4	242.5	226.5	228.3	257.6
By patient accommodation status									
Public patients	144.7	134.1	164.0	150.9	163.6	129.1	140.8	167.3	147.3
Private patients	97.7	108.4	107.5	91.8	116.5	100.0	83.2	57.4	102.6
Other patients	15.9	3.8	1.6	4.8	3.4	13.5	2.5	3.5	7.8
All patients	258.3	246.2	273.1	247.4	283.4	242.5	226.5	228.3	257.6

(a) Refer NHDD item P16, see Appendix D.

(b) Private hospital data not available by region.

Sources: AIHW National Minimum Data Set survey program, unpublished; ABS Cat. No. 4390.0.



# 4 BENCHMARKING IN THE HEALTH SECTOR

## INTRODUCTION

### Defining benchmarking

In a recent study by the Australian Manufacturing Council (AMC 1994), benchmarking is defined as ‘the ongoing, systematic process to search for and introduce international best practice into an organisation’. It is elsewhere defined as ‘the continuous process of measuring products, services and practices against the toughest competitors or those companies recognised as industry leaders’ (Camp 1989).

Paraphrasing the AMC, best practice can be defined as the cooperative way in which organisations undertake business activities in all key areas leading to sustainable world-class outcomes.

A standard dictionary entry for benchmark refers to a surveyor’s mark on a rock, etc. to mark a point in a line of levels. The term also has a figurative meaning, and refers to the matching of a value against a criterion. The criterion is synonymous with ‘best practice’, and explains why the terms benchmarking and best practice are commonly seen together.

### The benchmarking process

Benchmarking typically comprises five basic phases.

1. Preparation, in which the following are determined:
  - what to benchmark; and
  - who or what to benchmark against.

#### Box 4.1 A short history of benchmarking

Benchmarking is reputed to have started when the Xerox Corporation wanted to improve its order fulfilment process in 1982. The company approached a mail-order catalogue organisation considered to have superior order-filling processes. Xerox sent a group to visit the company’s warehouse to study its processes, as it felt that it could learn and adapt the best of the company’s practices. Xerox executives credited the technique with helping save the company from being crushed by Japanese competitors in the early 1980s.

Soon other companies conducted one-on-one analyses of the processes of other companies, and found that it led to significant successes. Interest in benchmarking as a quality management tool was further spurred by its inclusion in the criteria for the prestigious Malcolm Baldrige National Quality Award in the United States.

2. Comparison, which may include the following activities:
  - data collection;
  - data manipulation, construction of indicators, etc.; and
  - comparison of results with benchmarking partners.
3. Investigation, that is, identification of practices and processes that result in superior performance.
4. Implementation, in which best practices are adapted and/or adopted.
5. Evaluation, where new practices are monitored to ensure continuous improvement, and, if necessary, the whole cycle is repeated.

### **Levels of benchmarking**

The AMC report describes five levels of benchmarking ranging from ad hoc observations of competitors' products at the low end, to detailed comparison of processes and outcomes against the world's best – inside or outside the industry – at the high end. A finding of the report was that industry leaders tend to engage in higher-level benchmarking.

## **APPLICATION TO THE HEALTH SECTOR**

The previous section outlined the concepts of benchmarking, most of which were developed in the industrial sector. The principles, however, can be directly translated to the health sector.

### **Best practice in the health sector**

World-class outcomes in the health sector are difficult to identify for a number of reasons:

- it is difficult to directly measure health outcomes;
- where measures are used, they may not be the same as those used by the potential benchmarking partners;
- outcomes may be measured along a number of dimensions, for example, change in health status and cost, and achieving an excellent outcome on one dimension may compromise the outcome on another level;
- outcomes do not necessarily relate to one component of care; rather they are the result of many phases of investigation, intervention and evaluation. Not all of these phases occur during a hospital stay, so that inferences about hospital performance and outcome may be misguided;
- there are few precedents in Australia for setting desired performance levels; and
- there are political, psychological and sociological factors associated with an organisation not achieving benchmark performance levels.

Although it may be difficult to develop indicators for health care outcomes, it is possible to measure the processes and outputs of health care that contribute to health care outcomes. Indeed, the performance indicators in this document focus on these processes and outputs, and it is reasonable to infer that favourable results for these performance indicators

would be correlated with favourable results on outcomes indicators.

### **Application of benchmarking to health sector management**

As noted in Chapter 1, an objective of the benchmarking program is to provide governments and health services funders with a core set of performance information to assist in health sector management and policy development.

To this end, the NHMBWG has developed a succinct set of performance indicators to assess performance of the sector as a whole, incorporating the most critical measures of a complex health care delivery system.

In developing and publishing this set of indicators it is anticipated that interest in benchmarking will be stimulated and further incentives for continuous improvement will be generated.

### **Application of benchmarking at the hospital level**

Although the set of indicators in this report may be directed towards measurement of the performance of the system as a whole, it is evident that benchmarking has greater utility at the organisational level, where decisions related to changing behaviour are to be made. Benchmarking requires information on the current performance of the organisation, exchange of information with best practice providers on practices and processes, and implementation of changes if appropriate. In most cases, changes will be made at the individual provider level, so information on that provider's performance and on the changes that need to be made has to be

available to the manager of the individual organisation.

The data presented in this report are highly aggregated – mostly at the level of the State or Territory. Not only does this not reflect the performance of a single provider, but there is no information on the best practice providers (because they cannot be identified).

To a large extent, the indicators discussed in this report are meaningful only in the aggregate. For example, separations per 1,000 population reflect the performance of the whole hospital system: it may only be appropriate to report these rates for groups of providers that serve a particular catchment population, taking account of specialisation and complementary services in the private sector, among other things.

For other indicators, data are not readily available at the hospital level. For example, the cost per casemix-adjusted separation requires data on average case weights. This item is only readily available at an aggregated level, so that estimates of average cost per separation for each hospital would be based on incomplete information.

For benchmarking to be useful at the hospital level, current indicators will have to be enhanced, new ones developed, and data collections expanded, so that data collected at the hospital level can be used to construct indicators. Then, however, the results and information about the processes that led to them need to be shared with similar providers, and so on in the benchmarking cycle.

### **Facilitating inter-hospital communication of benchmarking information**

The exchange of information is crucial to a successful benchmarking program.

Providers have to communicate with best practice organisations, sharing information about the processes and practices that lead to superior performance.

Communication of this kind already occurs in some parts of the system. For example, hospital groups share a central administration, and regional or district health authorities collect data from hospitals that can be redistributed to other hospitals in the group.

Informal communication occurs among hospital managers and administrators through conferences, meetings of professional colleges, journals and published material (for example, Victorian 'Rainbow' series).

Benchmarking requires a cooperative, systematic approach to the exchange of information. It may be difficult for some hospitals to enter a cooperative arrangement with other hospitals for this purpose, and some assistance from central health authorities may be required to initiate such arrangements. It may also be

beneficial to categorise hospitals along the dimensions of size, casemix complexity, areas of specialisation, etc., so that networks of similar hospitals can be established that will enhance the value of benchmarking activities.

To facilitate a systematic approach, standard reports may need to be developed. In these reports, hospitals would report their results on the performance indicators, as well as document key practices and processes.

In the United States, for example, a comprehensive report card is used by a number of health plans to monitor and document the quality of care. The Health Plan Employer Data and Information Set (HEDIS) includes more than 60 performance indicators covering quality, access to and satisfaction with care, membership and use of services, finance and management. HEDIS results are published so that, among other things, purchasers can make better choices.

There is merit in having a standardised, systematic approach to the collection and presentation of performance information, and formalised information sets such as HEDIS may be useful in guiding development in Australia.



# 5 WHERE TO FROM HERE?

## INTRODUCTION

This report has presented data and information illustrating the state of play of health sector performance indicators. As noted throughout, a considerable amount of work is required to make the indicators more useful, especially if they are to be used in benchmarking exercises.

In summary, there are four possible areas of development in order to complete a program specified by the terms of reference. The order below reflects in general terms a development timetable consistent with current activities and perceived national priorities.

1. Improve indicators reported in this first national report (12 months).
2. Develop agreed indicators not reported in the first report (18–24 months).
3. Extend the set of agreed indicators to cover all components of the framework, such as outcomes and locational disadvantage (18–24 months).
4. Other activities, including facilitation of benchmarking networks, investigation of indicators to cover the continuum of hospital and non-hospital components of care, and investigation of options for international networks (18–36 months).

These development areas are discussed in the following sections, and possible sponsoring agencies identified.

In general, more consistent data would be available if definitions for all components of the indicators were in the NHDD, and jurisdictions were committed to using the definitions in the data collections.

## IMPROVE INDICATORS CURRENTLY REPORTED

### Increase coverage and disaggregation

A short-term aim of the continuing program should be to improve the coverage of the reported indicators in all States and Territories. Notable gaps exist in the waiting times data, casemix data and hospital morbidity data. In some of these cases, the data are collected but not made available; in other cases, new data collections may need to be established. The latter could take up to three years before valid data are available.

For a number of indicators, it would be desirable to report at the hospital level, or at least for groups of similar hospitals. Indicators that would be better reported at a lower level include all of the efficiency and productivity indicators, some of the quality indicators and the accident and emergency waiting times indicator.

This would require some data collections to be enhanced so that individual hospitals can be the unit of analysis. These enhancements could be effected almost immediately.

The improvements suggested here require the commitment of each State and Territory health authority, with central agencies taking a facilitating and coordinating role in developing definitions and National Minimum Data Sets. The National Health Information Agreement and its related processes and committees have well-established mechanisms for furthering these activities.

### **Increase usefulness of indicators at the hospital level**

Related to the above development is making the indicators more useful to individual providers. If indicator results are available for each provider, and the provider is able to share information with other similar providers, then the basics of a benchmarking program are in place.

### **Further develop risk-adjustment methodologies**

As noted above, none of the indicators reported have been adjusted for severity of the patients treated. To some extent, severity is captured in the AN-DRG classification, though there is scope to improve this. It would be appropriate for this work to be part of the Casemix Development Program.

A risk-adjustment method for the quality of care indicators is being developed as part of the study into the validity and reliability of the indicators which was commissioned by the National Hospital Outcomes Program.

## **DEVELOP INDICATORS NOT CURRENTLY REPORTED**

### **Quality of care and patient satisfaction indicators**

#### *Quality of care indicators*

The quality of care indicators have been developed to date as part of the National Hospitals Outcome Program. The development has moved into a new phase with the funding of a consultancy to assess the validity and reliability of the proposed definitions and to develop appropriate risk-adjustment methodologies.

After an open tender process, the consultancy was let to the Department of Epidemiology and Preventive Medicine, Monash University, in conjunction with the Eastern Health Care Network. The project is being overseen by a Steering Committee which consists of representatives from State health bodies and experts in epidemiology and health care.

The project will undertake a number of tasks:

1. a comprehensive literature review relating to the validity and reliability of the proposed indicators and current methods of risk adjustment;
2. tests of the reliability of the proposed indicators, including:

- tests of inter- and intra-rater reliability;
  - determination of sources of error in current data capture techniques; and
  - review of current coding mechanisms;
3. assessment of the validity of the indicators, including:
- epidemiology of the indicators;
  - explicit case review;
  - expert review; and
  - comparison with other indicators; and
4. development of a risk-adjustment methodology; the final adjustment method developed will involve a linear or multivariate logistic regression technique using data on the most critical variables identified.

Having started in September 1995, the project is expected to be completed after 18 months.

### ***Patient satisfaction indicator***

Another project funded under the National Hospital Quality Management Program, the Consumer Feedback into Hospital Management Project aimed to review, document and evaluate various methods of obtaining consumer feedback in hospitals. At the suggestion of the NHMBWG, the project was extended to define a core set of questions to be used in patient feedback surveys for national benchmarking purposes.

The project was conducted by the Royal Melbourne Institute of Technology and a final report was available in late 1995. The

project has identified several key areas of concern to consumers, including:

- communication between staff and consumers;
- good teamwork and communication among staff, good communication between professionals, and continuity of care;
- being treated with respect;
- discharge planning;
- being informed on all aspects of the hospital stay and being involved in decision making; and
- access issues and information about waiting.

The development of measures and indicators may involve further projects to test survey instruments and test validity and reliability.

### **Waiting times for accident and emergency**

Draft definitions for accident and emergency waiting times are being used in a number of hospitals, and recently the definitions became part of the ACHS accreditation program.

These definitions would need to be included in the NHDD and be specified for the National Minimum Data Set before nationally consistent data are available for reporting. A project led by the Australian Institute of Health and Welfare is developing agreed entities, attributes and data definitions to reflect persons receiving emergency services. This project is expected to finalise proposals for inclusion in version 6.0 of the NHDD (effective July 1997).

### **Cost per outpatient occasion of service**

This indicator relies on the development of a classification system for ambulatory care services, which in turn relies on the development of a national minimum data set and associated definitions for ambulatory care.

A project commenced in late 1995 aims to develop a strategic level model for institutional-based ambulatory care services. Such a model will provide the framework for the development of national definitions and will facilitate the development of more flexible contracting and costing mechanisms.

The project, funded by HSH with the NSW Health Department as the lead agency, plans to have pilot data definitions available for version 6.0 of the NHDD. Data collected according to these definitions may be available late 1997 and could be reported as preliminary or pilot data.

Development of costing systems for ambulatory services is another priority activity required to enhance the data quality for this indicator. The project currently under way to implement a national standard hospital chart of accounts will contribute to this development.

### **Waiting times for outpatients**

As for outpatient costs, this indicator will benefit from the work on developing definitions for ambulatory care services. Other definitional development work is required for basic issues such as urgency categorisation, and this could be sponsored by the Ambulatory Care Data Working Group convened by HSH.

Parallel with the definitional development activities, information systems will need to be established that enable the collection of appropriate data.

The lead time for these activities is considerable, and it is not expected that consistent data will be available before the second half of 1998.

## **EXTEND THE SET OF INDICATORS TO COVER THE FRAMEWORK**

### **Health service outcomes**

The focus on health outcomes has intensified over recent years and it is appropriate that performance indicators for outcomes be developed: outcomes are now a key component in policy statements of the State and Territory health authorities, the Commonwealth Department of Human Services and Health, the Australian Health Ministers' Advisory Council (AHMAC) and the Council of Australian Governments.

There is no internationally agreed definition of health outcome, but one widely adopted in Australia is: 'A health outcome is a change in the health of an individual, or group of people or population, which is attributable to an intervention or series of interventions' (AHMAC 1993).

The interest of the NHMBWG is in developing indicators for health outcomes. Armstrong (1994) described an outcome-related performance indicator as '...a statistic or other unit of information which reflects, directly or indirectly, the performance of a health or welfare intervention, facility, service or system in

maintaining or increasing the wellbeing of its target population.’

There are many projects that relate to health outcomes presently being conducted in Australia. A registry of these projects is maintained and promoted by the Australian Health Outcomes Clearing House.

A research consultancy has recently been commissioned under the National Hospital Outcomes Program to investigate the status of development and use of health outcome measures in Australia and overseas. The consultant will recommend key areas for implementation and further development of national health outcome measures in the Australian context, helping to lay the foundation for further work in this area.

One of the key programs is the National Health Goals, Targets and Strategies for Better Health Outcomes for Australians. The targets set in this program are ‘benchmarks’ for system performance into the next century. Specific goals relating to the hospital component of care have been set by some jurisdictions and may form the basis of hospital performance indicators.

In more general terms, the Better Health Outcomes Overseeing Committee is coordinating the prioritisation of targets and indicators, and will further the development of best practice guidelines for conditions that draw significantly on hospital resources.

The Better Health Outcomes Overseeing Committee has recommended to AHMAC that future development of indicators for the monitoring of outcomes against National Health Goals and Targets be undertaken under the auspices of the

National Health Information Management Group.

Given the complexity of health outcomes issues, the development of performance indicators will need to be guided by a long-term strategic plan, and nationally consistent data would probably not emerge before the end of 1998.

### **Physical access**

Physical access is seen as one component of the equity of access to health services.

Possible indicators could include:

- estimated average travelling time for hospital admission;
- number of people living more than 1 hour from a public hospital; and
- welfare loss resulting from less-than-ideal location of public hospitals.

Models have been developed previously for planning purposes, but any indicators developed would need to provide useful information about the access to health services. For example, States with low population density will likely have high values for the first two indicators listed above, and this does not provide any information on the performance of the system.

Further research is required in this area, though it is a complex task and will require intensive efforts in the short term.

### **Human resource management**

The cost per separation indicator reported above includes a component of human resource management, namely labour costs. Other indicators may be constructed from present data collections that will

relate to performance in human resource management.

One of the projects funded by the Best Practice in the Health Sector Program is looking at organisational health in hospitals. Conducted in a consortium of hospitals in Melbourne, the project is evaluating a number of quantitative and qualitative measures of organisational health. Some of the measures are:

- per cent of sick leave taken by staff;
- workers' compensation time lost in hours;
- injury rate;
- unscheduled staff turnover; and
- industrial disputation – work ban hours.

Another project, sponsored by the Health Department of Western Australia's Coordinating Panel on Employee Relations (COPER) is looking to develop benchmarks that address a range of management needs. The project identified 41 potential indicators in the areas of work organisation, leadership, availability for work, utilisation of people and performance development.

The results of these projects may be considered by the NHMBWG, and indicators may be adopted or adapted for national collection.

## **OTHER ACTIVITIES**

### **Covering the continuum of care**

Measuring the performance of the hospital system provides information on only one component of care, rather than on the whole continuum of care from primary care intervention (screening, GP

attendance, etc.) to reintegration into the community. Indeed, the performance of the system may be affected by the care patients received prior to entering the hospital. At the other end, the 'here-and-now' nature of the indicators developed

to date may fail to measure the impact of the hospital care on a patient's continuing recovery in other settings.

The non-hospital indicators reported in Chapter 2 are only substitutes for the measures required to properly assess the performance of the system as a whole in relation to its goals, namely maintaining and improving the well-being of individuals.

A major study addressing these issues, as well as some of the complex methodological issues, was recently begun in the Australian Capital Territory. The project, known as the Care Continuum and Health Outcomes Project, will provide key insights into the development of appropriate measures for health outcomes across the continuum of care. Preliminary results of the study should be available in early 1996.

### **Facilitation of benchmarking partnerships**

#### ***Within the health sector***

As noted above, the exchange of information is crucial to a successful benchmarking program.

To facilitate this, there may be a need to develop a national education program, so that organisations can gain a common awareness of the processes, advantages and pitfalls of benchmarking activities.

In the short term it would be useful to survey health service professionals and

managers to ascertain the general level and commonality of awareness of benchmarking in the health sector. The results of such a survey would provide the basis for the development of an appropriate education strategy.

### ***Outside the health sector***

In the longer term, consideration also needs to be given to the establishment of benchmarking partners outside of the health sector. This is consistent with the higher-level benchmarking demonstrated by industry leaders (as reported by the AMC study referenced above).

Generic benchmarking has been encouraged through the Best Practice in the Health Sector Program and a number of health organisations funded under the program have successfully developed. Again, significant developments in aligning basic data items would need to occur, but such issues could be discussed now in the many international forums in which Australian health professionals, managers and policy makers participate.

## **CONCLUSION**

The preceding sections have outlined a number of activities that would increase the usefulness of health sector performance measures in Australia.

If the health sector collectively is serious about achieving world-class outcomes, then the profile of performance measurement and benchmarking probably needs to be raised.

benchmarking partnerships with outside industries. For example, Maryborough District Health Service is benchmarking with other service industries in the areas of sick leave, staff/patient accident rates and organisation of their engineering department.

Significant developments would need to take place before this could feasibly be done, but such developments should be placed on the agenda now if results are to be seen within five years.

### **International benchmarking**

By definition, benchmarking has an international scope. Consideration needs to be given to the establishment of international benchmarking partners inside and outside the health services industry.

Allied with this, there needs to be a coordinated approach to integrating the many activities currently under way in the areas of best practice, quality improvement, health information development, health sector reform, and so on.

Benchmarking, in conjunction with other best practice management tools, is essential for maintaining and improving performance: the evidence from the industry sector is that it gets results. This report has shown that there is a long journey ahead in implementing a fully effective benchmarking program in the health sector. The journey, it seems, is worth making

## APPENDIXES

### Appendix A

#### *Membership of the National Health Ministers' Benchmarking Working Group at October 1995*

<b>Member</b>	<b>Organisation</b>
Mr Bob Wells (Chair)	Commonwealth Department of Human Services and Health
Ms Julie Legaspi	NSW Health Department
Ms Johanna Cook	Victorian Department of Health and Community Services
Dr Ian Ring	Queensland Health Department
Mr David Inglis	WA Health Department
Mr John Glover	SA Health Commission
Mr Tony Sansom	Tasmanian Department of Community Services and Health
Mr Garry Walsh	ACT Department of Health and Community Care
Mr Ken Bourke	NT Department of Health and Community Services
Ms Justine Curnow	Commonwealth Department of Human Services and Health
Ms Cathy Ellis	Commonwealth Department of Human Services and Health
Ms Chris Woodgate	Commonwealth Department of Human Services and Health
Mr Mark Cooper-Stanbury	Australian Institute of Health and Welfare
Mr John Harding	Australian Institute of Health and Welfare
Mr Paul D'Arcy	Industry Commission
Mr George Siolis	Industry Commission
Mr Nick Legge	Victorian Department of Treasury and Finance
Mr Robert Reeves	Victorian Department of Treasury and Finance
Mr Peter Baulderstone	Australian Hospitals' Association
Mr Garry Griffin	Victorian Hospitals' Association



## **Appendix B**

### ***Groups and programs related to the National Health Ministers' Benchmarking Working Group***

#### **1. COAG Review of Commonwealth and State Service Provision**

The review was established by the COAG in July 1993, its main tasks being to develop agreed national performance indicators for key services delivered by governments in Australia. The focus of the review is on key performance indicators that provide an overall, system-wide insight into the efficiency and effectiveness of each service area.

The review is to:

- establish the collection and publication of data that will enable ongoing comparisons of the efficiency and effectiveness of Commonwealth and State government services, including intra-government services; and
- compile and assess service provision reforms that have been implemented or are under consideration by Commonwealth and State governments.

The review Steering Committee selected for its initial focus eight service areas: schools, vocational training, hospitals, community services, public housing, police, courts, and corrective services.

#### **2. National Hospital Outcomes Program**

This Commonwealth program – which supersedes and builds on the work of the National Hospital Quality Management Program – aims to develop and implement performance measures for standards of quality and outcomes of care in Australian hospitals.

The program will:

- develop and refine measures and standards of hospital quality and outcomes, with the involvement of consumers, clinicians and hospital administrators;
- trial the use of these measures in hospitals;
- promote a range of activities that will assist hospitals to respond with improvements in quality and outcomes;
- implement an information/education strategy to promote the use of indicators and communicate quality and outcome improvement strategies to clinicians, managers and consumers; and
- evaluate the initiatives.

#### **3. Better Health Outcomes for Australians: National Goals, Targets and Strategies for Better Health Outcomes Into the Next Century**

As part of the development of a National Health Policy by Commonwealth and State and Territory Health Ministers, goals and targets for better health outcomes have been established in four focus areas: cardiovascular health, cancer, injury, and mental health.

For each of the goals in these areas, strategies have been proposed for achieving the determined targets.

The development of national health goals and targets provides:

- a way of focusing the health system on improving health outcomes, rather than activity levels and throughput;
- a focus on achieving more equitable outcomes in health;

- a way of monitoring and reviewing progress towards improved health outcomes, and of assessing the effectiveness of a range of preventive measures and treatment interventions; and
- a way of involving sectors other than health in health policy and planning.

#### **4. National Demonstration Hospitals Program**

This is a Commonwealth-funded program that involves public hospitals with best practice models of waiting time management working with groups of collaborating hospitals to transfer these best practice models. The expected outcomes of the program are:

- the transfer of best practice models in key hospital services to public hospitals throughout Australia;
- the exchange of information between public hospitals and the development of collaborating networks within the public hospital sector;
- the development and application of relevant industry benchmarks in the management of elective surgery; and
- the reduction of clinically inappropriate waiting times.

#### **5. Best Practice in the Health Sector Program**

This Commonwealth program provides funds to facilitate the adoption of best practice and enterprise-level reform in the health industry. It does this through the funding of projects capable of providing best practice demonstration models of organisational change to bring about better quality of care and health service delivery.

The objectives of the program are:

- to stimulate the health industry to adopt best practice standards in workplace organisation;
- to identify and develop innovative workplace initiatives that will be of benefit to the health industry nationally;
- to encourage benchmarking in the health industry; and
- to provide a wider understanding of best practice in health workplaces.

#### **6. Consultancy on Common Asset Valuation Methodology for the Health Sector**

This consultancy was commissioned by HSH to assist in the development of capital-related indicators in the health sector.

The terms of reference for the consultancy were:

1. determine the asset valuation methodology used by each State and Territory health authority;
2. examine these methodologies, showing the extent to which they are similar and/or different;
3. for the purposes of benchmarking, determine the extent to which the health authorities use the same capital-related definitions; and
4. recommend the most appropriate valuation methodology to be adopted by all States and assess the feasibility of this being implemented. If considered feasible, outline an implementation strategy, or if not feasible, recommend alternative options for making meaningful comparisons between States on capital-related performance measures.

#### **7. National Health Information Agreement**

The National Health Information Agreement was negotiated between Commonwealth, State and Territory health authorities, the ABS and the Institute. The agreement aims to improve cooperation on the development, collection and exchange of data and to improve access to

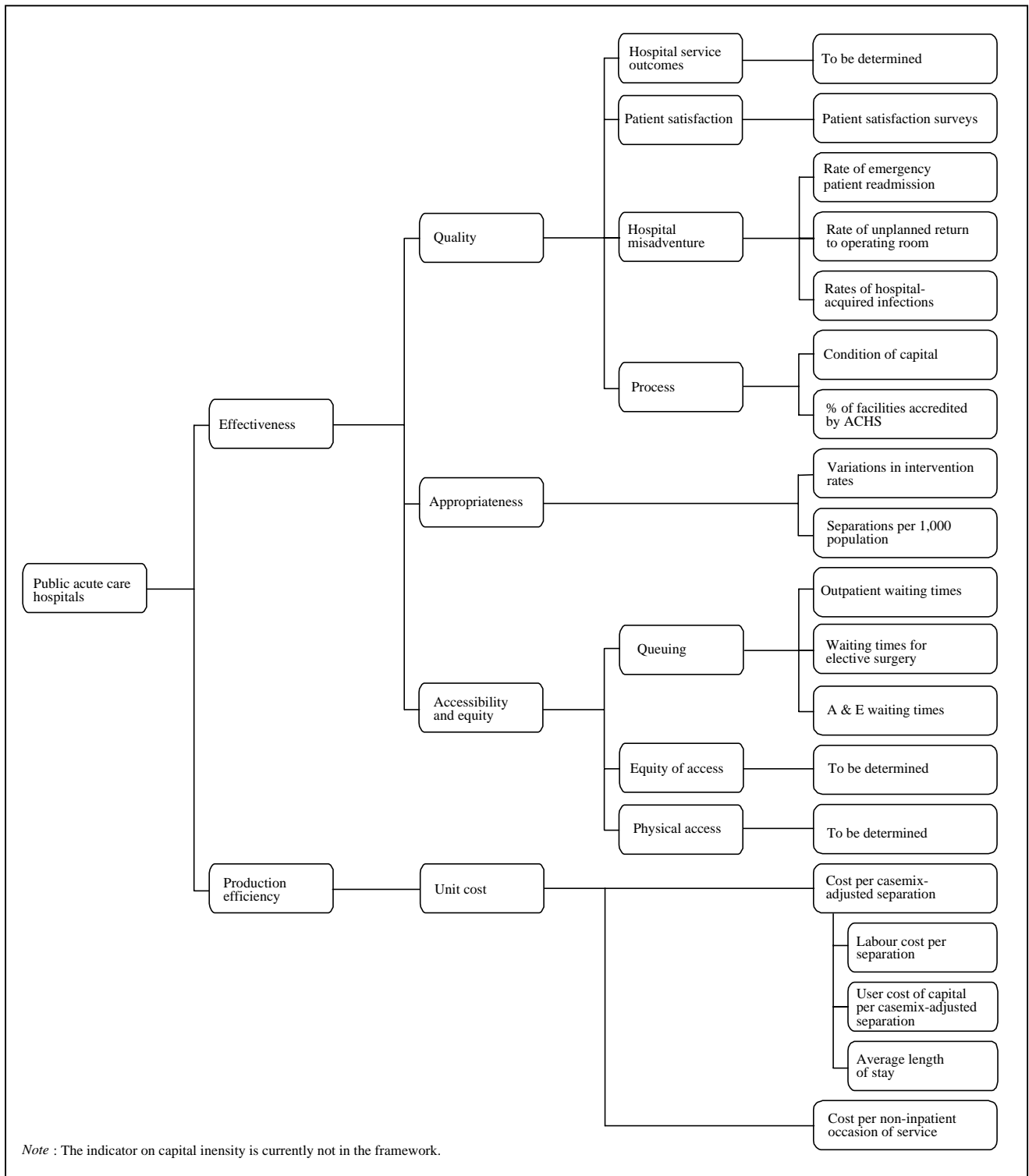
uniform health information by community groups, health professionals, government and non-government organisations.

A National Health Information Management Group (NHIMG) oversees the development of national health information and the implementation of the National Health Information Work Plan. The Group provides biannual reports to AHMAC on the progress of the work program.

The National Health Data Committee conducts an annual review of health-related definitions, coordinates information developments and endorses all definitions proposed for inclusion in the *National Health Data Dictionary* prior to making recommendations to the NHIMG.

## Appendix C

### Framework of hospital performance indicators: public acute hospitals



## Appendix D

*Extracts from National Health Data Dictionary (NHDD), Summary edition 1993  
(National Minimum Data Set Review Committee 1993)*

### *Selected patient-level data items*

#### **Item P9: Area of usual residence**

**Level of enumeration:** Patient.

**Definition:**

Geographic location of usual residence as stated by the patient at time of admission.

**Classification/coding:**

Statistical local area to be coded where place of usual residence is in same State or Territory as the establishment in which episode takes place. 4-digit statistical local area to be coded from the residential address using the Australian Standard Geographical Classification. Where complete residential address is not collected, the statistical local area should be derived from postcode using a postcode-to-statistical local area key.

State or Territory to be coded where place of residence is in different State or Territory to the establishment in which episode takes place.

#### **Item P16: Patient accommodation status**

**Level of enumeration:** Patient.

**Definition:**

An 'eligible person' means:

- a person who resides in Australia and whose stay in Australia is not subject to any limitation as to time imposed by law; but
- does not include a foreign diplomat or family (except where eligibility is expressly granted to such persons by the terms of a reciprocal health care agreement);
- persons visiting Australia who are ordinarily resident in the United Kingdom, New Zealand, Sweden, Malta, Italy and the Netherlands are covered by reciprocal health care agreements. However, persons from Malta or Italy are covered for six months only.

Eligible persons must enrol with Medicare before benefits can be paid.

***Eligible:***

*Public patient:* an eligible person who, on admission to a recognised hospital or soon after, elects to be a public patient;

or

an eligible public patient whose treatment is contracted to a private hospital.

A public patient shall be entitled to receive the care and treatment referred to in accordance with the Medicare Agreements without charge.

*Private patient:* an eligible person who, on admission to a recognised hospital or soon after, elects to be a private patient treated by a medical practitioner of his or her choice; or elects to occupy a bed in a single room.

Where such an election is made, the patient is responsible for meeting certain hospital charges as well as the professional charges raised by any treating medical or dental practitioner.

Or

an eligible person who chooses to be admitted to a private hospital.

Where such a choice is made, the patient is responsible for meeting all hospital charges as well as the professional charges raised by any treating medical or dental practitioner.

*Department of Veterans' Affairs patient:* an eligible person whose charges for this hospital admission are met by the Department of Veterans' Affairs.

*Other patient:* an eligible patient who does not meet the criteria for above categories; that is, not an eligible public patient, not an eligible private patient or an eligible Department of Veterans' Affairs patient. This category includes compensable patients, patients with Defence Force personnel entitlements and common law cases.

**Ineligible:**

a person who is not eligible under Medicare.

**Classification/coding:**

- 1 = Eligible public patient
- 2 = Eligible private patient
- 3 = Eligible Department of Veterans' Affairs patient
- 4 = Eligible other patient
- 5 = Ineligible patient.

**Item P21: Type of episode (type of care)**

**Level of enumeration:** Patient.

**Definition:**

Mode of care provided in patient episode is classified into three categories:

- Section 3 of the Health Insurance Act as a nursing home type patient;
- rehabilitation patient: patient, other than nursing home type patient, who is admitted or transferred to a designated rehabilitation unit within a recognised hospital. Rehabilitation units are designated by the State health authority; and
- other patient: all other patients.

**Classification/coding:**

- 1 = Nursing home type
- 2 = Rehabilitation unit
- 3 = Other.

**Item P37: Principal procedure**

**Level of enumeration:** Patient.

**Definition:**

The procedure which consumed the greatest amount of hospital resources or, if this cannot be determined, that which was the definitive treatment for the principal diagnosis.

Procedures which should be coded:

- are surgical in nature;
- carry a procedural risk; or
- carry an anaesthetic risk; and
- require special facilities or equipment only available in an acute care setting.

**Classification/coding:** ICD-9-CM Volume 3.

The classification is revised annually by the National Centre for Health Statistics in the United States. New editions are published each October and will be implemented in Australia the following July or as determined by the National Coding Authority.

### **Item P38: Additional procedures**

**Level of enumeration:** Patient.

**Definition:**

All significant procedures (additional to the principal procedure) performed on the patient during the episode of care. Refer to Item P37 for definition of procedures.

Procedures which should be coded:

- are surgical in nature;
- carry a procedural risk; or
- carry an anaesthetic risk; and
- require special facilities or equipment only available in an acute care setting.

**Classification/coding:** ICD-9-CM Volume 3.

The classification is revised annually by the National Centre for Health Statistics in the United States. New editions are published each October and will be implemented in Australia the following July or as determined by the proposed National Coding Authority.

### ***Selected establishment level activity items***

#### **Item A1: Separations**

**Level of enumeration:** Establishment.

**Definition:**

A separation is deemed to occur after a patient/client has been formally or statistically admitted for an episode of residential care and the patient/client:

- is formally discharged;
- is transferred to another institution;
- absconds;
- dies while in care;
- changes status between any of the categories of nursing home type, rehabilitation and other (see Item P21); or
- leaves hospital for a period of leave exceeding seven days (acute hospitals) or ten days (public psychiatric hospitals).

Note that if statistically admitted, separation results in a second inpatient episode.

#### **Item A2: Occupied bed-days**

**Level of enumeration:** Establishment.

**Definition:**

The number of occupied bed-days is defined as the total number of days of stay for all patients/clients who were formally admitted for an episode of care and who underwent separation (Item A1) during the financial year.

The number of days of stay for a patient is defined as the separation date minus the admission date except for patients/clients who are admitted and separated on the same day. These clients/patients are to be included with a stay of one day.

All leave days are to be excluded from the occupied bed-days count, with the exception of overnight leave.

In determining the number of occupied bed-days, patient lengths of stay are not to be truncated or trimmed.

**Item A4: Occasions of service**

**Level of enumeration:** Establishment.

**Definition:**

An occasion of service is defined as any examination, consultation, treatment or other service provided to a patient in each functional unit of a health service establishment on each occasion such service is provided. Each diagnostic test or simultaneous set of related diagnostic tests for the one patient referred to a hospital pathology department consists of one occasion of service.

***Selected establishment level resource items*****Item E3: Number of available beds for admitted patients**

**Level of enumeration:** Establishment.

**Definition:**

For acute and psychiatric hospitals the number of beds which are immediately available to be used by admitted patients or residents if required. They are immediately available for use if located in a suitable place for care, and there are nursing and other auxiliary staff available, or who could be made available within a reasonable period, to service patients or residents who might occupy them. The average number of beds should always be shown as a whole number. Exclude surgical tables, recovery trolleys, delivery beds, cots for normal neonates, emergency stretchers/beds not normally authorised or funded and beds designated for same-day non-inpatient care.

Beds in wards which were temporarily closed due to factors such as renovations or strikes but which would normally be open and therefore available for the admission of inpatients should be included in 30 June, end of financial year figures, but for average bed numbers, beds in wards which were closed for any reason (except weekend closures for beds/wards staffed and available for five days per week) should not be included. Numbers are to be provided as an average for the year and also at a point in time (end of year figures). The average is to be calculated from monthly figures where available (if not, basis is to be stated).

**Item E8: Salaries and wages by staffing categories**

**Level of enumeration:** Establishment.

**Definition:**

Salaries and wages payments for all employees of the establishment (including contract staff employed by an agency, provided staffing data are also available). This is to include all paid leave (recreation, sick and long-service) and also including salary and wage payments relating to workers' compensation leave for the following staffing categories:

- salaried medical officers;
- registered nurses;
- enrolled nurses;
- student nurses;
- trainee/pupil nurses;
- other personal care staff;
- diagnostic and health professionals;
- administrative and clerical staff; and
- domestic and other staff.



Generally, salary data by staffing categories should be broadly consistent with full-time equivalent staffing numbers. Where staff provide services to more than one hospital, their salaries should be apportioned between all hospitals to whom services are provided on the basis of hours worked in each hospital.

Salary payments for contract staff employed through an agency should be included under salaries for the appropriate staff category provided they are included in full-time equivalent staffing – if not, show salary payments separately.

#### **Item E9: Payments to visiting medical officers**

**Level of enumeration:** Establishment.

**Definition:**

All payments made to visiting medical officers for medical services provided to hospital (public) patients on an honorary sessionally paid or fee-for-service basis.

A visiting medical officer is a medical practitioner appointed by the hospital board to provide medical services for hospital (public) patients on an honorary sessionally paid or fee-for-service basis. This category includes the same Australian Standard Classification of Occupations codes as the 'salaried medical officers' category.

#### **Item E10: Superannuation employer contributions (including funding basis)**

**Level of enumeration:** Establishment.

**Definition:**

*Superannuation employer contributions*

Contributions paid or (for an emerging cost scheme) that should be paid (as determined by an actuary) on behalf of establishment employees either by the establishment or a central administration such as a State health authority, to a superannuation fund providing retirement and related benefits to establishment employees.

*Funding basis*

The following different funding bases are identified:

- paid by hospital to fully funded scheme;
- paid by Commonwealth government or State government to fully funded scheme; and
- unfunded or emerging costs schemes where employer component is not presently funded.

Fully funded schemes are those in which employer and employee contributions are paid into an invested fund. Benefits are paid from the fund. Most private sector schemes are fully funded.

Emerging cost schemes are those in which the cost of benefits is met at the time a benefit becomes payable; that is, there is no ongoing invested fund from which benefits are paid. The Commonwealth Superannuation Fund is an example of this type of scheme as employer benefits are paid out of general revenue.

#### **Item E11: Drug supplies**

**Level of enumeration:** Establishment.

**Definition:**

The cost of all drugs including the cost of containers. Gross expenditure should be reported with no revenue offsets (except for inter-hospital transfers).

**Item E12: Medical and surgical supplies**

**Level of enumeration:** Establishment.

**Definition:**

The cost of all consumables of a medical or surgical nature (excluding drug supplies) but not including expenditure on equipment repairs. Gross expenditure should be reported with no revenue offsets (except for inter-hospital transfers).

**Item E13: Food supplies**

**Level of enumeration:** Establishment.

**Definition:**

The cost of all food and beverages but not including kitchen expenses such as utensils, cleaning materials, cutlery and crockery. Gross expenditure should be reported with no revenue offsets (except for inter-hospital transfers).

**Item E14: Domestic services**

**Level of enumeration:** Establishment.

**Definition:**

The costs of all domestic services including electricity, other fuel and power, domestic services for staff, accommodation and kitchen expenses but not including salaries and wages, food costs or equipment replacement and repair costs. Gross expenditure should be reported with no revenue offsets (except for inter-hospital transfers).

**Item E15: Repairs and maintenance**

**Level of enumeration:** Establishment.

**Definition:**

The costs incurred in maintaining, repairing, replacing and providing additional equipment, maintaining and renovating building and minor additional works. Expenditure of a capital nature should not be included here. Do not include salaries and wages of repair and maintenance staff. Gross expenditure should be reported with no revenue offsets (except for inter-hospital transfers).

**Item E16: Patient transport**

**Level of enumeration:** Establishment.

**Definition:**

The direct cost of transporting patients excluding salaries and wages of transport staff.

**Item E17: Administrative expenses**

**Level of enumeration:** Establishment.

**Definition:**

All expenditure incurred by establishments (but not central administrations) of a management expenses/administrative support nature such as any rates and taxes, printing, telephone, stationery and insurance (including workers' compensation).

**Item E18: Interest payments**

**Level of enumeration:** Establishment.

**Definition:**

Payments made by or on behalf of the establishment in respect of borrowings (for example, interest on bank overdraft) provided the establishment is permitted to borrow. This does not include the cost of equity capital (that is, dividends on shares) in respect of for-profit private establishments.

**Item E19: Depreciation**

**Level of enumeration:** Establishment.

**Definition:**

Depreciation represents the 'expensing' of a long-term asset over its useful life and is related to the basic accounting principle of matching revenue and expenses for the financial period. Depreciation charges for the current financial year only should be shown as expenditure. Where intangible assets are amortised (such as with some private hospitals) this should also be included in recurrent expenditure.

**Item E20: Other recurrent expenditure**

**Level of enumeration:** Establishment.

**Definition:**

Other payments are all other recurrent expenditure not included elsewhere in any of the recurrent expenditure categories. Gross expenditure should be reported with no revenue offsets (except for inter-hospital transfers).

## Appendix E

### *Analysis of HASAC estimation of inpatient fractions*

One of the methodological issues in determining average cost per casemix-adjusted separation is the estimation of inpatient fractions (IFRACs). Theoretically this value could range from 0% to 100%, therefore it has a considerable influence on the bottom line. In this report IFRACs were provided by State and Territory health authorities at the hospital level for Victoria, Queensland, South Australia, the principal hospital in the Australian Capital Territory, and for the teaching and non-teaching groups of hospitals in Western Australia. For all other hospitals the IFRAC was estimated by using the HASAC conversion of non-admitted patient services into admitted patient bed-days.

The two issues arising from this are, firstly, a consistent approach to estimating IFRACs was not used for all jurisdictions, and, secondly, where HASAC is used it is a ratio established on the basis of hospital practices in 1971.

The first issue can be addressed by using the HASAC-calculated IFRACs for all hospitals. The results of this action are shown in Table E.1, in the rows labelled 'using HASAC=5.753'. Note that this reduces the average cost per casemix-adjusted separation by about 5% in Victoria and Queensland, with less significant changes in the other jurisdictions for which IFRACs were provided.

The conversion ratio was established almost 25 years ago, and reflected a resource relationship between admitted and non-admitted services at that time. Over the intervening period, the average length of stay for admitted patients has shortened (from 9.8 days in 1969–70 to 4.7 days in 1993–94) with a consequent increase in daily resource intensity. It is difficult to determine the change in resource intensity for non-admitted services over this period, though it is reasonable to question that the original ratio is still applicable.

The use of alternative ratios is tested in the table. The ratio of 7.102 non-admitted patient services to one bed-day was derived from the stated IFRACs provided by Victoria, Queensland and South Australia. The other two ratios shown are hypothetical, and indicate the direction and degree of the effect of using higher ratios. Other ratios may be tested using the data provided in the first two lines and the following formula:

$$\text{IFRAC}_H = \frac{OBD_s}{OBD_s + \left( \frac{NIOOS}{RATIO} \right)}$$

where  $\text{IFRAC}_H$  is the estimated IFRAC using the HASAC approach,  $OBD_s$  is the total occupied bed-days,  $NIOOS$  is the total non-inpatient occasions of service and  $RATIO$  is the ratio of non-admitted services to bed-days that is being tested.

Note, though, that such tests will not fit this series exactly, as other adjustments have been made in determining overall cost per separation, and the IFRACs shown below were calculated using hospital-level data.

**Table E.1: Cost per casemix-adjusted separation based on different IFRACs, public acute hospitals, 1993–94**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Total occupied bed-days ('000s)	5,739	3,474	2,790	1,473	1,399	422	241	183	15,721
Total non-inpatient occasions of service ('000s <sup>(a)</sup> )	12,346	6,559	6,115	2,643	2,119	664	404	322	31,173
Total recurrent expenditure (\$m)	3,821	2,231	1,481	896	820	253	191	116	9,809
Inpatient fractions (%)									
As used in this report	71.7	79.3	77.0	74.8	79.8	77.4	77.4	76.9	75.5
Using HASAC=5.753	71.7	74.9	73.2	76.2	77.7	77.4	77.2	76.9	73.9
Using HASAC=7.102 <sup>(b)</sup>	75.6	78.4	76.8	79.8	81.0	80.7	80.7	80.3	77.6
Using HASAC=7.500	76.5	79.3	77.7	80.7	81.8	81.6	81.5	81.2	78.4
Using HASAC=8.000	77.6	80.3	78.7	81.7	82.7	82.5	82.5	82.1	79.5
Cost per casemix-adjusted separation (\$) <sup>(c)</sup>									
As used in this report	2,348	2,307	2,234	2,283	2,208	2,809	3,237	2,948	2,327
Using HASAC=5.753	2,348	2,184	2,127	2,323	2,154	2,809	3,232	2,948	2,280
Using HASAC=7.102	2,460	2,284	2,227	2,427	2,238	2,927	3,360	3,075	2,384
Using HASAC=7.500	2,487	2,308	2,252	2,451	2,259	2,955	3,390	3,105	2,410
Using HASAC=8.000	2,519	2,336	2,279	2,480	2,282	2,987	3,425	3,140	2,439
Change on reported value (%)									
Using HASAC=5.753	–	-5.3	-4.8	1.8	-2.5	–	-0.2	–	-2.0
Using HASAC=7.102	4.8	-1.0	-0.3	6.3	1.4	4.2	3.8	4.3	2.5
Using HASAC=7.500	5.9	–	0.8	7.4	2.3	5.2	4.7	5.3	3.6
Using HASAC=8.000	7.3	1.3	2.1	8.6	3.3	6.3	5.8	6.5	4.8

(a) The number of non-inpatient services for WA was only available at the State level, therefore the estimates of IFRACs and costs shown in this table may be different from estimates based on hospital-level data.

(b) This ratio is derived from the inpatient fractions supplied by Vic, Qld and SA only.

(c) Includes costs for medical services.

Sources: AIHW National Minimum Data Set collection, unpublished; HSH casemix database, unpublished; HSH Medicare Agreements data, unpublished

## Appendix F

### *Comparison of expenditure data sources*

The recurrent expenditure data used in this report were derived from the Institute's National Minimum Data Set collection which is used to produce the *Hospital Utilisation and Costs Study* (HUCS) series. The data are defined by NHDD items E8–E20 (with E19 – depreciation – not in scope for public hospitals).

It was sensible to use the HUCS expenditure data as it related to the activity data used for some of the indicators. Other sources of hospital expenditure data are available and these are listed in Table F.1 below.

The discrepancies among these sources are difficult to explain, but lie in the reasons for and methods of collection. The Commonwealth Grants Commission, for example, aims not so much to report actual expenditure, but to assess the relative needs of States and Territories for financial assistance from the Commonwealth.

Clearly, there are issues to be worked through in moving towards greater consistency among these and other sources. Projects currently under way – such as the development of a standard hospital chart of accounts and a standard classification of health expenditure – will contribute to achieving greater consistency.

In the meantime, readers should be aware of the discrepancies in expenditure data (and, to a lesser extent, activity and other data) and consider these when interpreting the results.

**Table F.1: Recurrent expenditure data: comparison of sources, public acute hospitals, 1993–94**

Variable	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Total recurrent expenditure									
National Minimum Data Set (HUCS) <sup>(a)</sup>	3,821	2,231	1,481	896	820	253	191	116	9,809
Commonwealth Grants Commission <sup>(b)</sup>	2,536	2,162	1,422	793	719	223	182	101	8,138
Medicare Agreements data <sup>(c)</sup>	4,140	2,290	np	np	828	258	204	118	na
ABS Government finance statistics <sup>(d)</sup>	3,422	2,068	1,382	993	819	213	258	135	9,290
Expenditure as a proportion of HUCS (%)									
Commonwealth Grants Commission	66.4	96.9	96.0	88.5	87.6	88.2	95.5	87.4	83.0
Medicare Agreements data	108.4	102.6	na	na	101.0	101.8	106.9	101.3	na
ABS Government finance statistics	89.6	92.7	93.3	110.8	99.9	84.1	135.2	116.3	94.7

(a) Recurrent expenditure used in this report.

(b) Estimated gross costs of providing hospital services adjusted for cross-border transactions, Medicare bonus payments and the quarantined components of the Hospital Funding Grants. For NSW, approximately \$200m was excluded which related to the transfer of Concord repatriation hospital, and approximately \$340m of non-fund items was excluded.

(c) Estimated gross operating costs for recognised hospitals.

(d) Estimated State and Territory current outlays: includes Economic Transactions Framework categories 1113, 1115 and 1131 for general hospitals and hospitals not elsewhere classified.

Sources: AIHW National Minimum Data Set collection, unpublished; Commonwealth Grants Commission 1995; HSH Medicare Agreements data, unpublished; ABS Government finance statistics database, unpublished.

## Appendix G

### *Descriptive data for top 20 AN-DRGs*

**Table G.1: Top 20 AN-DRGs by volume (including same-day cases): key statistics, public and private acute hospitals, Australia, 1993–94<sup>(a)</sup>**

Rank	AN-DRG	Description	Separations	Bed-days	% total separations	% total bed-days	% same day separations for AN-DRG
1	572	Admit for renal dialysis	228,173	232,993	5.4	1.3	99.3
2	674	Vaginal delivery without complicating diagnosis	140,900	573,671	3.4	3.1	1.1
3	780	Chemotherapy	108,810	132,952	2.6	0.7	88.0
4	727	Neonate, admission weight > 2499 g, without significant OR procedure, without problem	108,595	423,672	2.6	2.3	5.8
5	332	Other gastroscopy for non-major digestive disease, without complications	99,016	127,410	2.4	0.7	89.3
6	335	Other colonoscopy without complications	85,397	111,464	2.0	0.6	86.8
7	683	Abortion with D&C, aspiration curettage or hysterotomy	63,160	73,289	1.5	0.4	72.4
8	099	Lens procedure without vitrectomy, without complications	54,523	88,200	1.3	0.5	40.3
9	187	Bronchitis and asthma, age < 50, without complications	51,385	117,417	1.2	0.6	9.9
10	484	Other skin, subcutaneous tissue and breast procedures	49,964	76,256	1.2	0.4	77.8
11	128	Dental extraction and restorations	47,083	53,417	1.1	0.3	62.5
12	421	Knee procedures	44,147	79,466	1.1	0.4	47.2
13	943	Other factors influencing health status, age < 80, without complications	42,070	155,372	1.0	0.8	46.2
14	455	Medical back problems, age < 75, without complications	40,713	169,406	1.0	0.9	24.7
15	659	Conisation, vagina, cervix and vulva procedures	40,219	51,350	1.0	0.3	76.3
16	660	Endoscopic procedures, female reproductive system	37,313	45,224	0.9	0.2	71.3
17	122	Tonsillectomy and/or adenoidectomy	36,386	59,066	0.9	0.3	9.2
18	347	Abdominal pain or mesenteric adenitis, without complications	36,257	79,707	0.9	0.4	21.5
19	686	Other antenatal admission with moderate or no complicating diagnosis	34,977	79,931	0.8	0.4	25.4
20	252	Heart failure and shock	34,586	324,328	0.8	1.7	2.4
Other			2,809,029	15,572,572	67.0	83.6	24.6
<b>Total</b>			<b>4,192,703</b>	<b>18,627,163</b>	<b>100.0</b>	<b>100.0</b>	<b>34.6</b>

(a) Estimates provided by HSH using AN-DRG version 3.0; data trimmed using inter-quartile range method.

*Note:* These estimates are based on an incomplete database, so caution should be exercised in interpreting the results.

*Source:* HSH casemix database, unpublished.

**Table G.2: Top 20 AN-DRGs by volume (excluding same-day cases): key statistics, public and private acute hospitals, Australia, 1993–94<sup>(a)</sup>**

Rank	AN-DRG	Description	Separations	Bed-days	% total separations	% total bed-days	% same day separations for AN-DRG
1	674	Vaginal delivery without complicating diagnosis	139,340	572,111	5.1	3.3	na
2	727	Neonate, admission weight > 2499 g, without significant OR procedure, without problem	102,308	417,385	3.7	2.4	na
3	187	Bronchitis and asthma, age < 50, without complications	46,285	112,317	1.7	0.7	na
4	252	Heart failure and shock	33,746	323,488	1.2	1.9	na
5	122	Tonsillectomy and/or adenoidectomy	33,028	55,708	1.2	0.3	na
6	099	Lens procedure without vitrectomy, without complications	32,538	66,215	1.2	0.4	na
7	177	Chronic obstructive airways disease	31,331	288,335	1.1	1.7	na
8	455	Medical back problems, age < 75, without complications	30,652	159,345	1.1	0.9	na
9	367	Cholecystectomy without common duct exploration	30,390	136,024	1.1	0.8	na
10	347	Abdominal pain or mesenteric adenitis, without complications	28,473	71,923	1.0	0.4	na
11	670	Caesarean delivery, without complicating diagnosis	27,429	180,224	1.0	1.1	na
12	320	Hernia procedures except inguinal and femoral, age > 9	26,522	87,814	1.0	0.5	na
13	686	Other antenatal admission with moderate or no complicating diagnosis	26,110	71,064	1.0	0.4	na
14	274	Cardiac disorder, without AMI, with invasive cardiac investigative procedure, without complicating diagnosis, without major comorbidities	24,501	54,323	0.9	0.3	na
15	656	Uterus/adnexa procedure, without malignancy, age > 39 without complications or age < 40 with complications	23,623	140,723	0.9	0.8	na
16	421	Knee procedures	23,329	58,648	0.9	0.3	na
17	943	Other factors influencing health status, age < 80, without complications	22,647	135,949	0.8	0.8	na
18	349	Oesophagitis, gastroenteritis and other miscellaneous digestive disorders, age 10–74, without complications	22,017	64,181	0.8	0.4	na
19	941	Rehabilitation	21,950	585,972	0.8	3.4	na
20	261	Chest pain	20,892	61,212	0.8	0.4	na
	Other		1,993,582	13,532,192	72.7	78.8	na
	<b>Total</b>		<b>2,740,693</b>	<b>17,175,153</b>	<b>100.0</b>	<b>100.0</b>	<b>na</b>

(a) Estimates provided by HSH using AN-DRG version 3.0; data trimmed using inter-quartile range method.

Note: These estimates are based on an incomplete database, so caution should be exercised in interpreting the results.

Source: HSH casemix database, unpublished.



## Appendix H

### *ICD-9-CM codes for sentinel procedures*

<b>Procedure</b>	<b>Codes<sup>(a)</sup></b>
Tonsillectomy ± adenoidectomy	282, 283
Hysterectomy	683–688
Caesarean section	74
CABG	361
Endoscopies	
Oesophagus	4223, 4224
Stomach	4413, 4414
Small intestine	4513, 4514, 4516
Colon	4523–4525
Hip replacement	8151, 8152
Lens insertion	137
Cholecystectomy	512
Appendicectomy	470

(a) Codes from *Annotated ICD-9-CM Volume 3*, effective 1 October 1991.

Age- and sex-standardised rates calculated using 1992–93 morbidity and population data, with the reference population being the Australian population as at 30 June 1991.

## Appendix I

### *Test of significance for intervention rates*

The intervention rates calculated for this report are estimates of the underlying rate in the population(s). Of interest is the difference between the rate estimate for one population and the rate estimate for a comparison population.

We hypothesise that the true rates are equal, and assume that the estimates are approximately normally distributed. We calculate a Z value of the difference between the rates:

$$Z = \frac{S - C}{\text{Standard error of difference}}$$

where S is the State or Territory rate, C is the comparison rate and the standard error of the difference is given by:

$$\sqrt{(\sigma_s^2 + \sigma_c^2)}$$

where  $s_s$  and  $s_c$  are the standard errors of the State and comparative rates respectively.

For age- and sex-standardised rates, the standard error of the rate is given by:

$$\sqrt{\sum_i \left( \frac{P_i^2 R_i (1 - R_i)}{P^2 P_i} \right)}$$

where  $P_i$  is the standard population in age-group  $i$ ,  $R_i$  is the age-specific rate,  $P_i$  is the age-specific population at risk, and P is the total standard population.

Under the hypothesis that the true rates are equal, Z is approximately normally distributed, so we reject the hypothesis if

$$|Z| > 1.96 \quad (5\%) \text{ or}$$

$$|Z| > 2.576 \quad (1\%).$$

In most cases the 5% level is an adequate safeguard against the risk of identifying a significant result that has arisen by chance. Where many tests are performed, as in this report, there is a higher chance that one of the tests falsely produces a significant result. To reduce the overall risk, the more stringent 1% threshold is used.

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## **GLOSSARY**

### **Acute**

Having a short and relatively severe course.

### **Acute care episode**

An episode of care in which the principal clinical intent is to do one or more of the following:

- manage labour (obstetric);
- cure illness or provide definitive treatment of injury;
- perform surgery;
- relieve symptoms of illness or injury (excluding palliative care);
- reduce severity of illness or injury;
- protect against exacerbation and/or complications of an illness and/or injury which could threaten life or normal functions;
- perform diagnostic or therapeutic procedures.

### **Acute hospital**

Public, private or repatriation hospital that provides services predominantly to admitted patients with acute or temporary ailments. The term 'acute hospital' is often used synonymously with 'recognised hospital' or 'general hospital'.

### **Admission**

The process by which an admitted patient commences an episode of care. The number of admissions has traditionally been a measure of hospital activity, though it is more appropriate to use the number of separations as the measure of activity (see below).

### **Admitted patient**

A patient who has undergone a hospital's formal admission process. This includes same-day patients (that is, patients who are admitted and separated on the same day). Admitted patient is synonymous with inpatient.

### **AN-DRG**

Abbreviation for Australian National-Diagnosis Related Group. Each AN-DRG represents a class of patients with similar clinical conditions requiring similar hospital services. The full set of AN-DRGs comprises a casemix classification system for use in Australian hospitals. Three versions of the classification system, and associated software, have been released to date.

### **Average case weight**

A number describing the overall relative costliness of the patients treated by a hospital or group of hospitals compared with another hospital or group, or compared with the unit value (1.00). For example, a hospital with an average case weight of 0.96 has an overall casemix that is expected to be 8% less costly per case than a hospital that has an average case weight of 1.04.

### **Average length of stay (ALOS)**

The average of the lengths of stay for all admitted patients in a hospital or group of hospitals. The length of stay for a patient is the difference between the date of separation and date of admission, less any leave days. For same-day patients, the length of stay is attributed a value of 1 day.

### **Benchmarking**

The ongoing, systematic process to search for and introduce international best practice into an organisation.

**Best practice**

The cooperative way in which organisations and their employees undertake business activities in all key processes – and the use of benchmarking – that can be expected to lead to sustainable world-class outcomes.

**Casemix**

The number and type of patients treated by a hospital or group of hospitals. In Australia, casemix is described using the AN-DRG classification system.

**Casemix-adjusted separations**

The number of separations for a hospital or group of hospitals multiplied by the average case weight. This product is often termed the units of care.

**Clearance time**

A prospective measure of the capacity of the system to remove patients from the waiting list. It is calculated as the number of patients waiting at a point in time (the census point) divided by the mean number of patients cleared (admitted or removed) from the waiting list per month.

**Compensable patient**

An admitted patient entitled to, or who has been paid, compensation, damages or other benefits in respect of the injury, illness or disease that is being treated.

**Cost weight**

The relative costliness of a particular AN-DRG, determined so that the average cost weight for all AN-DRGs is 1.00.

**Depreciated replacement value (DRV)**

Total replacement value less accumulated depreciation that would have applied from the date of acquisition to the current financial period.

**Depreciation**

A representation of the service potential of an asset consumed during a financial period.

**Eligible person**

A resident of Australia or person visiting Australia from a country covered by a reciprocal health care agreement.

**Episode of care**

A phase of treatment. For most patients, a single episode of care makes up the hospital stay; for other patients, multiple episodes of care occur during the one hospital stay.

**Free-standing day hospital facility**

A private hospital treating patients on a same-day basis only.

**Health outcome**

A change in the health of an individual, or group of people or population, which is attributable to an intervention or series of interventions.

**Hostel**

A residential establishment for aged or disabled persons who cannot live independently but do not need nursing care.

**IFRAC**

Abbreviation of inpatient fraction. The IFRAC is an expression of the ratio of inpatient costs to total hospital costs.

**Morbidity**

Any departure from a state of physiological or psychological well-being. Collectively, morbidity refers to the details of conditions and treatments relating to a group of patients.

**Non-admitted patient**

A patient who receives a hospital service or attends a hospital clinic or unit and does not undergo the hospital's formal admission process. This term is synonymous with non-inpatient, but is different from outpatient in that outpatient services are a subset of all non-inpatient services.

**Nursing home**

An institution that provides long-term, regular, basic nursing care to chronically ill, frail or disabled persons.

**Nursing home type patient (NHTP)**

An eligible person admitted as a nursing home type patient, or a patient whose length of stay exceeds 35 days and who is not certified as an acute patient. The care required is consistent with that normally provided in a nursing home.

**Opportunity cost**

The value of the next best alternative that is sacrificed by retaining the asset.

**Private patient**

An eligible person who is admitted to a private hospital or, on admission to a public hospital, elects to be treated by a medical practitioner of his or her choice, or elects to be accommodated in a single room. A private patient is liable for hospital and professional charges incurred during the hospital stay.

**Public (hospital) patient**

An eligible person who, on admission, elects to be treated by a hospital-nominated medical practitioner and is not charged for the care or treatment provided by the hospital.

**Recurrent expenditure**

Expenditure which recurs continually or frequently. For this report, recurrent expenditure is defined by NHDD items E8–E18 and E20. The depreciation item (E19) does not include public hospitals in its scope in the NHDD.

**Salaried medical officer**

A medical practitioner engaged by a hospital on a full-time or part-time salaried basis.

**Same-day patient**

An admitted patient whose admission date is the same as the separation date.

**Separation**

The process by which an admitted patient completes an episode of care. In general, a separation is synonymous with discharge. The number of separations is a measure of hospital activity. Separations are counted instead of admissions because some information that classifies the episode of care can be determined only after the episode has concluded. For acute hospitals, the number of separations will be similar to the number of admissions for the same reporting period.

**Total replacement value (TRV)**

Total of current replacement cost of all assets.

**Units of care**

The product of the number of separations and the average case weight for a hospital or group of hospitals.

**Visiting medical officer**

A medical practitioner appointed by a hospital board to provide medical services for hospital (public) patients on an honorary, sessional or fee-for-service basis.

**Waiting list**

A register which contains essential details about patients who have been assessed as needing elective hospital care.

**Waiting time**

The difference between the admission date and the date a patient was registered on a waiting list. Waiting time can also be determined at census, and is the difference between the census date and the date a patient was registered on a waiting list.

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### ***Internet contacts***

#### **World Wide Web (WWW)**

HCIA Inc. is a health care information company that markets clinical and financial decision support products to hospitals and related organisations. The company's databases and products are used to benchmark clinical performance and outcomes, and to manage the cost and delivery of health care.

E-mail contact is [info@hcia.com](mailto:info@hcia.com) or WWW home page is [www.hcia.com/home/catalog/impag.html](http://www.hcia.com/home/catalog/impag.html).

Also accessible from this home page is a summary of a report of the 100 top-performing acute care hospitals in the United States and benchmarks for successful and cost-effective health care delivery. The address is [www.hcia.com/home/top100/top100top.html](http://www.hcia.com/home/top100/top100top.html).

#### **Discussion groups**

Name: MHCARE-L; Description: discussion of topics pertaining to managed health care and continuous quality improvement; Contact: [listserv@MIZZOU1.MISSOURI.EDU](mailto:listserv@MIZZOU1.MISSOURI.EDU).

Name: HEALTHMGMT; Description: unmoderated discussion forum for those interested in the practice, research and education of management in health care and health care organisations; Contact: [listserv@CHIMERA.SPH.UMN.EDU](mailto:listserv@CHIMERA.SPH.UMN.EDU).