

Appendix 1: List of tables

Table 2.1:	Cost per casemix-adjusted separation, selected public acute hospitals, States and Territories, 1998-99.....	11
Table 2.2:	Cost per acute casemix-adjusted separation, selected public acute hospitals, excluding mental health programs New South Wales and Victoria, 1998-99.....	13
Table 2.3:	Average salary (\$), full time equivalent staff, public acute and psychiatric hospitals, States and Territories, 1998-99.....	14
Table 2.4:	Number of hospitals and available beds by sector and accreditation status, States and Territories, 1998-99.....	15
Table 2.5:	Separation statistics for selected procedures by State or Territory of usual residence, all hospitals, States and Territories, 1998-99.....	16
Table 2.6:	Average length of stay (days) for the 10 AN-DRGs with the highest number of separations, excluding same day separations, by hospital sector, States and Territories, 1998-99.....	20
Table 3.1:	Summary of hospitals, Australia, 1994-95 to 1998-99.....	27
Table 3.2:	Number of hospitals and available beds by hospital sector and type, States and Territories, 1998-99.....	28
Table 3.3:	Number of public acute and psychiatric hospitals and available beds by hospital size, States and Territories, 1998-99.....	29
Table 3.4:	Number of hospitals and available beds per 1,000 population by metropolitan, rural and remote region, public acute and psychiatric hospitals, States and Territories, 1998-99.....	30
Table 3.5:	Number of public acute hospitals with specialised services, States and Territories, 1998-99.....	31
Table 3.6:	Average full time equivalent staff, staff per 1,000 separations and staff per 1,000 patient days, public acute and psychiatric hospitals, States and Territories, 1998-99.....	32
Table 3.7:	Medical practitioners working in public and private hospitals, by type of occupation, States and Territories, December 1998.....	33
Table 3.8:	Recurrent expenditure (\$'000), public acute and psychiatric hospitals, States and Territories, 1998-99.....	34
Table 3.9:	Revenue (\$'000), public acute and psychiatric hospitals, States and Territories, 1998-99.....	35
Table 4.1:	Summary of separation, same day separation, average cost weight, patient day and average length of stay statistics, by hospital type, Australia, 1994-95 to 1998-99.....	42
Table 4.2:	Summary of separation, same day separation, average cost weight, patient day and average length of stay statistics, by hospital type, States and Territories, 1998-99.....	44
Table 4.3:	Separations by type of admitted patient episode, public acute and psychiatric hospitals, States and Territories, 1998-99.....	49
Table 4.4:	Patient days by type of admitted patient episode, public acute and psychiatric hospitals, States and Territories, 1998-99.....	49
Table 4.5:	Non-admitted patient occasions of service, by type of non-admitted patient care, public acute and psychiatric hospitals, States and Territories, 1998-99.....	50
Table 5.1:	Separations by accommodation status and hospital sector, States and Territories, 1998-99.....	58
Table 5.2:	Separations rates per 1,000 population by accommodation status, public and private hospitals, States and Territories, 1998-99.....	59
Table 5.3:	Average cost weight of separations by accommodation status and hospital sector, States and Territories, 1998-99.....	60
Table 5.4:	Patient days by accommodation status and hospital sector, States and Territories, 1998-99.....	61
Table 5.5:	Separations and patient days by accommodation status, hospital sector and year, Australia, 1994-95 to 1998-99.....	62
Table 5.6:	Separations by compensable status and hospital sector, States and Territories, 1998-99.....	63
Table 5.7:	Separations by State or Territory of usual residence and hospital sector, States and Territories, 1998-99.....	64

Table 5.8:	Separation rates per 1,000 population by State or Territory of usual residence and hospital sector, States and Territories, 1998-99.....	65
Table 5.9:	Per cent of separations by State or Territory of usual residence and hospital sector, States and Territories, 1998-99.....	66
Table 5.10:	Average cost weight of separations by State or Territory of usual residence and hospital sector, States and Territories, 1998-99.....	67
Table 5.11:	Separations by type of episode of care and hospital sector, States and Territories, 1998-99.....	69
Table 5.12:	Average length of stay (days) by type of episode of care and hospital sector, States and Territories, 1998-99.....	70
Table 5.13:	Separations by source of referral and hospital sector, States and Territories, 1998-99.....	71
Table 5.14:	Separations by mode of separation and hospital sector, States and Territories, 1998-99.....	72
Table 5.15:	Separations for patients over 70 years by type of episode of care and mode of separation, all hospitals, Australia, 1998-99.....	73
Table 5.16:	Separations by inter-hospital contracted patient status and hospital sector, States and Territories, 1998-99.....	74
Table 6.1:	Separations by age group and sex, all hospitals, States and Territories, 1998-99.....	79
Table 6.2:	Separations by age group and sex, public hospitals, States and Territories, 1998-99.....	80
Table 6.3:	Separations by age group and sex, private hospitals, States and Territories, 1998-99.....	81
Table 6.4:	Patient days by age group and sex, all hospitals, States and Territories, 1998-99.....	82
Table 6.5:	Patient days by age group and sex, public hospitals, States and Territories, 1998-99.....	83
Table 6.6:	Patient days by age group and sex, private hospitals, States and Territories, 1998-99.....	84
Table 6.7:	Separations by Aboriginal or Torres Strait Islander status and hospital sector, States and Territories, 1998-99.....	88
Table 6.8:	Separations by selected country/region of birth and hospital sector, Australia, 1998-99.....	90
Table 7.1:	Separation, same day separation, patient day and average length of stay statistics for National Health Priority Areas, all hospitals, Australia, 1998-99.....	103
Table 7.2:	Separations for National Health Priority Areas, all hospitals, States and Territories, 1998-99.....	107
Table 7.3:	Separation, same day separation, patient day and average length of stay statistics by principal diagnosis in ICD-10-AM groupings, public hospitals, Australia, 1998-99.....	111
Table 7.4:	Separation, same day separation, patient day and average length of stay statistics by principal diagnosis in ICD-10-AM groupings, private hospitals, Australia, 1998-99.....	113
Table 7.5:	Separations by principal diagnosis in ICD-10-AM groupings, public hospitals, States and Territories, 1998-99.....	115
Table 7.6:	Separations by principal diagnosis in ICD-10-AM groupings, private hospitals, States and Territories, 1998-99.....	117
Table 7.7:	Patient days by principal diagnosis in ICD-10-AM groupings, public hospitals, States and Territories, 1998-99.....	119
Table 7.8:	Patient days by principal diagnosis in ICD-10-AM groupings, private hospitals, States and Territories, 1998-99.....	121
Table 7.9:	Separations for males by age group and principal diagnosis in ICD-10-AM groupings, all hospitals, Australia, 1998-99.....	123
Table 7.10:	Separations for females by age group and principal diagnosis in ICD-10-AM groupings, all hospitals, Australia, 1998-99.....	125
Table 7.11:	Separations by number of diagnoses reported and hospital sector, States and Territories, 1998-99.....	127
Table 7.12:	Separation, same day separation, patient day and average length of stay statistics for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, public hospitals, Australia, 1998-99.....	128
Table 7.13:	Separation, same day separation, patient day and average length of stay statistics for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, private hospitals, Australia, 1998-99.....	129
Table 7.14:	Separations for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, public hospitals, States and Territories, 1998-99.....	130

Table 7.15:	Separations for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, private hospitals, States and Territories, 1998-99.....	131
Table 7.16:	Average length of stay (days) for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, public hospitals, States and Territories, 1998-99.....	132
Table 7.17:	Average length of stay (days) for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, private hospitals, States and Territories, 1998-99.....	133
Table 7.18:	Separations for males for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, by age group, all hospitals, Australia, 1998-99.....	134
Table 7.19:	Separations for females for the 30 principal diagnoses in 3-character ICD-10-AM groupings with the highest number of separations, by age group, all hospitals, Australia, 1998-99.....	135
Table 7.20:	Separation, same day separation, patient day and average length of stay statistics by principal diagnosis in ICD-10-AM groupings, public psychiatric hospitals, Australia, 1998-99.....	136
Table 8.1:	Separation, same day separation, patient day and average length of stay statistics by principal procedure in ICD-10-AM groupings, public hospitals, Australia, 1998-99.....	145
Table 8.2:	Separation, same day separation, patient day and average length of stay statistics by principal procedure in ICD-10-AM groupings, private hospitals, Australia, 1998-99.....	147
Table 8.3:	Separations by principal procedure in ICD-10-AM groupings, public hospitals, States and Territories, 1998-99.....	149
Table 8.4:	Separations by principal procedure in ICD-10-AM groupings, private hospitals, States and Territories, 1998-99.....	151
Table 8.5:	Patient days by principal procedure in ICD-10-AM groupings, public hospitals, States and Territories, 1998-99.....	153
Table 8.6:	Patient days by principal procedure in ICD-10-AM groupings, private hospitals, States and Territories, 1998-99.....	155
Table 8.7:	Separations for males by age group and principal procedure in ICD-10-AM groupings, all hospitals, Australia, 1998-99.....	157
Table 8.8:	Separations for females by age group and principal procedure in ICD-10-AM groupings, all hospitals, Australia, 1998-99.....	159
Table 8.9:	Separations by number of procedures reported and hospital sector, States and Territories, 1998-99.....	161
Table 8.10:	Separation, same day separation, patient day and average length of stay statistics for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, public hospitals, Australia, 1998-99.....	162
Table 8.11:	Separation, same day separation, patient day and average length of stay statistics for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, private hospitals, Australia, 1998-99.....	163
Table 8.12:	Separations for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, public hospitals, States and Territories, 1998-99.....	164
Table 8.13:	Separations for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, private hospitals, States and Territories, 1998-99.....	165
Table 8.14:	Average length of stay (days) for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, public hospitals, States and Territories, 1998-99.....	166
Table 8.15:	Average length of stay (days) for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, private hospitals, States and Territories, 1998-99.....	167
Table 8.16:	Separations for males for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, by age group, all hospitals, Australia, 1998-99.....	168
Table 8.17:	Separations for females for the 30 principal procedures in ICD-10-AM blocks with the highest number of separations, by age group, all hospitals, Australia, 1998-99.....	169
Table 8.18:	Principal and additional procedures in ICD-10-AM groupings, public hospitals, States and Territories, 1998-99.....	170
Table 8.19:	Principal and additional procedures in ICD-10-AM groupings, private hospitals, States and Territories, 1998-99.....	172
Table 9.1:	Separation, same day separation, patient day and average length of stay statistics by external cause in ICD-10-AM groupings and hospital sector, Australia, 1998-99.....	178

Table 8.18: Principal and additional procedures in ICD-10-AM groupings, public hospitals, States and Territories, 1998–99	170
Table 8.19: Principal and additional procedures in ICD-10-AM groupings, private hospitals, States and Territories, 1998–99	172
Table 9.1: Separation, same day separation, patient day and average length of stay statistics by external cause in ICD-10-AM groupings and hospital sector, Australia, 1998–99	178
Table 9.2: Separations by external cause in ICD-10-AM groupings and hospital sector, States and Territories, 1998–99	179
Table 9.3: Patient days by external cause in ICD-10-AM groupings and hospital sector, States and Territories, 1998–99	180
Table 9.4: Separations for males by external cause in ICD-10-AM groupings and age group, all hospitals, Australia, 1998–99	181
Table 9.5: Separations for females by external cause in ICD-10-AM groupings and age group, all hospitals, Australia, 1998–99	182
Table 9.6: Separations by external cause in ICD-10-AM groupings and place of occurrence, all hospitals, Australia, 1998–99	183
Table 9.7: Separations by external cause in ICD-10-AM groupings and activity while injured, all hospitals, Australia, 1998–99	184
Table 9.8: Separations by external cause and principle diagnosis in ICD-10-AM groupings, all hospitals, Australia, 1998–99	185
Table 10.1: Separation, same day separation, patient day, average length of stay and cost statistics by Major Diagnostic Category, public hospitals, Australia, 1998–99	195
Table 10.2: Separation, same day separation, patient day, average length of stay and cost statistics by Major Diagnostic Category, private hospitals, Australia, 1998–99	196
Table 10.3: Separations by Major Diagnostic Category, public hospitals, State and Territories 1998–99	197
Table 10.4: Separations by Major Diagnostic Category, private hospitals, State and Territories 1998–99	198
Table 10.5: Patient days by Major Diagnostic Category, public hospitals, States and Territories, 1998–99	199
Table 10.6: Patient days by Major Diagnostic Category, private hospitals, States and Territories, 1998–99	200
Table 10.7: Separation, same day separation, patient day, average length of stay and cost statistics for the 30 AN-DRGs with the highest number of separations, public hospitals, Australia, 1998–99	201
Table 10.8: Separation, same day separation, patient day, average length of stay and cost statistics for the 30 AN-DRGs with the highest number of separations, private hospitals, Australia, 1998–99	202
Table 10.9: Separations for the 30 AR-DRGs version 4.0/4.1 with the highest number of separations, public hospitals, States and Territories, 1998–99	203
Table 10.10: Separations for the 30 AR-DRGs version 4.0/4.1 with the highest number of separations, private hospitals, States and Territories, 1998–99	204
Table 10.11: Average length of stay (days) for the 30 AR-DRGs version 4.0/4.1 with the highest number of separations, public hospitals, States and Territories, 1998–99	205
Table 10.12: Average length of stay (days) for the 30 AR-DRGs version 4.0/4.1 with the highest number of separations, private hospitals, States and Territories, 1998–99	206
Table 10.13: Separations for males for the 30 AR-DRGs version 4.0/4.1 with the highest number of hospital separations, by age group, all hospitals, Australia, 1998–99	207
Table 10.14: Separations for females for the 30 AR-DRGs version 4.0/4.1 with the highest number of hospital separations, by age group, all hospitals, Australia, 1998–99	208
Table 10.15: Separation, same day separation, patient day, average length of stay and cost statistics for the 30 AR-DRGs version 4.0/4.1 with the highest number of separations, public psychiatric hospitals, Australia, 1998–99	209
Table 10.16: Separations for Group 1 Error DRGs for the 10 principal procedures with the highest number of separations, by hospital sector, States and Territories, 1998–1999	210
Table 10.17: Separations for Group 2 Error DRGs for the 10 principal diagnoses with the highest number of separations, by hospital sector, States and Territories, 1998–1999	211

Table A3.1: Private hospital separations reported to the National Hospital Morbidity Database and the Private Health Establishments Collection, States and Territories, 1998–99	222
Table A4.1: Summary of diseases and disease groups that changed chapters between ICD-10-AM and ICD-9-CM	226
Table A4.2: Examples of procedures and procedure groups that are included in an ICD-10-AM chapter based on one body system and in an ICD-9-CM procedure chapter based on another body system	230
Table A5.1: Summary of episodes of care other than acute in public acute hospitals selected for Table 2.1 Cost per casemix-adjusted separation(a) States and Territories, 1998–99.....	243
Table A8.1: Estimated resident population by age group and sex, States and Territories, 31 December 1998	253
Table A8.2: Projected Aboriginal and Torres Strait Islander population by age group and sex, States and Territories, 30 June 1998	254
Table A8.3: Estimated resident population by country/region of birth, Australia, 30 June 1998	255
Table A10.1:NHCDC average cost per separation, public hospitals, States and Territories, 1996–97 to 1998–99	259
Table A10.2:NHCDC sample public hospital participation rate relative to population hospitals, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)	259
Table A10.3:NHCDC sample public hospital participation, States and Territories, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)	259
Table A10.4:Separations for sample public hospitals and overall population hospitals, States and Territories, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99).....	260
Table A10.5:Average length of stay (days) for public hospitals, States and Territories, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)	260
Table A10.6:Number of DRGs by standard error range, public hospitals, AR-DRGs, version 4.1, 1998–99	260
Table A10.7:Average component costs by Major Diagnostic Category, public hospitals, AR-DRGs version 4.1, 1998–99	261
Table A10.8:Core and overhead costs by component, public hospitals, AR-DRGs version 4.1, 1998–99	262
Table A10.9:Percentage of total costs by component, public hospitals, AR-DRGs version 4.1, 1998–99	262
Table A10.10:NHCDC average cost per separation, private hospitals, 1996–97 to 1998–99	263
Table A10.11:NHCDC sample private hospital participation rate relative to population hospitals, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)	263
Table A10.13:Number of DRGs by standard error range, private hospitals, AR-DRGs, version 4.1, 1998–99	263
Table A10.15:Core and overhead costs by component, private hospitals, AR-DRGs version 4.1, 1998–99	264
Table A10.16:Percentage of total costs by component, private hospitals, AR-DRGs version 4.1, 1998–99	264
Table A10.14:Average component costs by Major Diagnostic Category, private hospitals, AR-DRGs version 4.1, 1998–99.....	265
Table A11.1:Average costs and selected parameters by hospital peer group, Australia, 1998–99.....	273
Table A11.2 Average costs and selected data by hospital peer group, Australia, 1998–99.....	274

Appendix 2: List of figures

Figure 4.1: Separations and patient days per 1,000 population, public acute and private hospitals, Australia, 1994-95 to 1998-99.....	47
Figure 4.2: Average length of stay, public acute and private hospitals, Australia, 1994-95 to 1998-99.....	47
Figure 4.3: Separations by month of separation and length of stay, public hospitals, Australia, 1998-99.....	48
Figure 4.4: Separations by month of separation and length of stay, private hospitals, Australia, 1998-99.....	48
Figure 5.1: Separations per 1,000 population by Statistical Division of usual residence, public hospitals, Australia, 1998-99.....	68
Figure 5.2: Separations per 1,000 population by Statistical Division of usual residence, private hospitals, Australia, 1998-99.....	68
Figure 6.1: Separations per 1,000 population by age group and sex, public hospitals, Australia, 1998-99.....	85
Figure 6.2: Separations per 1,000 population by age group and sex, private hospitals, Australia, 1998-99.....	85
Figure 6.3: Patient days per 1,000 population by age group and sex, public hospitals, Australia, 1998-99.....	86
Figure 6.4: Patient days per 1,000 population by age group and sex, private hospitals, Australia, 1998-99.....	86
Figure 6.5: Average length of stay by age group and sex, public hospitals, Australia, 1998-99.....	87
Figure 6.6: Average length of stay by age group and sex, private hospitals, Australia, 1998-99.....	87
Figure 6.7: Separations per 1,000 population by sex, age group and reported Aboriginal or Torres Strait Islander origin status, all hospitals, Australia, 1998-99.....	89
Figure 7.1: Separations by principal diagnosis in ICD-9-CM chapter groupings and hospital sector, Australia, 1998-99.....	98
Figure 7.2: Patient days by principal diagnosis in ICD-9-CM chapter groupings and hospital sector, Australia, 1998-99.....	99
Figure 7.3: Separations per 1,000 population for cancer, by Statistical Division of usual residence, Australia, 1998-99.....	100
Figure 7.4: Separations per 1,000 population for mental disorders, by Statistical Division of usual residence, Australia, 1998-99.....	100
Figure 7.5: Separations per 1,000 population for cardiovascular disease, by Statistical Division of usual residence, Australia, 1998-99.....	101
Figure 7.6: Separations per 1,000 population for injury and poisoning, by Statistical Division of usual residence, Australia, 1998-99.....	101
Figure 7.7: Separations per 1,000 population for asthma, by Statistical Division of usual residence, Australia, 1998-99.....	102
Figure 7.6: Separations per 1,000 population for diabetes, by Statistical Division of usual residence, Australia, 1998-99.....	102
Figure 8.1: Separations by principal procedure, in ICD-10-AM chapter groupings, and hospital sector, Australia, 1998-99.....	143
Figure 8.2: Patient days by principal procedure, in ICD-10-AM chapter groupings and hospital sector, Australia, 1998-99.....	144
Figure 10.1: Separations by Major Diagnostic Category, public hospitals, State and Territories 1998-99.....	193
Figure 10.2: Patient Days by Major Diagnostic Category, public hospitals, State and Territories 1998-99.....	194
Figure 10.3: Error DRGs as a percentage of all separations, States and Territories, 1998-99.....	212

Appendix 3: Technical notes

Definitions

If not otherwise indicated, data elements were defined according to the 1998–99 definitions in the *National Health Data Dictionary* Version 7.0 (summarised in the Glossary).

Unless otherwise specified:

- public acute hospitals and public psychiatric hospitals are included in the public hospital (public sector) category, and all public hospitals other than public psychiatric hospitals are included in the public acute hospital category.
- private psychiatric hospitals, private free-standing day hospital facilities and other private hospitals are included in the private hospital (private sector) category.

Data presented by State or Territory refer to the State or Territory of the hospital, not to the State or Territory of the usual residence of the patient. The exceptions are Tables 5.7, 5.8, 5.9 and 5.10, in which the State or Territory of usual residence of the patient is reported against the State or Territory of hospitalisation. Data presented in Table 2.4 are presented by State or Territory of usual residence. The maps in Chapters 5 and 7 are also based on data on the State or Territory and Statistical Division of usual residence of the patient (see below).

Data presentation

Except as noted, where totals are provided in the tables, they include data only for those States and Territories for which data were available, as indicated in the tables. The exceptions are Table 2.3, Tables 4.3 and 4.4, and some tables for private hospitals in Chapters 7, 8 and 10. Although available, some data in these tables were not published, for confidentiality reasons. The abbreviation 'n.p.' has been used in these tables to denote this.

Throughout the publication, percentages may not add up to 100.0 due to rounding. Percentages and population rates printed as 0.0 or 0 may denote less than 0.05 or 0.5, respectively.

Population rates

Summary population rates presented in Chapters 2, 4, 5 and 6 are age-standardised, calculated using the direct standardisation method and 5-year age groups. The total Australian population for 30 June 1991 was used as the population for which expected rates were calculated. The Australian Bureau of Statistics' population estimates for 31 December 1998 (Appendix 8) were used for the observed rates. The exceptions were Tables 6.7 and 6.8, for which the population estimates for the Aboriginal and Torres Strait Islander population (and the remainder of the population) and for the population for selected countries of birth for 30 June 1998, respectively, were used for the observed rates (Appendix 8). Rates in Table 2.5 were standardised by sex as well as by age.

Crude population rates in Chapters 7, 8 and 10 and age group-specific rates in Chapter 6 were calculated using Australian Bureau of Statistics' population estimates for 31 December 1998 (Appendix 8). For Figure 6.7, 30 June 1998 estimates for the Aboriginal and

Torres Strait Islander population and for the remainder of the population were used for age group-specific rates for the Aboriginal and Torres Strait Islander population and others.

Newborn episodes of care and the reporting of separations for patients aged less than 10 days

The *Newborn* type of episode of care was introduced in 1998–99 to report a single episode of care for all patients aged 9 days or less at admission, regardless of their qualification status and whether they changed qualification status during their hospital stay. Thus these episodes can include qualified days only, a mixture of qualified days and unqualified days, or only unqualified days. Qualified days are considered to be the equivalent of acute care days and *Newborn* episodes with qualified days only are considered to be equivalent to *Acute care* episodes. *Newborn* episodes with no qualified days are considered to be equivalent to the previous category *Unqualified neonate*. In this report, *Newborn* episodes with at least one qualified day have been included in all the tables reporting separations.

Only Queensland, New South Wales, South Australia and Victoria implemented the new definition for 1998–99 and therefore were the only jurisdictions to report *Newborn* separations that had a mixture of qualified and unqualified days (see Table 5.11). For the other four jurisdictions, separations reported as *Acute care* separations for patients aged less than 10 days are included in the National Hospital Morbidity Database and this report as *Newborn* episodes with qualified days only. Separations reported as *Unqualified neonates* are included as *Newborn* episodes with no qualified days.

Previously, New South Wales, Queensland and South Australia (public hospitals) had counted separate episodes of care within a hospital stay as individual separations. With the implementation of the *Newborn* definition, they began to count each hospitalisation of a patient admitted under the age of 10 days as one separation (as Victoria had been doing prior to 1 July 1998). This change is likely to have resulted in a slight reduction in the number of separations for these States in 1998–99 compared with 1997–98, and a slight increase in their average lengths of stay.

In 1998–99, the Australian Capital Territory and Western Australia counted separations for patients aged 10 days or less on admission as qualified (*Acute care*) if at least one day was qualified. Tasmania and the Northern Territory continued to report a new episode of care for patients aged less than 10 days at admission with each change in qualification status. The reporting method used in Tasmania and the Northern Territory may mean that there were more separations for patients under the age of 10 days for these jurisdictions, relative to others, and that they had a lower average length of stay.

Data on Statistical Division of usual residence

Data on the Statistical Division of usual residence of admitted patients are presented in maps in Chapter 5 (Figures 5.1 and 5.2) and Chapter 7 (Figures 7.3 to 7.8). The data used for these maps were derived from data supplied for each separation by the States and Territories for the National Hospital Morbidity Database on the area of usual residence of the patients. The *National Health Data Dictionary* specifies that these data should be provided as the State or Territory and the Statistical Local Area (SLA) of usual residence. SLAs are small units within the Australian Bureau of Statistics' Australian Standard Geographical Classification (ASGC), and can be aggregated to Statistical Divisions for reporting, as in the maps in this publication. The data on the State or Territory of usual residence are reported in Chapter 5 (Tables 5.7, 5.8, 5.9 and 5.10).

Although most separations included data on the State or Territory of usual residence, not all States and Territories were able to provide information on the area of usual residence in the form of an SLA code, using the 1998 edition of the ASGC. If SLA information was unavailable for a patient then postcode was requested. The Institute then mapped the supplied data to the standard, as far as possible. SLAs were derived from postcodes based on the probabilities that persons for whom a postcode was reported were resident in each SLA. Similarly, 1998 SLA codes were derived from SLA codes from earlier editions of the ASGC on a probabilistic basis. The standardised data were then aggregated to Statistical Division data for reporting.

New South Wales, Victoria and the Australian Capital Territory were able to provide SLA codes for both patients usually resident in the jurisdiction and patients not usually resident in the jurisdiction. Queensland, the Northern Territory, Tasmania and South Australia provided SLA codes (or Local Government Area codes) for patients usually resident in the jurisdiction and postcodes for patients usually resident elsewhere. Western Australia provided SLA codes for patients in public psychiatric hospitals and postcodes for all their other patients.

The mapping process identified missing, invalid and superseded codes, but resulted in 98.8% of records being assigned SLA codes. To enable further analysis of the SLA information on area of usual residence, it was aggregated to Statistical Sub-Division and Statistical Division levels. Data for the two Statistical Divisions in the Australian Capital Territory were combined for mapping purposes because of the very small population of one of the Statistical Divisions.

Private hospitals in the National Hospital Morbidity Database

Chapter 1 and the Internet tables for Appendix 7 include details of the private hospitals included in the National Hospital Morbidity Database. Data were not provided for 1998–99 for 12 private free-standing day hospital facilities and one other private hospital in Victoria, three private free-standing day hospital facilities in South Australia, one private free-standing day hospital facility and four other private hospitals in Tasmania, six private free-standing day hospital facilities and one private hospital in the Australian Capital Territory, and the one private hospital in the Northern Territory. In addition, about 5.6% of private hospital separations data for Western Australia were not included (mainly for hospitals other than free-standing day hospital facilities); the Western Australian data were provided as at 31 December 1999, and some private hospitals had been unable to finalise their data by then due to system problems associated with the introduction of ICD-10-AM.

The Australian Bureau of Statistics (ABS) collates summary hospital morbidity data from private hospitals in its Private Hospital Establishments Collection. In 1998–99, the Private Health Establishments Collection reported 1,986,299 separations (ABS unpublished data), compared with 1,875,358 separations reported for the National Hospital Morbidity Database.

This discrepancy of 110,941 separations (5.6%) (40,980 for private free-standing day hospital facilities and 69,961 for other private hospitals) may be due to the use of differing definitions or different interpretations of definitions, or differences in the quality of the data provided for different purposes. It is also likely to reflect the omission of some private hospitals from the National Hospital Morbidity Database and also some separations for some private hospitals that were otherwise included in the database. The Private Health Establishments Collection included all private acute and psychiatric hospitals licensed by State and Territory health authorities and all private free-standing day hospital facilities approved by the Department of Health and Aged Care.

Fewer separations were reported to the National Hospital Morbidity Database for 1998–99 than to the Private Health Establishments Collection for all geographical areas for which data are available from the Private Health Establishments Collection (ABS, unpublished data) (Table A3.1).

Table A3.1: Private hospital separations reported to the National Hospital Morbidity Database and the Private Health Establishments Collection, States and Territories, 1998–99

	NSW–ACT	Vic	Qld	WA	SA–NT	Tas	Total
AIHW National Hospital Morbidity Database							
<i>All private hospitals</i>	583,507	495,667	411,279	186,997	150,741	47,167	1,875,358
Free-standing day hospital facilities	123,835	47,063	70,831	9,994	8,310	1,106	261,139
Other private hospitals	459,672	448,604	340,448	177,003	142,431	46,061	1,614,219
ABS Private Health Establishments Collection							
<i>All private hospitals</i>	599,132	545,220	412,714	205,773	165,311	58,189	1,986,299
Free-standing day hospital facilities	131,871	65,261	71,895	12,863	16,466	3,763	302,119
Other private hospitals	467,261	479,959	340,819	192,870	148,845	54,426	1,684,180
Difference between the AIHW and ABS data collections— separations							
<i>All private hospitals</i>	15,625	49,553	1,435	18,736	14,570	11,022	110,941
Free-standing day hospital facilities	8,036	18,198	1,064	2,869	8,156	2,657	40,980
Other private hospitals	7,589	31,355	371	15,867	6,414	8,365	69,961
Difference between the AIHW and ABS data collections—per cent							
<i>All private hospitals</i>	2.6	9.1	0.3	9.1	8.8	18.9	5.6
Free-standing day hospital facilities	6.1	27.9	1.5	22.3	49.5	70.6	13.6
Other private hospitals	1.6	6.5	0.1	8.2	4.3	15.4	4.2

These discrepancies seem to reflect major differences in coverage of the National Hospital Morbidity Database and the Private Health Establishments Collection. That is, they seem to reflect the omission from the National Hospital Morbidity Database of all six private free-standing day hospital facilities and one private hospital in the Australian Capital Territory (reflected in the Private Hospital Establishments Collection separation counts for New South Wales and the Australian Capital Territory combined), 12 private free-standing day hospital facilities and one other private hospital in Victoria, three private free-standing day hospital facilities in South Australia, the one private hospital in the Northern Territory (reflected in the Private Hospital Establishments Collection separation counts for South Australia and the Northern Territory combined), one private free-standing day hospital facility and four other private hospitals in Tasmania, and the data for some private hospital separations for some Western Australian hospitals.

However, because of possible differences in definitions used and data quality between the two data collections, it cannot be concluded that the discrepancies represent exact measures of the numbers of separations for the omitted hospitals.

Patient days

Patient days provide information on the length of stay of patients and are calculated as the difference between the separation date and admission date, less any leave days. Same day patients are allocated a length of stay of one day.

As the databases contain records for patients separating from hospital during the year, this definition means that not all patient days reported will have occurred in the reporting period (1 July 1998 to 30 June 1999) and, therefore, cannot be used to calculate accurate financial year-based activity estimates. It is expected, however, that in acute hospitals, patient days for patients who separated in 1998–99, but who were admitted in 1997–98, would be counterbalanced by the patient days for patients in hospital on 30 June 1999 who will separate in the following reporting period, and for whom data will be reported in the data collection for the 1999–2000 year. Because of the more variable lengths of stay in long-stay establishments (such as public psychiatric hospitals), the numbers of separations and patient days can be a less accurate measure of the activity of these establishments.

Discrepancies in reporting of separations and patient days between the databases

Both the National Hospital Morbidity Database and the National Public Hospital Establishments Database include data on separations and patient days for public hospitals. The data are collected at the patient level for the National Hospital Morbidity Database and at an aggregate level for individual hospitals for the National Public Hospital Establishments Database. There are some discrepancies in the number of separations and patient days reported to the two databases (see Table 4.2, and Tables 4.3 and 4.4).

Differences between the National Public Hospital Establishments Database and the National Hospital Morbidity Database are slight for 1998–99. They were mainly caused by differences in the timing of extractions of data for the two databases and slight differences in the definitions of borders and the inclusions of *Newborn* episodes.

Appendix 4: The introduction of ICD-10-AM and version 4.0/4.1 AR-DRGs

Introduction of ICD-10-AM

Previous publications in the Australian Hospital Statistics series have presented information on diseases, procedures and external causes of injury and poisoning using the *Australian Version of the International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) (National Coding Centre 1996). This report uses the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification* (ICD-10-AM) (NCCH 1998).

The ICD-10-AM classification was developed in Australia by the National Centre for Classification in Health, with the disease and external cause classifications based on the World Health Organization's ICD-10, and the procedure classification based on the procedure lists of the Medicare Benefits Schedule. Assistance provided by Australian clinicians and coders in this development ensured that the classification was current and appropriate for Australian clinical practice. It has been used by New South Wales, Victoria, the Australian Capital Territory and the Northern Territory since July 1998, and by the other States from July 1999.

This staggered implementation of ICD-10-AM resulted in the provision of 1998–99 data to the Institute's National Hospital Morbidity Database in ICD-9-CM by four jurisdictions and in ICD-10-AM by the remaining four jurisdictions. For this report, the Institute therefore mapped the data reported in ICD-9-CM to ICD-10-AM (see below) so that national data could be presented in a single classification (except for Table 2.5).

Data for 1999–2000 will be provided by all States and Territories using ICD-10-AM. The second edition of the classification was endorsed by the National Health Information Management Group for implementation nation-wide on 1 July 2000.

The ICD-10-AM classification

ICD-10-AM consists of:

- A disease classification based on World Health Organization's publication of ICD-10,
- A new Australian classification of procedures based on the Medicare Benefits Schedule (MBS), sometimes referred to as MBS-Extended, or MBS-E; and
- Australian Coding Standards for the selection of disease and procedure codes.

Readers should refer to the published classification (NCCH 1998) and its Implementation Kit (NCCH 1997) (which is the source of some of the information in this appendix) for detailed information about ICD-10-AM and its relationship with its predecessor, ICD-9-CM. However, the sections below summarise the main characteristics of the new classification and major differences between it and ICD-9-CM, to guide readers in interpretation of the data presented in this report.

The disease classification

ICD-10-AM uses an alphanumeric coding scheme for diseases, comprising one alphabetic character generally followed by two, three or four numerals. The disease categories are grouped into 19 chapters (see Figures 7.1 and 7.2), and the supplementary classifications in ICD-9-CM (for external causes and morbidity and mortality and of factors influencing health status and contact with health services) also have chapter status in ICD-10-AM. The ICD-10-AM chapters generally have the same subject matter as in the chapters of ICD-9-CM. However, the order of the chapters was changed slightly and the ICD-9-CM chapter on 'Diseases of the nervous system and sense organs' was split into chapters on diseases of the nervous system, of the eye and adnexa and of the ear and mastoid processes. In addition, there has also been some relocation of diseases and conditions, as detailed in Table A4.1. Relevant post-procedural disorders have also been moved, from Chapter 17 'Complications of surgical and medical care' in ICD-9-CM, to the end of each body system chapter in ICD-10-AM.

Other changes between ICD-9-CM and ICD-10-AM include the use of the term 'sequelae' rather than 'late effects', and a change of the axis for classifying injuries from type of injury (e.g. fractures) in ICD-9-CM to body site (e.g. head) in ICD-10-AM. Fifth characters for obstetric codes have also been discontinued. They were used in ICD-9-CM to distinguish between antepartum and postpartum conditions or complications pre and post delivery.

The classifications for external causes of injury and poisoning, place of occurrence and activity while injured

The chapter classifying external causes of injury and poisoning (Chapter XX) is part of the disease classification in ICD-10-AM. However, this chapter is used to classify and code external causes, rather than diagnoses, in the National Hospital Morbidity Database and in this report, so it is not included with the remainder of the ICD-10-AM disease classification in Chapter 7 reporting diagnoses.

The ICD-10-AM external cause classification is largely similar to the ICD-9-CM external cause classification; however, the injured person's mode of transport, rather than the accident type, is used as the main axis for classification of land transport accidents. The classification of place of occurrence also differs from the ICD-9-CM place of occurrence classification. It can be recorded as the 4th character of an external cause code, in which case it is not used for all external causes (see Chapter 9).

The ICD-10-AM classification also includes a classification of the activity being undertaken by the injured person at the time they were injured. It can be recorded as the fifth character of an external cause code, in which case it is not reported for all external causes (see Chapter 9).

Table A4.1: Summary of diseases and disease groups that changed chapters between ICD-10-AM and ICD-9-CM

Location in ICD-10-AM		Location in ICD-9-CM	
Chapter	Code and description	Chapter	Code and description
I Certain infectious and parasitic diseases	A09 Diarrhoea and gastroenteritis of presumed infectious origin	16 Symptoms ^(a)	787.91 Diarrhoea, NOS
	A33 Tetanus neonatorum	15 Perinatal ^(b)	771.3 Tetanus neonatorum
	A34 Obstetrical tetanus	11 Obstetric ^(c)	670 Major puerperal infection
	A69.0 Cancrum oris	9 Diseases of the digestive system	528.1 Cancrum oris
	B34.9 Viraemia NOS	16 Symptoms ^(a)	790.8 Viraemia, unspecified
II Neoplasms	C88.0x Waldenström's macroglobulinaemia	3 Endocrine ^(d)	273.3 Macroglobulinaemia
	C88.1 Alpha heavy chain disease		273.2 Other paraproteinaemias
	C94.5x Acute myelofibrosis	4 Diseases of the blood and blood-forming organs	289.8 Myelofibrosis
	D13.1, D13.2 Benign neoplasm of other and ill-defined parts of digestive system, stomach/duodenum	9 Diseases of the digestive system	537.84 Hyperplastic polyp of stomach and duodenum
III Diseases of the blood and blood-forming organs, immune mechanism	D86.x Sarcoidosis	1 Infectious and parasitic diseases	135 Sarcoidosis
V Mental and behavioural disorders	F53.0 Post-natal depression NOS	11 Obstetric ^(c)	648.4x Postpartum depression
VI Diseases of the nervous system	G45.x Transient cerebral ischaemic attacks and related syndromes	7 Diseases of the circulatory system	435.x Transient cerebral ischaemia
	G47.x Sleep disorders	16 Symptoms ^(a)	780.5x Sleep disturbances
	G90.1 Familial dysautonomia (Riley-Day)	14 Congenital anomalies	742.8 Familial dysautonomia
	G93.3 Postviral fatigue syndrome	16 Symptoms ^(a)	780.7 Postviral syndrome
IX Diseases of the circulatory system	I88.x Nonspecific lymphadenitis	4 Diseases of the blood and blood-forming organs	289.3 Lymphadenitis, unspecified, except mesenteric
X Diseases of the respiratory system	J02.0 Streptococcal pharyngitis	1 Infectious and parasitic diseases	034.0 Streptococcal sore throat
	J03.0 Streptococcal tonsillitis		034.0 Streptococcal sore throat
	J86.0 Pyothorax with fistula	9 Diseases of the digestive system	530.84 Tracheo-oesophageal fistula
XI Diseases of the digestive system	K12.2 Submandibular abscess	12 Diseases of the skin and subcutaneous tissue	682.0 Submandibular abscess
	K67.3 Tuberculous peritonitis	1 Infectious and parasitic diseases	014.0x Tuberculous peritonitis
	K90.8 Other intestinal malabsorption		040.2 Whipple's disease
	K92.1 Malaena	16 Symptoms ^(a)	792.1 Stool contents
XII Diseases of the skin and subcutaneous tissue	L94.6 Ainhum	1 Infectious and parasitic diseases	136.0 Ainhum

Table A4.1 (continued): Summary of diseases and disease groups that changed chapters between ICD-10-AM and ICD-9-CM

Location in ICD-10-AM		Location in ICD-9-CM	
Chapter	Code and description	Chapter	Code and description
XIII Diseases of the musculoskeletal system and connective tissue	M01.0x Meningococcal arthritis	1 Infectious and parasitic diseases	036.82 Meningococcal arthropathy
	M01.4x Rubella arthritis		056.71 Arthritis due to rubella
	M02.3x Reiter's disease		099.3 Reiter's disease
	M07.xx Psoriatic and enteropathic arthropathies	12 Diseases of the skin and subcutaneous tissue	696.0 Psoriatic arthropathy
	M10.xx Gout	3 Endocrine ^(d)	274.x Gout
	M30.x Polyarteritis nodosa and related conditions, M31.x other necrotising vasculopathies	7 Diseases of the circulatory system	446.x Polyarteritis nodosa and allied conditions
	M34.8 Other forms of systemic sclerosis	8 Diseases of the respiratory system	517.2 Lung involvement in systemic sclerosis
	M35.2 Behcet's disease	1 Infectious and parasitic diseases	136.1 Behcet's syndrome
	M35.9 Auto-immune disease (systemic) NOS	3 Endocrine ^(d)	279.4 Auto-immune disease, NEC
M73.0x Gonococcal bursitis	1 Infectious and parasitic diseases	098.52 Gonococcal bursitis	
M73.1x Syphilitic bursitis		095.7 Syphilitic bursitis	
XIV Diseases of the genitourinary system	N23 Unspecified renal colic	16 Symptoms ^(a)	788.0 Renal colic
	N34.1 Nonspecific urethritis	1 Infectious and parasitic diseases	099.4x Other nongonococcal urethritis
XV Pregnancy, childbirth and the puerperium	O41.9 Disorder of amniotic fluid and membranes, unspecified	16 Symptoms ^(a)	792.3 Non-specific abnormal findings in other body substances, amniotic fluid
XVII Congenital malformations, deformations and chromosomal abnormalities	Q85.0 Neurofibromatosis (non-malignant)	2 Neoplasms	237.70 Neurofibromatosis, unspecified
XVIII Symptoms, signs and abnormal findings, nec	R09.1 Pleurisy	8 Diseases of the respiratory system	511.0 Pleurisy, without mention of effusion or current tuberculosis
	R18 Ascites	9 Diseases of the digestive system	568.82 Peritoneal effusion (chronic)
	R23.8 Other and unspecified skin changes	12 Diseases of the skin and subcutaneous tissue	706.3 Seborrhoea
	R31 Unspecified haematuria	10 Diseases of the genitourinary system	599.7 Haematuria
	R44.1 Visual hallucinations	6 Diseases of the nervous system and sense organs	368.16 Visual hallucination
	R58 Haemorrhage, NEC	7 Diseases of the circulatory system	459.0 Haemorrhage, unspecified system

(a) 16 Symptoms signs and ill-defined conditions.

(b) 15 Certain conditions originating in the perinatal period.

(c) 11 Complications of pregnancy, childbirth and the puerperium.

(d) 3 Endocrine, nutritional, and metabolic diseases and immunity disorders.

Source: *Essentials of ICD-10-AM— An information package for clinicians and other users of coded data.* www.cchs.usyd.edu.au/ncch/clined/AppendixA.html, NCCH, 1999, extracted 18 February 2000.

The procedure classification

The chapters of the procedure classification follow the ICD-10 body system structure closely. Within each chapter, a number of axes are used to arrange the procedure codes. The principal axis is defined by anatomical site and is structured with a 'proximal to distal' or 'head to toe' approach. For example, gynaecological procedures are sequenced: ovary, fallopian tubes, uterus, cervix, vagina and vulva. Under the secondary axis, the procedures are listed under the anatomical site (principal axis) from the least invasive procedures through to the most invasive. Some of the general categories of the secondary axis are: examination, excision, reduction, repair, reoperation. The tertiary axis includes details of the specific site, the specific procedure, the technology and techniques used.

The actual procedure codes exist at the tertiary axis level. They have as their basis the MBS item numbers (5-digit), and have a 2-digit extension to identify individual procedural concepts within the MBS item number. The procedure codes (which are not in numerical order in the classification) are grouped into blocks (one to four digits), that are numbered sequentially and allow location of the codes and aggregation of the data. Codes are usually therefore referred to with their block number, for example 48224-00 [1435] (Bone graft to radius or ulna, in Block 1435, Bone graft to forearm).

As the ICD-10-AM procedure classification is not based on the ICD-9-CM procedure classification, it cannot be easily compared with it. The chapter structure (see Figures 8.1 and 8.2) is broadly similar; however, the ICD-9-CM chapter on operations on the nose, mouth and pharynx was split into chapters for procedures on the nose, mouth and pharynx, and for dental services in ICD-10-AM. In addition, there is a separate chapter for procedures on the breast, which were included with operations on skin and subcutaneous tissue in the ICD-9-CM chapter on operations on the integumentary system. Procedures grouped into the ICD-9-CM chapter on miscellaneous diagnostic and therapeutic procedures have been split into separate ICD-10-AM chapters for chemotherapeutic and radiation oncology, diagnostic imaging services, allied health interventions and miscellaneous procedures.

In addition, the different structure of ICD-10-AM (compared with ICD-9-CM) has meant that some procedures are categorised within a different body system in the new classification and so appear to have 'moved' chapters. For example, some procedures for excision of skin or skin lesions were classified with the area of the body under 'of the skin' in ICD-9-CM, but all these procedures are located together in the ICD-10-AM Chapter XVI (Dermatological and plastic procedures). These and other examples of 'movements' (other than the chapter changes mentioned above) are detailed in Table A4.2.

ICD-10-AM categories used in this report

In both Chapter 7 (Diagnoses) and Chapter 8 (Procedures), the data are presented using the chapters of ICD-10-AM and more detailed categories in the classification. Figures 7.1 and 7.2 present data on principal diagnoses by ICD-10-AM chapter and Figures 8.1 and 8.2 present principal procedure data using the ICD-10-AM procedure chapters.

The diagnosis information is also presented using 73 groupings to cover the entire disease classification at a manageable level (Tables 7.3 to 7.10). These categories are similar to those used to report ICD-9-CM data previously, but reflect the differences between the two classifications in chapter structure, and the major differences in structure within the chapters. Diagnosis information is also presented in 3-character ICD-10-AM groupings, describing the diseases quite specifically (Tables 7.12 to 7.19). There are 1,540 of these 3-character categories, compared with about 1,000 ICD-9-CM 3-digit categories used for the

Table A4.2: Examples of procedures and procedure groups that are included in an ICD-10-AM chapter based on one body system and in an ICD-9-CM procedure chapter based on another body system

Location in ICD-10-AM		Location in ICD-9-CM	
Chapter	Block or code and description	Chapter	Code and description
I Procedures on nervous system	Blocks [46] Decompression cervical spinal cord, [51] Discectomy for recurrent disc lesion, [52] Other discectomy, code 40336-00 [31] Injection of chemonucleolytic agent into disc	14 Operations on the musculoskeletal system	80.5x Excision or destructon of intervertebral disc
VIII Procedures on cardiovascular system	90205-01 [660] Heart and lung transplantation	6 Operations on the respiratory system	33.6 Combined heart-lung transplantation
XI Procedures on urinary system	13100-00 [1059] Haemodialysis	7 Operations on the cardiovascular system	39.95 Haemodialysis
	Block [1060] Peritoneal dialysis	9 Operations on the digestive system	54.98 Peritoneal dialysis
XII Procedures on male genital organs	13290-00 [1192] Collection of semen using a device, 13292-00 [1192] Collection of semen using a device under general anaesthetic	16 Miscellaneous, diagnostic and therapeutic procedures	99.96 Collection of sperm for artificial insemination
XV Procedures on musculoskeletal system	Block [1387] Closed reduction of fracture/dislocation of spine, [1388] Open reduction of fracture/dislocation of spine	1 Operations on the nervous system	03.53 Repair of vertebral fracture
	Block [1365] Reduction fracture of nasal bone	5 Operations on the nose, mouth and pharynx	21.7x Reduction of nasal fracture
XVI Dermatological and plastic procedures	Block [1718] Other procedures for craniostenosis	1 Operations on the nervous system	02.01 Opening of cranial suture
	31255-00 [1622] Excision of basal/squamous cell carcinoma of eyelid, 31300-00 [1623] Excision of residual or recurrent basal/squamous cell carcinoma of eyelid, 90664-00 [1625] Excision of lesion of skin and subcutaneous tissue of eyelid, nec	3 Operations on the eye	08.20 Removal of lesion of eyelid, nos, 08.22 Excision of other minor lesion of eyelid, 08.23 Excision of major lesion of eyelid, partial-thickness, 08.25 Destruction of lesion of eyelid
	45665-01 [1662] Full thickness wedge excision of eyelid		08.24 Excision of major lesion of eyelid, full-thickness
	Block [1677] Repair of blepharoptosis		08.31–08.36 Repair of blepharoptosis by by frontalis muscle technique with suture or with fascial sling, by resection or advancement of levator muscle or aponeurosis, by other levator techniques, by tarsal technique, by other techniques, 08.37 Reduction of overcorrection of ptosis
	Block [1684] Reconstruction of eyelid, 45656-02 [1669] Composite graft to eyelid, 45451-00 [1649] Full thickness skin graft of eyelid		08.6x Reconstruction of eyelid with flaps or grafts, 08.7x Other reconstruction of eyelid
	45617-00 [1662] Reduction of upper eyelid, 45620-00 [1662] Reduction of lower eyelid		08.86 Lower eyelid rhytidectomy, 08.87 Upper eyelid rhytidectomy
	Block [1678] Repair of ear	4 Operations on the ear	18.5 Surgical correction of prominent ear

Table A4.2 (continued): Examples of procedures and procedure groups that are included in an ICD-10-AM chapter based on one body system and in an ICD-9-CM procedure chapter based on another body system

Location in ICD-10-AM		Location in ICD-9-CM	
Chapter	Block or code and description	Chapter	Code and description
XVI Dermatological and plastic procedures (continued)	31255-02 [1622] Excision of basal/squamous cell carcinoma of ear, 31300-02 [1623] Excision of residual or recurrent basal/squamous cell carcinoma of ear, 90664-02 [1625] Excision of lesion of skin and subcutaneous tissue of ear, nec, 45665-02 [1663] Full thickness wedge excision of ear		18.29 Excision or destruction of other lesion of external ear, 18.3x Other excision of external ear
	31255-01 [1622] Excision of basal/squamous cell carcinoma of nose, 31300-01 [1623] Excision of residual or recurrent basal/squamous cell carcinoma of nose, 90664-01 [1625] Excision of lesion of skin and subcutaneous tissue of nose nec	5 Operations on the nose, mouth and pharynx	21.30 Excision or destruction of lesion of nose, nos, 21.32 Local excision or destruction of other lesion of nose
	Block [1679] Rhinoplasty, block [1680] Other repair of nose, 45650-00 [1687] Revision of rhinoplasty, 45051-00 [1682] Facial contour reconstruction with implant		21.82 Closure of nasal fistula, 21.84, Revision rhinoplasty, 21.85 Augmentation rhinoplasty, 21.86 Limited rhinoplasty, 21.87 Other rhinoplasty, 21.89 Other repair and plastic operations on nose
	Block [1664] Excision, lip, 31255-03 [1622] Excision of basal/squamous cell carcinoma of lip, 31300-03 [1623] Excision of residual or recurrent basal/squamous cell carcinoma of lip, 90664-03 [1625] Excision of lesion of skin and subcutaneous tissue of lip, nec		27.42 Wide excision of lesion of lip, 27.43 Other excision of lesion or tissue of lip
	45448-02 [1645] Small split skin graft of lip, 45451-02 [1649] Full thickness skin graft of lip		27.55 Full-thickness skin graft to lip and mouth, 27.56 Other skin graft to lip and mouth
	Blocks [1690 Procedures for cleft palate, [1691] Procedures for cleft lip and anterior palate		27.62 Correction of cleft palate, 27.63 Revision of cleft palate repair, 27.69 Other plastic repair of palate
	Block [1681] Repair of pharynx		29.4 Plastic operation on pharynx
	[1699] Resection of mandible, [1700] Resection of maxilla, [1701] Resection of other facial bone, [1702] Genioplasty, [1703] [1704] Osteotomy or ostectomy of zygoma, without/with internal fixation, [1705] [1706] Osteotomy or ostectomy of mandible or maxilla without/with internal fixation, [1707] [1708] Osteotomy or ostectomy of mandible or maxilla, without/with internal fixation, procedures in combination, [1709] Midfacial osteotomies, [1710] Frontal bone advancement, [1712] Other repair of skull or facial bone	14 Operations on the musculoskeletal system	76.3x Partial ostectomy of facial bone, 76.4x Excision and reconstruction of facial bones, 76.5 Tempromandibular arthroplasty, 76.6x Other facial bone repair and orthognathic surgery

Abbreviations: nec—not elsewhere classified, nos—not otherwise specified.

equivalent tables in previous reports. Information is not generally presented using the very specific 4- and 5-character ICD-10-AM disease categories in this report.

In addition to being presented in chapter groupings, the procedure information is presented using 64 groupings to cover the entire procedure classification (Tables 8.1 to 8.8, 8.18, 8.19). These groupings are largely similar to those used with ICD-9-CM previously but, as for the diagnosis categories, reflect the differences between the two classifications in chapter structure, and the major differences in structure within the chapters. The procedure data are also presented in ICD-10-AM procedure blocks, describing the procedures at a quite specific level (Tables 8.10 to 8.17). There were about 900 ICD-9-CM 3-digit categories used for the equivalent tables in previous reports, so the 1,635 procedure blocks provide comparatively more specificity. Information is not generally presented in this report using the very specific 7-digit ICD-10-AM procedure codes.

External causes are presented in this report using the external causes chapter of ICD-10-AM, divided into 16 groupings (Tables 9.1 to 9.8). A slightly more detailed categorisation is used for the National Health Priority Area tables in Chapter 7.

Mapping between ICD-9-CM and ICD-10-AM

'Mapping' refers to the process of finding an 'equivalent' code between two classifications to enable data users to interpret data partly classified in one classification and partly classified in another. Mapping is therefore important for use of the 1998-99 data in the National Hospital Morbidity Database and for time series analysis of morbidity data. Mapping is also important for grouping data into Australian National Diagnosis Related Groups (AN-DRGs) and AR-DRGs as each version is developed to use a particular set of disease and procedure codes. To suit these purposes, the National Centre for Classification in Health developed four types of maps between ICD-9-CM and ICD-10-AM:

- 'forward historical', to convert ICD-9-CM to ICD-10-AM, so that the ICD-9-CM coded data could be described in ICD-10-AM terms, for example when used with ICD-10-AM coded data (as in this report)
- 'backward historical', to convert ICD-10-AM to ICD-9-CM, so that the ICD-10-AM coded data could be described in ICD-9-CM terms, for example when used with ICD-9-CM coded data (for example in time series analyses with older data coded in ICD-9-CM)
- 'forward logical', to convert ICD-9-CM to ICD-10-AM, for AR-DRG grouping purposes
- 'backward logical', to convert ICD-10-AM to ICD-9-CM, for AR-DRG and AN-DRG grouping purposes

These maps are available on the NCCH Internet site at www.cchs.usyd.edu.au/ncch/

The majority of the code maps in each of these groups are one-to-one maps, meaning that a code in one classification has been mapped to one code only in the other classification. Others are one-to-many maps or many-to-one maps, where one code in one classification is equivalent to two, three or more codes in the other classification. Some are conditional maps, for example mapping a code that is not sex-specific in one classification (for example, a procedure on genital skin) to a female-specific code for data for a female patient, and to male-specific code for a male patient.

Forward historical mapping

The forward historical mapping translates the clinical meaning of codes from ICD-9-CM to ICD-10-AM, as far as is possible. They were initially developed by NCCH in 1997 as one-to-one maps (that is, a principal ICD-10-AM map), with listings of codes associated with the principal map. When the final version of the ICD-10-AM publication became available,

and following input from the South Australian Department of Human Services and the Institute (which had both been using the maps to forward map ICD-9-CM data in large databases), revisions were made in 2000 to incorporate a range of one-to-many, many-to-one and conditional maps. The revised maps (which are available from the Institute) have been used by the Institute to forward map the ICD-9-CM codes provided for the National Hospital Morbidity Database for 1998–99 by Queensland, South Australia, Western Australia and Tasmania. This mapping has enabled the national 1998–99 diagnosis, procedure and external cause data to be presented in ICD-10-AM in this report.

Backward historical mapping

The NCCH's backward historical maps translate the clinical meaning of ICD-10-AM codes to ICD-9-CM codes, as far as is possible, using one-to-one maps. The Institute has made a few revisions to these maps, creating sex-specific conditional maps as required, however, the maps do not incorporate other conditional maps nor one-to-many and many-to-one maps that would probably be required for optimal backward historical mapping.

These maps have been used by the Institute to map the 1998–99 ICD-10-AM codes provided by New South Wales, Victoria, the Australian Capital Territory and the Northern Territory to ICD-9-CM for the National Hospital Morbidity Database. These mapped data are not presented in this report but will be available in the database for data users.

Logical mapping

The logical maps are designed to ensure that the data group appropriately, so they do not always translate clinical meaning in the same way that the historical maps do. In most cases, logical and historical maps are the same, however, they can differ. For example, the forward historical ICD-9-CM code for *Salmonella meningitis* (003.21) is A02.2 (Localised *Salmonella* infection), a code in the *Certain infectious and parasitic diseases* chapter, reflecting the aetiology of the disease. The forward logical map for this code is, however, G01 (Meningitis in bacterial diseases classified elsewhere), a code in the *Diseases of the nervous system* chapter, reflecting the manifestation of the disease and ensuring that the data would group to a DRG within MDC 01 (Diseases and disorders of the nervous system).

Backward logical maps are used to map the coded ICD-10-AM data to ICD-9-CM for grouping in AN-DRGs and AR-DRGs. NCCH's initial backward maps were designed for AR-DRGs version 4.0, and these were revised, with input from the Victorian Department of Human Services, for grouping to AN-DRGs version 3.1. The revised logical backward maps (which have been endorsed by the National Health Information Management Group as a national standard) were used by the Institute to map the 1998–99 ICD-10-AM data provided to the National Hospital Morbidity Database by New South Wales, Victoria, the Australian Capital Territory and the Northern Territory to ICD-9-CM, for AN-DRG version 3.1 grouping. The AN-DRG data accompanying this report on the Internet for those jurisdictions are therefore based on these backward logical maps.

Forward logical maps were used to create version 4.1 of the AR-DRGs from version 4.0 AR-DRGs (see below).

Comparison of mapped and unmapped data

The suite of maps described above have allowed the Institute to collate data partly provided in ICD-9-CM and partly provided in ICD-10-AM into one data set and to present them as national data in this report. However, it is important to note that none of the mappings are perfect. When the codes of one classification are more precise or less precise than those of the other, meaning is lost. Data mapped from ICD-9-CM to ICD-10-AM is therefore not exactly equivalent to data originally classified and reported in ICD-10-AM.

Caution should therefore be exercised when interpreting national data (which are a mix of mapped and unmapped data) and when comparing data from jurisdictions that reported in ICD-10-AM (New South Wales, Victoria, the Australian Capital Territory and the Northern Territory) with data from the States that reported in ICD-9-CM (Queensland, Western Australia, South Australia and Tasmania). Reference should be made to the classifications and the maps for precise interpretation.

Introduction of version 4.0/4.1 AR-DRGs

Previous publications in the Australian Hospital Statistics series have presented information on Diagnosis Related Groups using AN-DRGs version 3.0 or version 3.1. This report instead uses AR-DRGs version 4.0/4.1.

AR-DRG version 4.0/4.1 was developed by the Department of Health and Aged Care to update the Australian DRG system in line with changes to medical, surgical and ICD coding practices (DHAC 1998). Version 4.0 was developed first, using ICD-9-CM codes. Once the logic and the DRG definitions had been changed, the diagnosis and procedure codes were logically forward mapped to ICD-10-AM codes, forming version 4.1. Versions 4.0 and 4.1 are therefore based on the same logic (with a few minor exceptions), despite requiring ICD-9-CM and ICD-10-AM codes, respectively, as input. For 1998-99, cost weights for version 4.0 and version 4.1 combined have been produced by the Department of Health and Aged Care (see Appendix 10).

In this report, data provided in ICD-9-CM codes have been grouped to AR-DRG version 4.0, and data provided in ICD-10-AM codes have been grouped to AR-DRG version 4.1. The version 4.0 and version 4.1 data are essentially equivalent, but it is possible that the logical mapping that underlies version 4.1 means that there are slight differences between the data in each version. Caution should therefore be exercised in interpreting the national AR-DRG data (which are a mix of version 4.0 data and version 4.1 data) and when comparing data from jurisdictions that reported in ICD-10-AM (New South Wales, Victoria, the Australian Capital Territory and the Northern Territory) with data from the States that reported in ICD-9-CM (Queensland, Western Australia, South Australia and Tasmania).

Features of AR-DRG version 4.0/4.1

The Major Diagnostic Category (MDC) structure (see Figures 10.1 and 10.2) of the classification is essentially the same as the MDC structure for AN-DRGs, and the AR-DRGs are similarly based on hierarchies of diagnoses and procedures distributed between surgical, medical and other partitions. However, the AR-DRG classification represents a major overhaul of the DRG classification, with these main features changed:

- The numbering system was changed to an alphanumeric one, showing the broad group to which the DRG belongs (usually the MDC), the adjacent DRG, and the existence and/or nature of splits based on resource consumption.
- The treatment of severity was changed markedly. In AN-DRG version 3.1 the single most severe complication or comorbidity was used as an indicator of the severity of a patient's illness. In AR-DRG version 4.0/4.1 an algorithm has been developed to take account of the cumulative effect of multiple significant complications and/or comorbidities in the patient record.
- MDCs 02 Diseases and disorders of the eye, 17 Neoplastic disorders and 22 Burns were extensively modified, as was multiple trauma.
- Some surgical hierarchies were reordered, especially in MDC 06 Diseases and disorders of the digestive system, MDC 08 Diseases and disorders of the musculoskeletal system

and connective tissue and MDC 09 Diseases and disorders of the skin, subcutaneous tissue and breast.

- Some DRGs were completely restructured. Included were those for tracheostomy, acute myocardial infarction, stroke, head injury, hip replacement, shoulder procedures, elbow procedures, skin disorders and aftercare.
- New DRGs were created, including those for percutaneous coronary angioplasty, microvascular tissue transfer, endoscopic procedures for oesophageal varices, same-day HIV admissions, and opioid use disorder and dependence. Other DRGs were merged.
- The majority of paediatric age splits were changed from 10 years to 3 years. The adjacent DRGs which are split by paediatric age were also changed.
- Parallel DRGs, or surgical DRGs with the same DRG definition and severity splits, have been created for prostatectomy in MDC 11 Diseases and disorders of the kidney and urinary tract and in MDC 12 Diseases and disorders of the male reproductive system.
- The data requirements for grouping were changed. Actual same day stay status is now required rather than intended length of stay, admission weight diagnosis codes are no longer recognised, the acceptable range for actual admission weight values was modified to between 400 and 9999 grams, and mental health legal status has been added for severity splits in MDC 19 Mental diseases and disorders.

Overall, there are 23 MDCs, (as for AN-DRGs version 3.1), but the number of DRGs has reduced from the 667 in AN-DRG version 3.1 to 661 in AR-DRG version 4.0/4.1.

Further information about the AR-DRG classification system is available in *Australian Refined Diagnosis Related Groups Version 4.1 Definitions Manual* (DHAC 1998).

Appendix 5: Cost per casemix-adjusted separation methodology

Summary

Table 2.1 presents a measure of the average cost of providing care for an admitted patient (whether an overnight-stay patient or a same day patient), adjusted for the relative complexity of the patient's clinical condition and of the hospital services provided. This is an important efficiency performance indicator.

The methodology used to calculate the cost per casemix-adjusted separation for the current report uses the method agreed by the National Health Ministers' Benchmarking Working Group (NHMBWG 1998).

The scope of hospitals included in this benchmarking efficiency indicator has been agreed between the States and Territories, and has progressively narrowed in the last few years by excluding atypical hospitals. The scope has been slightly reduced this year. In 1997-98 hospitals which undertook 3.5% of all public hospital separations were not included in the selected 'benchmarking' hospitals. This year, hospitals undertaking 4.2% of total separations were not included.

The current methodology includes all admitted patient separations and their associated costs. It is appropriate to include the 97% of separations which are acute in this calculation, as cost weights are available for each of the acute separations. However the 3% of separations which are not acute are also included, and as there are no cost weights for the non-acute separations, the overall cost per separation is biased. To improve this situation, every State would need to estimate the cost of acute admitted patient separations. New South Wales and Victoria have been able to do this for 1998-99 and this data was presented in Table 2.2.

The Institute hopes that all jurisdictions will soon be in a position to provide reasonably accurate data on the costs of treating acute admitted patients that are separated in a year. When all States and Territories are able to make this estimate, it will be possible to publish a cost per acute admitted separation in *Australian Hospital Statistics*. In addition, if the States are able to provide cost weights e.g. AN-SNAP weights for the admitted patient episodes which are not acute, then it will also be possible to publish an overall cost per separation as well as a cost per palliative separation, a cost per rehabilitative separation, a cost per maintenance episode etc.

In considering whether to change the methodology for this performance indicator, the time series aspects need to be considered. Any move to cost per acute admitted patient episode will mean that it will not be valid to make comparisons with the cost per total admitted patient episode that have been published up until now.

The pros and cons of changing the performance indicator from cost per total separation to cost per acute separation, the timing of such a change, and the appropriate methodology to be used will be considered by the National Health Performance Committee later this year.

Changes to the way unqualified newborns are counted has changed somewhat the numbers in this report as compared to 1997-98.

Finally, the Institute notes that the publication in the Steering Committee for the Review of Commonwealth/State Service Provision (SCRCSSP 2000) (Figure 4.9 and Table 4A.17) of cost per acute case mix weighted separation from the National Hospital Cost Data Collection (NHCDC) data is potentially misleading. The NHCDC is an excellent collection and each year more and more hospitals join it, but it is a voluntary collection and so it has limitations. In Western Australia in 1997-98, the NHCDC included hospitals which had 50% of the State's separations. In South Australia it was 60%. In Victoria it was 73%. Thus an indicator drawn from the NHCDC data is not a performance indicator for the jurisdiction as a whole. It is a performance indicator of an unrepresentative sample of hospitals in that jurisdiction. The NHCDC has a lower representation of non-metropolitan hospitals than the Hospital Establishments collection, which is a census of all public hospitals.

As more and more hospitals come into the NHCDC it will be increasingly possible to use NHCDC data to refine the data that is provided for the Hospital Establishments collection so as to improve the performance indicators that come from the Hospital Establishments collection. For example, the nursing cost per casemix-adjusted separation is currently calculated by applying the overall inpatient fraction to nursing costs. It would be better to use NHCDC data to work out a nursing cost inpatient fraction. The nursing cost per casemix-adjusted separation calculated in this way would be better for benchmarking purposes.

Introduction

Table 2.1 presents a measure of the average cost of providing care for an admitted patient (whether an overnight-stay patient or a same day patient), adjusted for the relative complexity of the patient's clinical condition and of the hospital services provided. The cost per casemix-adjusted separation does not, however, take account of the quality of care delivered within a hospital nor the health outcomes achieved.

The methodology used to calculate the cost per casemix-adjusted separation for the current report uses the method used to report this indicator in *Australian Hospital Statistics 1997-98* (AIHW 1999) and is a methodology agreed by the National Health Ministers' Benchmarking Working Group. The indicator is calculated as:

$$\frac{\text{Recurrent expenditure} \times \text{IFRAC}}{\text{Total separations} \times \text{Average cost weight}}$$

where IFRAC (admitted patient fraction) is the estimated proportion of total hospital costs related to admitted patients and average cost weight is a single number representing the relative costliness of cases for a particular provider (or a group of providers, for example teaching hospitals). Calculation of the average cost weight is described below.

Recurrent expenditure for this indicator is defined by the recurrent expenditure data elements in the *National Health Data Dictionary*.

Total separations excludes *Newborns* with no qualified days, and boarders, defined in the Glossary. 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.

As there is inconsistency between States and Territories in the recording of depreciation, it has been excluded from this analysis. It is anticipated that as accrual accounting becomes universally adopted by health authorities, comparable data on depreciation will become available and it will be included in these analyses (see Tables 3.8 and 3.10 for available data on capital expenditure and depreciation).

The cost per casemix-adjusted separation can not be used as the sole measure of the efficiency of the different jurisdictions in providing hospital services, as some of the costs incurred are costs beyond the control of a jurisdiction. For example, the Northern Territory has high staffing and transport costs, and treats a greater proportion of Aboriginal and Torres Strait Islander patients than other jurisdictions. Because of factors such as these, cost disabilities associated with providing the same level and standard of hospital services available elsewhere in Australia are recognised by the Commonwealth Grants Commission (CGC). Cost disability refers to variables such as remoteness, high input costs and socioeconomic factors that increase the cost of providing services. Other jurisdictions may suffer cost disabilities for other reasons. Factors such as these should be taken into account when making comparisons.

Further work

It has been proposed that further work should be undertaken to refine the methodology to address some of its deficiencies. This report splits the hospitals further into peer groups to enable comparison at a more appropriate level (Appendix 11). Another area of development is the treatment of expenditure on non-acute and psychiatric patients. Both New South Wales and Victoria provided AIHW with estimates of their expenditure on acute non-psychiatric patients which enabled an estimate to be made of the average casemix-adjusted cost of acute non-psychiatric patients for these two States. The effect of restricting the analysis to only acute non-psychiatric patients was to reduce the cost per casemix-adjusted separation by 4.8% in New South Wales and 5.7% in Victoria (See Table 2.2).

These attempts at restricting the analysis also raise questions about the overall framework of the cost and performance analyses. There are a number of alternatives which could improve the analysis including:

- Calculating the casemix adjustments by estimating cost weights for patients other than Acute (using AN-SNAP cost weights for example)
- Estimating costs at other levels such as peer group (Appendix 11), program or diagnostic groupings. The New South Wales and Victorian estimates in Table 2.2 take out mental health programs, which would enable them to be analysed separately, but other programs are also of interest.
- Broadening the analysis to include non-admitted patient care and other hospital outputs such as teaching, research and preventive services. If relative cost weights for each of these outputs can be calculated, then eventually there can be an indicator of overall cost per adjusted output unit for all hospital outputs. Inconsistency in definitions between jurisdictions and questions about the quality of non-admitted patient and other data make this option unlikely in the short term.

Scope

For the purposes of improving the comparability of data across jurisdictions and increasing the accuracy of the analysis, the scope for Table 2.1 has been restricted to those hospitals which mainly provide acute care. The hospitals that were excluded in previous versions of *Australian Hospital Statistics* include: multi-purpose services; hospices; rehabilitation hospitals; mothercraft hospitals; other sub-acute hospitals (e.g. geriatric care centres providing a mix of rehabilitation and nursing home type care); small non-acute hospitals

and psychiatric hospitals. A number of other hospitals were excluded due to various criteria including dental and other minor specialised hospitals. To make the exclusions consistent and to ensure that hospitals were consistently treated, all hospitals in the 'Unpeered and other' group (Appendix 11) have been excluded from this edition of *Australian Hospital Statistics*. The 'Unpeered and other' group contains: hospitals with less than 200 separations; acute metropolitan hospitals with less than 2,000 separations (mainly small specialised hospitals such as dental hospitals, pregnancy advisory centres & etc); and hospitals that have been subjected to major trauma (including being closed, major flood or fire).

The scope of public hospital establishments included in the calculation of the cost per casemix-adjusted separation figures for 1998–99 is different from the scope of the data reported in all other tables and the scope has also changed since the reports using 1997–98 data (AIHW 1999a, SCRCSSP 2000).

Financial data for most Victorian, and some South Australian hospitals were only available at the network level. For Victoria it was not possible to exclude thirteen hospitals (campuses) with a total of 19,500 separations that would otherwise have satisfied the criteria for exclusion. The effect on the Victorian estimate is likely to be in the order of 1%.

The Tasmanian data was problematic in that there was no estimate of admitted patient expenditure from Tasmania for a number of hospitals and it was not possible to estimate admitted patient expenditure for any but the three largest hospitals in Tasmania. This is not considered a significant problem as the three largest hospitals in Tasmania account for 92% of the total separations in that jurisdiction.

The networking made no difference to the exclusions for South Australia as all of the members of the networks were classified to the same categories as the networks themselves.

As the service reforms under the National Mental Health Strategy are put into place, fewer patients are being treated in specialised psychiatric hospitals, with a shift to treatment and rehabilitation being provided in the public acute hospital system and in the community, including specialised community residential facilities (Commonwealth of Australia 1998). However, these changes are occurring at a different rate between jurisdictions. Table 4.2 shows the crude separation rate for public psychiatric hospitals varied widely, from 0.3 per 1,000 population in Victoria, to 2.9 per 1,000 population in South Australia. This variation reflects differences in the extent to which public psychiatric hospital services have been mainstreamed into public acute hospitals or replaced by community care, and indicates that there are differences across jurisdictions in the number of psychiatric patients who are being included in the total separations used to calculate the cost figures in Table 2.1.

Determining costs for admitted patients

The efficiency indicator published in Table 2.1 covers the costs of all admitted patients. Ideally, costs for acute admitted patients only would be used in this indicator. At present the only cost weights available for all of Australia are the Australian Refined Diagnosis Related Groups cost weights which only apply to acute admitted patients. The current methodology includes non acute separations and their costs because it has been too difficult to separate these costs. The costs weights applied to these non acute separations have been the acute cost weights. It is known that this underestimates the costs of non acute separations.

There are two dimensions to this scope: *admitted* patients and *acute* admitted patients. On the first dimension, it is necessary to exclude costs not directly associated with admitted patient care, notably non-admitted patient costs. To determine the costs associated with admitted patients, an admitted patient fraction (IFRAC) is used. The IFRAC is an expression of the

ratio of admitted patient costs to total hospital costs. The IFRAC is generally estimated at a hospital level from the results of surveys.

$$\text{IFRAC} = \frac{\text{Inpatient cost}}{\text{Total cost}}$$

For hospitals where the IFRAC was not available or clearly inconsistent with the data, the admitted patient costs were estimated using the Health and Allied Services Advisory Council (HASAC) ratio (see Cooper-Stanbury, Solon & Cook 1994). The HASAC IFRAC is calculated using the following formula:

$$\text{IFRAC}_H = \frac{\text{Patient days}}{\text{Patient days} + \left(\frac{\text{NAPOOS}}{\text{Ratio}} \right)}$$

Where NAPOOS = Non-admitted patient occasions of service;

IFRAC_H = the IFRAC calculated; and

Ratio = the ratio of non-admitted patient cost to admitted patient cost per service.

The ratio used in this report equates the cost of 5.753 non-admitted patient services to the cost of one admitted patient bed day.

Unbundling teaching and research costs from the total costs are not directly covered by this equation. The component of costs that relate to teaching are not directly estimated by this HASAC calculation. In effect they would be allocated to admitted patients and non-admitted patients according to the proportion calculated by the HASAC IFRAC. For the most part, research costs are omitted from the scope of the collection as they are most frequently controlled by institutions legally (if not physically) separated from the hospital.

A brief analysis of hospitals where IFRACs were supplied shows that the ratio of non-admitted patient cost to admitted patient cost per service varies considerably between hospitals and jurisdictions. There are two explanations for this: either the casemix is different between the hospitals or the occasions of service are not being counted consistently. For example, a hospital that performed non-admitted patient pathology for a number of other hospitals may have a very different ratio of admitted patient costs to non-admitted patient costs compared with a hospital that performed many non-admitted patient magnetic resonance imaging scans.

The HASAC method is used in this report to estimate IFRACs for 3 very small excluded hospitals in Queensland, 1 small selected and 3 small excluded hospitals in Victoria, 5 small excluded hospitals in South Australia, 1 small selected and 6 excluded hospitals in New South Wales, 1 excluded hospital in the Australian Capital Territory, 1 small selected hospital and 2 small excluded hospitals in Western Australia. The remainder of inpatient fractions in Western Australia were estimated by using 1997–98 data with the exception of the 4 major teaching hospitals and 4 smaller hospitals which supplied provided inpatient fractions for 1998–99 year. These hospitals were responsible for over 60% of the separations in Western Australia. The HASAC IFRAC was usually only used on small rural hospitals and the impact on the statistics is thought to be minimal. It also seems apparent from inspection of the data that some hospitals may have used the HASAC method to estimate their IFRAC for reporting purposes.

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.

Admitted patients other than acute patients

It was not possible to isolate the costs of acute admitted patients from all admitted patient costs (as defined by the *National Health Data Dictionary* data element *Type of episode of care*). Because costs are being estimated per separation and not per patient day most of the non-acute admitted patients (including rehabilitation and non-acute 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 3% of total admitted patient episodes and account for approximately 15% of patient days. Many of these records have been excluded from the analysis by the restrictions in establishment scope.

There is also variation in the application of the episodes of care and type of episode of care between States and Territories. In States or Territories where there is a clear delineation in funding arrangements between acute and sub-acute services, the split between acute and other types of patients may be different from where this is done purely on a statistical basis.

Care needs to be taken when the comparison is done that allowance is made for uncertainty introduced by these episodes for which the cost weights are invalid. Table 2.1 and Table 2.2 show that there is significant variation in the number and length of stay for the separations other than acute between jurisdictions. Appendix 11 also shows average costs for the types of hospital that are excluded.

The rates at which the types of care other than acute are identified in each jurisdiction do not vary very significantly across the larger jurisdictions, but do vary amongst the smaller jurisdictions. In the current cost per casemix-adjusted separation model they are given the average weights for all other separations in the State. The average weights are within 5% of 1.00 for all States except for the Northern Territory (0.78).

The data in Table 2.2 and the New South Wales and Victorian calculations indicates that moving to cost per acute admitted patient episode instead of cost per total admitted patient episode is likely to change the dollar amounts by 5% or so, but that there is unlikely to be any significant change in the relative positions of the jurisdictions on this performance indicator.

Newborn data

The introduction of a new type of episode of care (NHDC 1998) to change the way of accounting for the newborn data is improving the level of knowledge about newborns. Traditionally unqualified neonates have been costed as a component of the mother's cost weight. The cost weight of the mother reflects the costs of the mother and the unqualified neonate. As a result, the inclusion of unqualified neonates in the count of casemix-adjusted separations would double count the costs of caring for unqualified neonates. From June 1998 separations for newborns were classified on a different basis. Qualified and unqualified patient days are counted separately for a single record (see Appendix 3).

To maintain consistency with the earlier work, the November meeting of the Australian Hospital Statistics Advisory Committee, discussed how to report newborn episodes in *Australian Hospital Statistics 1998-99*, given that they can now comprise qualified days only, a mix of unqualified and qualified days, or unqualified days only. It was agreed that the tables would include separations if there was at least one qualified day, and qualified days were to be used as the count of patient days. Separations that have qualified days are included (as they are equivalent to acute separations), and separations that are totally unqualified are excluded (as they are equivalent to the old 'unqualified neonates'). The cost

of qualified days is treated as expenditure under the newborn's record and the cost of unqualified days is treated as expenditure under the mother's record.

Future costing work may develop these analyses further and the outputs from the National Hospital Cost Data Collection need to be examined to further discussion about the merits of the various approaches that are now possible. For the purposes of calculating the cost per casemix-adjusted separation it does not matter if the costs of newborns with no qualified days are counted separately or combined with the mother as long as the treatment of these newborns is consistent.

Not all jurisdictions had implemented this definition in 1998–99. See Appendix 3 for more information on inconsistencies in the reporting of newborn data.

Adjusting for casemix

The average cost weight is used in this report to adjust for differences in the relative costliness of all acute admitted 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 separations for that group to produce the number of casemix-adjusted separations. The term 'cost per casemix-adjusted separation' derives from this use of the number of separations adjusted by relative costliness.

Casemix refers to the numbers and types of admitted patients a hospital treats. Hospitals collect data that allow admitted patient episodes to be classified using the Australian National Diagnosis Related Groups (AR-DRG) version 4 casemix classification system. This system groups episodes of similar clinical condition and resource use into 661 categories or AR-DRGs. The National Hospital Cost Data Collection has collected data to produce a cost weight for each AR-DRG (see Appendix 10). The set of cost weights is a relative value scale for all AR-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 cost weight for a hospital or group of hospitals. The average cost weight is calculated as follows:

$$\text{Average cost weight} = \frac{\sum_{i=1}^n (CW_i \times \text{separations}_i)}{\text{Total no. of acute separations}}$$

where i represents each of the 661 AR-DRGs and CW_i is the cost weight for the i th AR-DRG (the different versions of the classification system released to date have different numbers of AR-DRGs).

The average cost weight for a hospital 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 cost 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 cost weight of 1.08 has an 8% more costly casemix than the national average (by design equal to 1.00).

Hospital morbidity data provided to the National Hospital Morbidity Database were used to estimate average cost weights for the groups of hospitals reported in this analysis. Version 4.1 of the AR-DRG classification system was used to allocate patient episodes to AR-DRGs in the jurisdictions using ICD-10-AM: New South Wales, Victoria, the Australian Capital Territory and the Northern Territory. Version 4.0 of the AR-DRG classification system was used to allocate patient episodes to AR-DRGs in the jurisdictions using ICD-9-CM:

Queensland, Western Australia, South Australia and Tasmania. Cost weights were supplied by the Department of Health and Aged Care, from the 1998–99 National Hospital Cost Data Collection. There is some concern over the comparability of the different DRG versions but the effect at the State level, given all States average cost weights changed very little in value between 1997–98 and 1998–99 it is anticipated that effect will be negligible. There are possibly slight differences between the ICD-9-CM States and the ICD-10-AM jurisdictions because of this use of the different ICD classifications, as discussed in Appendix 4. The 1998–99 AR-DRG version 4.0/4.1 combined cost weights (DHAC, unpublished, see Appendix 10) were applied to all jurisdictions.

The complexity of cases treated as admitted patients can differ regionally. Some jurisdictions admit patients who might be treated as non-admitted patients in other jurisdictions. Age structures are less of a concern in comparing States and Territories, and the AR-DRG adjustment is deemed to compensate for the differences in costs due to the higher proportion of older patients in some jurisdictions (Gillett & O'Connor-Cox 1996; Duckett & Jackson 1998).

The validity of comparisons of average cost weights is limited by differences in the extent to which each jurisdiction's psychiatric services are integrated into its public hospital system as service delivery changes under the National Mental Health Strategy. For example, in Victoria, almost all public psychiatric hospitals are now mainstreamed into acute hospital services and psychiatric patient data are therefore included in the acute hospital reports. Cost weights are not as useful as measures of resource requirements for acute psychiatric services because the relevant AR-DRGs are less homogeneous than for other acute services.

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 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. The cost of private patients is therefore estimated by assuming that a patient day of care by a medical practitioner costs the same, whether the patient is public or not. The private patient medical costs are then estimated by pro-rating the sum of salary/sessional and VMO payments according to the number of public patient days and the number of private patient days. This is equivalent to multiplying by one minus the public patient day proportion and dividing by the public patient day proportion. The underlying assumption ignores a number of factors including the propensity for junior medical staff to provide care to private patients and for doctors with private patients to charge at higher rates than they would charge the public system under a contract for public patients.

Payroll tax

Only Tasmanian hospitals are liable for a significant proportion of payroll tax. The Institute has worked with the Department of Human Services Tasmania to remove payroll tax costs from the cost per casemix-adjusted separation table. While New South Wales hospitals are payroll tax exempt, payroll tax is paid for central office and some other support service staff.

The amount is insignificant with respect to the New South Wales total. While Queensland hospitals pay payroll tax it is reimbursed and in theory should not be included in any accounts as reported to the National Public Hospital Establishments Database. In practice there is a very small amount reported due to administrative lags and other inconsistencies. No action has been taken to remove this small amount of payroll tax from Queensland or New South Wales data.

Table A5.1: Summary of episodes of care other than acute in public acute hospitals selected for Table 2.1 Cost per casemix-adjusted separation^(a) States and Territories, 1998–99

Variable	NSW	Vic	Qld	WA	SA	Tas ^(b)	ACT	NT ^(c)	Total
Total separations	1,213	944	674	342	332	74	59	55	3,692
Total Patient days	4,668	3,549	2,324	1,242	1,142	273	216	191	13,605
Psychiatric care separations^(b)									
Separations ('000)	24	20	20	0	6	3	1	1	75
Proportion of all separations	2%	2%	3%	0%	2%	4%	1%	1%	2%
Patient days	221	273	189	0	55	16	8	8	770
Proportion of all Patient days	5%	8%	8%	0%	5%	6%	3%	4%	6%
Acute Separations^(c)									
Separations	1,185	917	647	338	327	73	58	54	3,599
Proportion of all separations	98%	97%	96%	99%	98%	98%	98%	99%	97%
Patient days	4,251	3,020	2,094	1,132	1,067	238	199	181	12,183
Proportion of all Patient days	91%	85%	90%	91%	93%	87%	92%	95%	90%
Acute psychiatric care separations									
Separations ('000)	19	20	19	0	6	3	1	1	69
Proportion of all separations	2%	2%	3%	0%	2%	4%	1%	1%	2%
Patient days	167	273	166	0	55	16	8	6	690
Proportion of all Patient days	3.6%	7.7%	7.1%	0.0%	4.8%	6.0%	3.5%	3.3%	5.1%
Acute non-psychiatric care separations									
Separations ('000)	1,166	897	628	338	321	70	57	54	3,530
Proportion of all separations	96%	95%	93%	99%	97%	95%	97%	98%	96%
Patient days	4,085	2,747	1,928	1,132	1,012	222	192	175	11,493
Proportion of all Patient days	88%	77%	83%	91%	89%	81%	89%	92%	84%
Separations other than acute									
Rehabilitation Separations ('000)	18.5	18.7	20.9	3.1	1.4	0.6	0.2	0.2	63.5
Proportion of all separations	1.5%	2.0%	3.1%	0.9%	0.4%	0.9%	0.3%	0.4%	1.7%
Patient days	240	318	115	83	20	15	5	4	800
Proportion of all Patient days	5.2%	9.0%	5.0%	6.6%	1.7%	5.5%	2.4%	2.2%	5.9%
Palliative Care Separations ('000)	3.2	1.6	2.4	0.4	0.9	0.2	0.2	0.1	8.9
Proportion of all separations	0.3%	0.2%	0.4%	0.1%	0.3%	0.2%	0.4%	0.1%	0.2%
Patient days	32	21	23	4	11	1	4	0	97
Proportion of all Patient days	0.7%	0.6%	1.0%	0.4%	1.0%	0.5%	1.9%	0.1%	0.7%
Non-acute Separations ('000)	4.3	6.1	3.2	0.9	0.5	0.3	0.2	0.3	15.7
Proportion of all separations	0.4%	0.7%	0.5%	0.3%	0.1%	0.3%	0.4%	0.5%	0.4%
Patient days	138	190	89	23	33	17	3	5	498
Proportion of all Patient days	2.9%	5.4%	3.8%	1.9%	2.9%	6.1%	1.4%	2.9%	3.7%
Other separations	2.0	0.0	0.4	0.0	2.2	0.1	0.4	0.0	5.2
Proportion of all separations	0.2%	0.0%	0.1%	0.0%	0.7%	0.2%	0.7%	0.0%	0.1%
Patient days	6	0	3	0	11	1	5	0	27
Proportion of all Patient days	0.1%	0.0%	0.1%	0.0%	1.0%	0.5%	2.2%	0.1%	0.2%
Total separations other than acute									
Separations ('000)	27.9	26.5	26.8	4.4	5.0	1.2	1.1	0.5	93.3
Proportion of all separations	2.3%	2.8%	4.0%	1.3%	1.5%	1.6%	1.8%	1.0%	2.5%
Patient days	416.5	528.8	230.2	110.1	75.3	34.1	17.0	9.9	1,421.9
Proportion of all Patient days	8.9%	14.9%	9.9%	8.9%	6.6%	12.5%	7.9%	5.2%	10.5%

(a) From the National Hospital Morbidity Database, including same day separations and newborns with qualified days.

(b) Patients with total days of psychiatric care equal to the total length of stay.

(c) Includes acute and unspecified separations and newborn episodes of care with qualified days.

Appendix 6: Sentinel procedures

Background

The sentinel procedures table was originally defined as a performance indicator of the National Health Ministers' Benchmarking Working Group (NHMBWG) to provide comparative data between jurisdictions for a defined set of procedures. The rates are age-sex standardised and statistically compared. The procedures were chosen largely on the basis of the frequency with which they were undertaken and because they were often elective, or discretionary in nature.

Extra procedures proposed by South Australia were included in the table by the Australian Hospital Statistics Advisory Committee (AHSAC) on 15 April 1999.

At the meeting of the Australian Hospital Statistics Advisory Committee on 30 November 1999 the need to alter the sentinel procedures table to account for conversion to ICD-10-AM was raised. Appendix 4 provides further information on the introduction of ICD-10-AM and the differences between ICD-9-CM and ICD-10-AM. As ICD-9-CM data were to be mapped forward for this report, it was initially proposed that sentinel procedures would be defined using the same maps. It was noted that for some sentinel procedures, it might not be possible to measure the same concept in ICD-10-AM as was measured in ICD-9-CM.

An AHSAC subcommittee consisting of Dr Raina MacIntyre, Ms Sue Cornes, Mr Ric Marshall and Ms Jo Murray was formed to guide and assist the Institute in the review of the sentinel procedures table. This subcommittee's prime purpose was a review of the intention of several sentinel procedures and to decide on the procedure list to be included in *Australian Hospital Statistics 1998-99*.

This subcommittee discussed the definition of the term 'sentinel procedures' and the framework in which sentinel procedures are selected. Under the NHMBWG framework the variation in sentinel procedures is primarily regarded as a measure of the appropriateness of care. The subcommittee noted that the current list of procedures is an eclectic mix, reflecting a range of interests in this performance indicator.

The subcommittee decided general rules for this analysis:

- For greatest accuracy in identifying the records of interest it was decided that we should use the classification in use in each State in 1998-99 to identify the sentinel procedures, i.e. ICD-9-CM codes to identify the procedures of interest in ICD-9-CM States and the ICD-10-AM codes in the ICD-10-AM jurisdictions and Territories.
- To maintain comparability across time the ICD-9-CM codes for the States using ICD-9-CM would not be modified.
- The apparent intent of the sentinel procedure was to be reflected in the choice of ICD-10-AM codes. The national standard forward historical maps (see Appendix 4) would not necessarily be used unless appropriate.

Codes

The subcommittee also noted that major problems lay in the comparability of data on arthroscopy and endoscopy.

The mapping of the ICD-9-CM data to ICD-10-AM introduces a degree of uncertainty to the inter-jurisdictional comparisons that may not be accounted for in the statistical tests that are used in the table. Thus comparisons between the ICD-9-CM and ICD-10-AM

jurisdictions are more difficult to make than comparisons within either of those groups. The table is therefore separated into the two groups of jurisdictions representing the different versions of the classifications of procedures. Notes on comparability are outlined in the text and/or footnotes to the table.

There are some inconsistencies in the inclusions in the sentinel procedures as originally defined using ICD-9-CM. For example, in the selected sentinel procedures, the angioplasty codes excluded open angioplasty without stenting but included open angioplasty with stenting, because of anomalies in the code structure. These anomalies will be preserved in the ICD-10-AM procedures until a further review is undertaken.

Because of the different structures in ICD-9-CM and ICD-10-AM the sentinel procedures (as defined in ICD-9-CM) and the intent behind them could not always be directly translated into ICD-10-AM. The task also entails making a judgement on the comparability of data between the two coding systems. For example: it is difficult to be conclusive about the comparability of the endoscopy codes.

ICD-9-CM and ICD-10-AM codes for selected procedures

Appendicectomy

ICD-9-CM

47.0

ICD-10-AM

Block [926]

Original ICD-9-CM codes excluded incidental appendicectomy (ICD-9-CM code 47.1) but ICD-10-AM codes do not. There were 1,901 incidental appendicectomies performed in 1997-98 and 25,963 appendicectomies. To maintain comparability within the ICD-9-CM States it was decided that these are not to be included to allow cross-year comparison, but where the procedures were performed in a hospital in an ICD-9-CM State on a resident of an ICD-10-AM jurisdiction, then the incidental appendicectomies would be included.

Angioplasty

ICD-9-CM

36.01, 36.02, 36.05, 36.06, 36.07

ICD-10-AM

Blocks [669], [671], codes 35304-00, 35305-00,

ICD-9-CM code 36.09 is not included, probably because the number of these would have been negligible as it is a non-specific code.

Code 35304-01 *Open transluminal balloon angioplasty of 1 coronary artery* is excluded but code 35310-03 *Open insertion of 1 Transluminal stent into single coronary artery* is included. This inconsistency arises because there is no ICD-9-CM code to separate open from percutaneous dilation/stenting of coronary vessels.

There were 6 separations with the open angioplasty codes 35310-03 to 35310-05 in the ICD-10-AM jurisdictions so the actual impact of this inconsistency is minimal.

Caesarean section

ICD-9-CM

74.0, 74.1, 74.2, 74.4, 74.99

ICD-10-AM

Block [1340]

The inclusion of caesarean sections in the table is slightly misleading in that the population-based rate of caesarean sections is dependent on the fertility rate as well as the population. The number of in-hospital births has been included as a second point of reference.

The number of births was determined by counting the number of separations with an outcome of birth indicator code reported as an additional diagnoses. The outcome of birth indicator codes are V27.0 to V27.9 in ICD-9-CM and Z37.0 to Z37.9 in ICD-10-AM.

Cholecystectomy

ICD-9-CM

51.2

The differences between the classifications do not appear to be problematic for cholecystectomies.

ICD-10-AM

Block [965]

Coronary artery bypass graft

ICD-9-CM

36.1

The differences between the classifications do not appear to be problematic for coronary artery bypass grafts.

ICD-10-AM

Blocks [672] - [679]

Diagnostic gastrointestinal endoscopies

ICD-9-CM

42.23, 42.24, 44.13, 44.14, 45.13, 45.14, 45.16, 45.23-45.25

ICD-10-AM

Codes 30473-03, 41822-00, 30473-04, 30473-00, 30473-01, 32090-00, 32084-01, 41816-00
Blocks [894], [905], [1005]- [1008]
(without code 30473-02)

The ICD-9-CM list of procedures is inconsistent. There is also inconsistency in the mapping of the endoscopy codes for the different types of endoscopies. For example, rigid endoscopies are not always included as well as flexible endoscopies and endoscopies via stoma are not always excluded. The original codes are restricted to diagnostic endoscopies of the gastro-intestinal tract only. Endoscopies that include taking of biopsies are included and Endoscopies that include destruction of tissue are not included. The group has been re-named Diagnostic Gastrointestinal Endoscopies rather than Endoscopies to reflect the contents more accurately.

To maintain comparability with the earlier data, rigid sigmoidoscopy will be excluded even though rigid oesophagoscopy is included. Code 41816-00 *Rigid oesophagoscopy* is included, as there is no distinction between flexible and rigid oesophagoscopy in ICD-9-CM codes 42.23 and 42.24.

The relevant ICD-10-AM codes are not all specific for the stomach and small intestine, with codes for panendoscopies (Blocks 1005-1008) having replaced the more specific ICD-9-CM rubrics.

ICD-10-AM code 32095-00 *Endoscopic examination of small intestine via artificial stoma* is not included as it is equivalent to ICD-9-CM code 54.12 *Endoscopy of small intestine via artificial stoma* which is excluded from the ICD-9-CM list.

ICD-10-AM Block 905 *Fibreoptic colonoscopy* includes colonoscopy via artificial stoma, whereas ICD-9-CM code 45.22 *Endoscopy of large intestine via artificial stoma* was excluded from the ICD-9-CM codes. There were no recorded instances of ICD-9-CM code 45.22 in either 1997-98 or 1998-99. This will mean that there should be no marked difference between the two classifications due to this difference between ICD-9-CM and ICD-10-AM.

ICD-9-CM and ICD-10-AM Coding Standard 0023 relating to Laparoscopic/arthroscopic/ endoscopic surgery states that if a procedure is performed using one of the three approaches and there is no code provided that encompasses both the 'scopy' and the procedure (e.g. 51.23 laparoscopic cholecystectomy), then both procedures should be coded.

This causes inconsistencies as for example: in ICD-10-AM there is a code for endoscopic removal of foreign body 30478-00. In ICD-9-CM there is no such code and the endoscopy would have been coded separately from the removal of the foreign body. There are 5,629 additional separations in the ICD-10-AM coded jurisdictions with the following codes, which would have been coded with both the procedure and endoscopy separately in ICD-9-CM:

- 30476-00, 30476-01, 30490-00, 30476-02, 41819-00, 41831-00, 30476-03, 30475-00, 30568-00, 32094-00, 30478-00, 30478-01, 30478-04, 30478-10, 41825-00

The net effect of all these differences is that comparability between the ICD-9-CM coded and the ICD-10-AM coded jurisdictions is compromised. The ICD-9-CM States are estimated as having rates of the order of 2% higher than the ICD-10-AM jurisdictions. This is the estimated overall effect of the procedures being counted in the ICD-9-CM coded jurisdictions but not in the ICD-10-AM jurisdictions and vice versa.

There is also inconsistency between this group of codes used for sentinel procedures and the group called 'Endoscopy' used in Tables 4.3 and 4.4, as defined in the *National Health Data Dictionary* Version 7 (AIHW 1998). The NHDD list includes endoscopy of non-gastrointestinal sites, polpectomies and other minor endoscopic procedures. The re-naming of the group to 'Gastrointestinal diagnostic endoscopies' will help to avoid confusion.

Hip replacement

ICD-9-CM

81.51, 81.52, 81.53

ICD-10-AM

Block [1492], codes 47522-00, 49315-00, 49318-00, 49319-00

The differences between the classifications do not appear to be problematic for hip replacements.

Hysterectomy

ICD-9-CM

68.3-68.8

ICD-10-AM

Blocks [1238], [1268] and [1269]

The ICD-10-AM codes for hysterectomies also include other procedures such as salpingo-oophorectomy. Thus to count all hysterectomies, all the codes in blocks [1238], [1268] and [1269] were included.

As the other procedures are usually incidental to the hysterectomy, as evidenced by the naming convention 'Hysterectomy with ...', we have included all of the codes. This is in

contrast to the endoscopy and arthroscopy codes where the joint codes were excluded (e.g. 30478-00 *Endoscopic removal of foreign body*).

Lens insertion

ICD-9-CM

13.7

ICD-10-AM

Codes 42701-01, 42702-00 to 42702-11, 42703-00, 42710-00, 42707-00, 42701-00

ICD-9-CM coded lens insertion and removal separately. In ICD-10-AM there are a number of joint codes, which are included in the analysis.

The ICD-9-CM codes include replacement of lenses so replacement lens codes 42707-00 and 42710-00 have been included.

The ICD-10-AM code 42731-00 *Capsulectomy of lens by posterior chamber sclerotomy with removal of vitreous* may include the insertion of a lens. However the insertion of a lens after the removal of vitreous does not seem logical. We have therefore not included it in the list of procedures for ICD-10-AM jurisdictions. There were only 75 of these procedures in the ICD-10-AM jurisdictions so the impact on the statistics is minimal.

Tonsillectomy ± adenoidectomy

ICD-9-CM

28.2, 28.3

ICD-10-AM

Codes 41789-00, 41789-01

ICD-10-AM codes specifically exclude:

- 41804-00 *Removal of lingual tonsil*. There is a separate ICD-9-CM code (28.5) so it is presumed these are not included in both ICD-9-CM and ICD-10-AM.
- 41787-01 *Uvulectomy with partial palatotomy and tonsillectomy*. There were 35 of these recorded in the ICD-10-AM coded jurisdictions in 1998-99.
- 41786-01 *Uvulopalatopharyngoplasty with tonsillectomy*. There were none of these recorded in the ICD-10-AM coded jurisdictions in 1998-99.

Given that uvulectomy and uvulopalatopharyngoplasty are significant procedures, tonsillectomy is considered incidental to these and they have been excluded from the ICD-10-AM coded jurisdictions. Their rarity indicates that this should have little impact on the statistics.

Myringotomy (with insertion of tube)

ICD-9-CM

20.01

ICD-10-AM

Codes 41632-00, 41632-01

The ICD-9-CM code is specific for myringotomy with insertion of tube (grommet), as are the ICD-10-AM codes. The title of the sentinel procedure has been changed from 'Myringotomy' to 'Myringotomy with insertion of tube' to reflect this.

The two ICD-10-AM codes are for unilateral and bilateral myringotomy. This does not appear to be problematic for the comparability of the statistics.

Knee replacement

ICD-9-CM

81.54, 81.55

ICD-10-AM

Block [1518], [1519], [1523], 49527-00

The differences between the classifications do not appear to be problematic for knee replacements.

Prostatectomy

ICD-9-CM

60.2-60.6, 60.20-60.69
37207-00,

ICD-10-AM

Blocks [1165], [1167] codes 37200-06,

37207-01, 90407-00, 36839-01, 36839-03

Excision of lesion of prostate is included in the ICD-9-CM codes so for comparison the excision of lesion of prostate is included in the ICD-10-AM codes. This is not consistent with the other codes. Hysterectomy, for example, does not include excision of lesion of uterus.

Block [1166] *Other closed prostatectomy* includes two procedures not clearly related to the other prostatectomies: 37200-01 *Microwave thermotherapy of prostate* and 37200-02 *High intensity focused ultrasound [HIFUS] (transrectal) of prostate*. There were only 5 separations reporting microwave thermotherapy of the prostate and no separations reporting the HIFUS procedures in the ICD-10-AM coded jurisdictions. The omission of these codes is not considered problematic.

Arthroscopy and arthroscopic procedures

ICD-9-CM Arthroscopy

80.2, 80.20–80.29

ICD-10-AM Arthroscopy

50100-00, 49118-00, 49218-00, 49360-00, 49557-00, 49700-00, 53215-00, 48945-00

ICD-10-AM Arthroscopic procedures

53218-02, 53218-00, 53218-01, 48954-00, 48948-01, 90600-00, 48945-01, 48948-00, 48948-02, 48951-00, 48957-00, 48960-00, 49121-00, 49121-01, 49121-04, 49118-01, 49109-00, 49121-02, 49121-03, 49221-00, 49221-01, 49221-02, 49218-01, 49224-00, 49224-01, 49224-02, 49227-00, 49366-01, 49366-00, 49363-00, 49560-00, 49560-02, 49557-01, 49557-02, 49558-00, 49560-01, 49560-03, 49566-00, 49561-02, 49562-02, 49561-00, 49562-00, 49561-01, 49562-01, 49558-01, 49558-02, 49559-00, 49563-00, 49539-00, 49542-00, 49703-00, 49703-02, 49700-01, 49703-01, 49703-04, 49703-03, 50100-01, 50102-00

ICD-9-CM and ICD-10-AM Coding Standard 0023 relating to laproscopic/arthroscopic/endoscopic surgery states if a procedure is performed using one of the three approaches and there is no code provided that encompasses both the 'scopy' and the procedure (e.g. 51.23 *Laparoscopic cholecystectomy*) then both procedures should be coded.

The ICD-9-CM codes for arthroscopies are codes that separately identify the operative approach, and are usually used with another code for a treatment procedure. They are not commonly used on their own.

In ICD-10-AM, many arthroscopy codes are now combined codes that is, they describe the operative approach and the treatment procedure in one code. The arthroscopy codes listed are just for arthroscopies that are undertaken without another procedure. With another procedure, the codes listed under arthroscopic procedures have arthroscopy or arthroscopic in the title, i.e. an extra 58 procedure codes.

There were 45,051 separations in the ICD-10-AM jurisdictions with these additional procedure codes. This is nearly four times the number of selected arthroscopies (i.e. without the additional procedures). The ICD-10-AM and ICD-9-CM States are clearly not comparable unless the separate set of data including both the arthroscopy and arthroscopic procedure codes are also included. After inspection of the data, the Institute decided to include both the arthroscopy and the arthroscopic procedure codes (including arthroscopies) separately to allow readers to make their own judgements.

There is also an ICD-10-AM code 53215-00 *Arthroscopy of temporomandibular joint* that may have been coded to 80.29 *Arthroscopy of joint NEC* or to 76.19 *Other diagnostic procedures on facial bones and joints* or to both in ICD-9-CM. There were only 47 of these reported in the ICD-10-AM jurisdictions.

Appendix 7: Hospitals contributing to this report

Tables accompanying this report on the Internet at <http://www.aihw.gov.au/publications/health/ahs98-9.html> list the public hospitals that contributed to the National Public Hospital Establishments Database for 1998–99 and the public and private hospitals that contributed to the National Hospital Morbidity Database for 1998–99.

Table A7.1 lists the public hospitals included in one or both databases, with information on their average available bed numbers, their peer group (see Appendix 11) and the Statistical Local Area and RRMA category of their location. Those that were not included in the National Hospital Morbidity Database are annotated as such, as are hospitals not included in the cost per casemix-adjusted separation analysis presented in Chapter 2.

Table A7.2 lists the private hospitals that contributed to the National Hospital Morbidity Database, and whether each was a private free standing day hospital facility.

Appendix 8: Population estimates

Table A8.1: Estimated resident population by age group and sex, States and Territories, 31 December 1998

Sex	Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia ^(a)
Females	0	42,470	29,403	22,685	11,996	8,969	2,852	2,062	1,674	122,124
	1-4	170,182	121,473	95,123	49,660	37,240	12,488	8,339	6,870	501,480
	5-14	430,597	312,057	245,659	131,468	97,532	33,960	21,509	15,837	1,288,972
	15-24	432,868	324,453	250,038	133,219	97,501	31,748	24,796	14,809	1,309,586
	25-34	486,403	368,101	265,256	141,255	106,541	32,583	25,336	18,032	1,443,786
	35-44	491,587	362,399	268,134	145,830	114,541	36,686	25,023	14,990	1,459,493
	45-54	414,422	491,587	229,150	120,372	101,532	31,425	22,413	10,488	1,238,088
	55-64	281,518	207,016	145,547	75,154	68,741	21,718	11,554	4,517	815,833
	65-74	239,760	175,851	114,802	57,224	61,315	18,274	7,598	1,964	676,807
	75 and over	218,041	159,671	102,743	50,410	59,101	17,062	6,123	1,107	614,271
<i>Total</i>		<i>3,207,848</i>	<i>2,552,011</i>	<i>1,739,137</i>	<i>916,588</i>	<i>753,013</i>	<i>238,796</i>	<i>154,753</i>	<i>90,288</i>	<i>9,470,440</i>
Males	0	44,683	31,361	23,749	12,793	9,352	3,067	2,145	1,828	128,998
	1-4	179,066	128,437	100,221	52,817	39,183	13,313	8,656	7,280	529,076
	5-14	452,152	327,028	258,952	138,487	102,877	35,350	22,372	16,992	1,354,550
	15-24	451,394	338,011	260,807	140,711	102,524	32,862	27,087	16,473	1,370,081
	25-34	484,313	363,714	266,155	145,751	108,876	31,229	24,903	19,748	1,445,004
	35-44	493,236	356,875	266,083	147,020	113,382	35,586	23,828	16,536	1,452,836
	45-54	424,585	306,166	237,464	126,755	100,389	31,752	22,077	12,694	1,262,152
	55-64	284,945	206,574	152,726	78,471	67,564	21,774	11,849	6,162	830,173
	65-74	217,939	158,436	108,421	54,017	55,674	16,693	6,871	2,416	620,496
	75 and over	136,018	98,673	68,589	32,139	36,709	10,517	3,812	904	387,381
<i>Total</i>		<i>3,168,331</i>	<i>2,315,275</i>	<i>1,743,167</i>	<i>928,961</i>	<i>736,530</i>	<i>232,143</i>	<i>153,600</i>	<i>101,033</i>	<i>9,380,747</i>
Persons	0	87,153	60,764	46,434	24,789	18,321	5,919	4,207	3,502	251,122
	1-4	349,248	249,910	195,344	102,477	76,423	25,801	16,995	14,150	1,030,556
	5-14	882,749	639,085	504,611	269,955	200,409	69,310	43,881	32,829	2,643,522
	15-24	884,262	662,464	510,845	273,930	200,025	64,610	51,883	31,282	2,679,667
	25-34	970,716	731,815	531,411	287,006	215,417	63,812	50,239	37,780	2,888,790
	35-44	984,823	719,274	534,217	292,850	227,923	72,272	48,851	31,526	2,912,329
	45-54	839,007	614,295	466,614	247,127	201,921	63,177	44,490	23,182	2,500,240
	55-64	566,463	413,590	298,273	153,625	136,305	43,492	23,403	10,679	1,646,006
	65-74	457,699	334,287	223,223	111,241	116,989	34,967	14,469	4,380	1,297,303
	75 and over	354,059	258,344	171,332	82,549	95,810	27,579	9,935	2,011	1,001,652
Total		6,376,179	4,867,286	3,482,304	1,845,549	1,489,543	470,939	308,353	191,321	18,851,187

(a) Includes Other Territories.

Source: Australian Bureau of Statistics unpublished data.

Table A8.2: Projected Aboriginal and Torres Strait Islander population by age group and sex, States and Territories, 30 June 1998

Sex	Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia ^(a)
Females	0	1,641	325	1,584	759	306	216	45	684	5,561
	1-4	6,570	1,301	6,348	2,998	1,234	836	165	2,668	22,124
	5-14	14,398	2,813	13,916	7,478	2,892	1,964	403	6,206	50,087
	15-24	10,508	2,073	10,620	5,549	2,214	1,663	345	5,549	38,539
	25-34	9,554	2,028	9,379	5,054	2,100	1,191	321	4,726	34,370
	35-44	7,097	1,506	6,613	3,671	1,421	1,057	243	3,170	24,789
	45-54	4,339	838	4,006	2,000	796	571	100	1,944	14,606
	55-64	2,293	453	2,019	1,061	448	271	26	1,116	7,690
	65-74	1,126	285	1,094	611	224	125	15	527	4,010
	75 and over	525	150	526	298	114	73	3	256	1,948
	<i>Total</i>	<i>58,051</i>	<i>11,772</i>	<i>56,105</i>	<i>29,479</i>	<i>11,749</i>	<i>7,967</i>	<i>1,666</i>	<i>26,846</i>	<i>203,724</i>
Males	0	1,725	343	1,665	801	317	225	50	724	5,851
	1-4	6,704	1,372	6,485	3,176	1,227	869	202	2,921	22,962
	5-14	15,012	2,880	14,362	7,645	2,998	2,093	395	6,808	52,213
	15-24	10,787	2,162	10,730	5,606	2,091	1,592	325	5,552	38,873
	25-34	8,418	1,896	8,522	4,733	1,834	1,075	287	4,704	31,489
	35-44	6,336	1,403	5,940	3,363	1,347	961	224	2,889	22,478
	45-54	4,046	858	3,600	1,848	739	660	86	1,710	13,557
	55-64	2,136	204	1,685	956	404	261	21	930	6,823
	65-74	902	423	848	494	162	109	8	405	3,133
	75 and over	294	90	382	220	85	29	2	198	1,301
	<i>Total</i>	<i>56,360</i>	<i>11,631</i>	<i>54,219</i>	<i>28,842</i>	<i>11,204</i>	<i>7,874</i>	<i>1,600</i>	<i>26,841</i>	<i>198,680</i>
Persons	0	3,366	668	3,249	1,560	623	441	95	1,408	11,412
	1-4	13,274	2,673	12,833	6,174	2,461	1,705	367	5,589	45,086
	5-14	29,410	5,693	28,278	15,123	5,890	4,057	798	13,014	102,300
	15-24	21,295	4,235	21,350	11,155	4,305	3,255	670	11,101	77,412
	25-34	17,972	3,924	17,901	9,787	3,934	2,266	608	9,430	65,859
	35-44	13,433	2,909	12,553	7,034	2,768	2,018	467	6,059	47,267
	45-54	8,385	1,696	7,606	3,848	1,535	1,231	186	3,654	28,163
	55-64	4,429	657	3,704	2,017	852	532	47	2,046	14,513
	65-74	2,028	708	1,942	1,105	386	234	23	932	7,143
	75 and over	819	240	908	518	199	102	5	454	3,249
Total		114,411	23,403	110,324	58,321	22,953	15,841	3,266	53,687	402,404

(a) Includes Other Territories.

Source: ABS 1998 Experimental projections of the Aboriginal and Torres Strait Islander population, 30 June 1996 to 30 June 2006 Cat. No. 3231.0.

Table A8.3: Estimated resident population by country/region of birth, Australia 30 June 1998

Country/region of birth	Population	Country/region of birth	Population
Australia	14,364,044	Myanmar	11,474
New Zealand	342,705	Indonesia	56,798
Papua New Guinea	26,585	Cambodia	23,993
Fiji	38,889	Malaysia & Brunei	89,527
Oceania (other)	30,104	Philippines	114,304
<i>Oceania (total)</i>	<i>14,802,327</i>	Singapore	28,772
		Vietnam	173,549
United Kingdom & Ireland	1,224,670	Thailand	22,306
Greece	140,955	China	149,101
Italy	247,519	Hong Kong & Macau	55,256
Malta	55,976	Japan	22,081
Former Yugoslavia	203,488	Korea	38,345
Former USSR & Baltic States	55,344	India	95,259
Hungary	27,103	Sri Lanka	55,240
Poland	70,639	Asia (other)	52,112
Romania	13,482	<i>Asia (total)</i>	<i>988,117</i>
Austria	22,129		
France	18,500	Canada	29,654
Germany	122,690	United States of America	62,126
Netherlands	92,756	North America (other)	459
Europe & the former USSR (other)	122,155	<i>North America (total)</i>	<i>92,239</i>
<i>Europe & the former USSR (total)</i>	<i>2,417,406</i>		
		Argentina	11,617
Lebanon	77,155	Chile	26,110
Turkey	31,428	The Caribbean	3,700
Iran	18,551	Central & South America (other)	40,828
Egypt	37,396	<i>South America, Central America & The Caribbean (total)</i>	<i>82,255</i>
Middle East & North Africa (other)	54,363		
<i>Middle East & North Africa (total)</i>	<i>218,893</i>	Mauritius	17,786
		South Africa	68,406
		Africa excluding North Africa (other)	42,930
		<i>Africa excluding North Africa (total)</i>	<i>129,122</i>
		<i>Overseas (total)</i>	<i>4,366,315</i>
		Total	18,730,359

Source: ABS 1998. Migration Australia 1996-97. Cat No. 3412.0.

Appendix 9: Further information

Australian Hospital Statistics 1998–99 is complemented by other recent national publications that have also released hospital statistics:

- Previous years' data in the National Hospital Morbidity Database and the National Public Hospital Establishments Database were summarised in *Australian Hospital Statistics 1997–98* (AIHW 1999a), *Australian Hospital Statistics 1996–97* (AIHW 1998), *Australian Hospital Statistics 1995–96* (AIHW 1997b) and *Australian Hospital Statistics 1993–95: An Overview* (AIHW 1997a).
- Information on patterns of health and illness, use of health services and health services costs and performance were published in *Australia's Health 2000* (AIHW 2000b).
- Establishment-level data on the resources and activities of private hospitals are compiled and published annually by the Australian Bureau of Statistics. Data for 1998–99 are presented in *Private Hospitals, Australia 1998–99* (ABS 2000).
- The *First National Report on Health Sector Performance Indicators*, *Second National Report on Health Sector Performance Indicators* and *Third National Report on Health Sector Performance Indicators* reported a range of indicators of hospital performance (National Health Ministers' Benchmarking Working Group 1996, 1998, 1999).
- Hospital performance indicator data have been released in the *Report on Government Services 1999* (Steering Committee for the Review of Commonwealth/State Service Provision 1999), and *Report on Government Services 2000* (Steering Committee for the review of Commonwealth/State Service Provision 2000).
- Statistics on the hospital-based pharmaceutical, nursing and medical workforces are respectively included in *Pharmacy Labour Force 1998*, *Nursing Labour Force 1998* and *Medical Labour Force 1998* (AIHW 2000c, 1999b, 2000a).
- Summary information on public hospital elective surgery waiting times in was published in *Waiting Times for Elective Surgery 1997–98* (AIHW 2000d).
- The Department of Health and Aged Care's Internet site includes tables of data from the Department's National Hospital Morbidity (Casemix) Database at <http://www.health.gov.au>. The scope of the Department's tables may differ from the scope of the tables presented in this report, so data in the Department's tables may not correspond exactly to data presented in this report.
- Further information on the derivation of AR-DRG and AN-DRG cost weights and average costs was published in *Report on the National Hospital Cost Data Collection 1997–98 (Round 2)* (Department of Health and Aged Care 1999).
- The National Public Hospital Establishments Database and the National Hospital Morbidity Database include data additional to those published in this report. These data can be made available to interested readers. Further information on data availability can be provided by the Institute.

Appendix 10: The National Hospital Cost Data Collection, 1998–99

The National Hospital Cost Data Collection (NHCDC) was established to produce annual updates of Diagnosis Related Groups (DRG) cost weights, as incorporated into tables in Chapters 2, 4, 5 and 10. It is undertaken by the Department of Health and Aged Care and is a voluntary collection of hospital cost and activity data covering the financial year prior to the collection period; in 1999–2000 the NHCDC collected data for the 1998–99 financial year. The NHCDC collects both public and private hospital data with the results being separately reported for the two sectors.

In the 1998–99 collection (Round 3), cost data was obtained for the following products: acute admitted patients, outpatients, rehabilitation, palliative care, non-acute admitted patients, outreach/community, staff education, research and other. However, in this report the cost data was analysed and reported at a jurisdiction and national level for acute admitted patients only (i.e. by DRG). In addition, data for emergency departments and outpatient clinics were captured by most jurisdictions for this collection. However, at the time of publishing this report, data for both emergency departments and outpatient clinics were not available.

The results used in this report and described here relate to the financial year 1998–99. They involved the collection of data grouped to Australian Refined Diagnosis Related Groups (AR-DRG) version 4.1. For this collection the cost weights are defined as ‘Combined’ due to the mix of jurisdictions in their coding (ICD-9-CM and ICD-10-AM) and their grouping (AR-DRGs version 4.0 and 4.1) of hospital cost and activity data. The average cost per separation for public hospitals increased from \$2,412 in Round 2 (1997–98) to \$2,488 in Round 3 (1998–99). The number of public hospitals included in the collection increased from 150 in Round 2 (1997–98) of the NHCDC to 173 in this collection, representing a 15% increase. Whilst the coverage of public hospitals was approximately 33% of total hospitals, the total number of separations was approximately 75% of the estimated total population of separations, because of the significant number of large teaching hospitals in the sample. A total of 52 private hospitals contributed to this collection. The average cost per separation for private hospitals decreased from \$1,932 in Round 2 (1997–98) to \$1,870 in Round 3 (1998–99) in part due to a change in hospital mix between the Rounds.

The NHCDC involves arrangements whereby the hospital data are collected by the individual hospitals, and checked and validated by State/Territory/private sector coordinators before being passed onto the Department. Further checks are conducted by the Department in processing the data to produce the final cost weights and associated tables.

The participating hospitals include both patient costing and cost modelling sites. Cost modelling generally refers to a process where estimates of costs are produced at the level of each DRG. The approach is ‘top down’ where costs from the hospitals’ general ledgers are allocated down to acute admitted patients using a series of allocation statistics. Patient costing or clinical costing is a ‘bottom up’ approach where the costs of each service provided to an individual patient are measured or estimated so that the total cost of treating individual patients is obtained. The majority of participating hospitals are cost modelled sites.

As with the Department’s previous studies of hospital costs in Australia, the NHCDC is a voluntary collection, and the data from all sites that chose to participate were used in compiling national public and private sector cost weights. In deriving the final results, the sample hospitals were stratified by factors which predispose towards cost differences such

as sector (public or private), State or Territory, location (major urban/non-major urban) and number of separations.

The following tables provide summary information from the 1998-99 NHCDC for the public and private sectors. Tables A10.1 to A10.9 provides a summary of results for the public sector, including some comparative data for Rounds 1 to 3. Information provided includes the estimated average cost per separation by jurisdiction, for each round (Table A10.1), the numbers and proportions of hospitals and separations included in the NHCDC (Tables A10.2 to A10.4), the average length of stay for sampled separations (Table A10.5), and the size of the standard errors associated with the cost weight estimates (Table A10.6). Table A10.7 provides information on the average component costs for separations in each Major Diagnostic Category, and Tables A10.8 and A10.9 present information on overall core and overhead costs. Similar information is presented for private hospitals in Tables A10.10 to A10.16.

Most component costs are split between direct costs and overhead costs and all figures have been population adjusted. Some tables show slight variations in the reported total average cost. This is due to rounding at the total level and not inconsistencies in the data. The numbers of hospitals and separations reported in the NHCDC do not correspond with those reported elsewhere in this report. This difference is due to the NHCDC excluding very small hospitals from the population count and using population adjustments to estimate separations.

Further information about the NHCDC is available in the report of the 1997-98 collection (Commonwealth Department of Health and Aged Care 1999). Cost weights and associated tables for the this round and the previous two rounds can be obtained from the Costing and Ambulatory Section, Acute and Co-ordinated Care Branch, Commonwealth Department of Health and Aged Care (Phone 02 6289 8272).

Table A10.1: NHCDC average cost per separation, public hospitals, States and Territories, 1996–97 to 1998–99

	Round 1 (1996–97, Version 3.1)	Round 2 (1997–98, Version 4.0)	Round 3 (1998–99, Version 4.1)
NSW	2,338	2,528	2,628
Vic	2,110	2,292	2,326
Qld	2,232	2,238	2,368
SA	2,144	2,380	2,357
WA	2,356	2,499	2,472
Tas	2,665	2,332	2,738
NT	2,629	2,781	2,860
ACT	3,334	3,184	3,370
Total	2,275	2,412	2,488
Teaching	2,486	2,608	2,736
Non teaching	2,138	2,257	2,293
Major urban	2,444	2,562	2,660
Non-major urban	2,028	2,126	2,141

Note: Uniformity in depreciation in these data is uncertain across jurisdictions. For example, depreciation data for Victoria is \$ 6 per separation and for Western Australia is \$ 55 per separation against a national average cost per separation of \$ 74.

Table A10.2: NHCDC sample public hospital participation rate relative to population hospitals, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)

	Round 1 (1996–97)	Round 2 (1997–98)	Round 3 (1998–99)
Sample hospitals	126	150	173
% increase		19%	15%
Population hospitals	649	524	518
% sample to population	19%	29%	33%

Note: The change in population hospitals from Round 1 (1996–97) to Round 2 (1997–98) was due to a change in hospitals in scope from bed size of 15 to separations exceeding 200 to more accurately reflect throughput.

Table A10.3: NHCDC sample public hospital participation, States and Territories, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)

	Round 1 (1996–97)	Round 2 (1997–98)	Round 3 (1998–99)
NSW	41	50	77
Vic	25	30	25
Qld	27	31	34
SA	15	18	20
WA	7	12	7
Tas	6	3	3
NT	3	4	5
ACT	2	2	2
Total	126	150	173

Table A10.4: Separations for sample public hospitals and overall population hospitals, States and Territories, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)

	Round 1 (1996–97)			Round 2 (1997–98)			Round 3 (1998–99)		
	Sample	Population	Sample as % of	Sample	Population	Sample as % of	Sample	Population	Sample as % of
			population			population			population
NSW	590,418	1,462,098	40	697,924	1,192,425	59	954,698	1,215,192	79
Vic	536,849	952,432	56	626,994	859,176	73	520,168	824,088	63
Qld	407,686	680,400	60	414,566	649,268	64	559,927	671,178	83
SA	239,390	389,923	61	193,765	324,395	60	229,223	322,229	71
WA	73,687	350,471	21	173,522	342,828	51	227,037	371,160	61
Tas	71,365	75,411	95	76,559	81,923	93	74,346	79,342	94
NT	42,728	85,456	50	55,324	58,782	94	54,508	54,508	100
ACT	55,251	55,251	100	56,647	56,647	100	59,121	59,121	100
Total	2,017,374	4,051,442	50	2,295,301	3,565,444	64	2,679,028	3,596,818	74

Note: Separations for New South Wales and Victoria for Round 1 (1996–97) are inflated due to a change in neonate reporting in Round 2 (1997–98).

Table A10.5: Average length of stay (days) for public hospitals, States and Territories, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)

	Round 1 (1996–97)	Round 2 (1997–98)	Round 3 (1998–99)
NSW	3.72	3.43	3.54
Vic	3.51	3.52	3.20
Qld	3.66	3.47	3.25
SA	3.71	3.85	3.30
WA	3.65	3.42	3.20
Tas	4.62	3.62	3.62
NT	4.02	3.61	3.19
ACT	3.78	3.63	3.54
Total	3.68	3.51	3.35

Table A10.6: Number of DRGs by standard error range, public hospitals, AR-DRGs, version 4.1, 1998–99

Standard error	Number of DRGs	Separations	% of DRGs	% of total separations
0.010–0.039	334	3,087,701	50.5	85.8
0.040–0.099	197	397,303	29.8	11.0
0.100–0.149	60	60,396	9.1	1.7
0.150–0.199	22	21,031	3.3	0.6
0.200–0.399	32	25,404	4.8	0.7
0.400 +	16	4,915	2.4	0.1
Total	661	3,596,750	100.0	100.0

Table A10.7: Average component costs by Major Diagnostic Category, public hospitals, AR-DRGs version 4.1, 1998–99

Major Diagnostic Category	Separations		Average cost per separation (\$)		Average DRG component cost (\$)															
	Number	%	ALOS (days)		Hotel	Ward Med	Ward Nurs	Path	Imag	Allied	Pharm	Critic-al	OR	Emerg Dept	Supp-lies	Pros	Dep-rec	On-Costs	SPS	Other
0 Pre MDC	8,826	0.25	27.11	45,619	936	2,499	5,747	2,577	1,108	1,344	4,227	18,546	2,455	209	2,111	352	1,022	1,743	197	544
1 Nervous systems disorders	176,907	4.92	5.22	3,416	133	376	1,091	137	164	171	130	141	261	142	228	23	96	165	17	142
2 Eye disorders	69,302	1.93	1.44	1,905	55	326	213	19	11	12	70	4	679	19	178	129	56	74	14	45
3 Ear, nose and throat disorders	176,680	4.91	1.70	1,553	57	186	327	37	21	20	66	19	412	51	140	26	51	70	17	55
4 Respiratory disorders	229,940	6.39	5.00	3,028	132	347	1,005	167	103	73	174	152	91	137	211	8	89	165	19	155
5 Circulatory disorders	308,962	8.59	4.48	3,926	128	403	788	178	138	60	144	581	391	135	278	145	116	174	138	128
6 Digestive disorders	409,600	11.39	2.71	2,005	79	226	492	99	52	26	92	61	351	75	161	21	65	100	31	75
7 Hepatobiliary/pancreas disorders	74,288	2.07	4.32	3,537	122	376	859	204	194	50	172	116	592	88	309	30	108	159	34	125
8 Musculoskeletal /connective tissue disorders	292,478	8.13	4.35	3,592	131	331	876	80	128	149	118	30	716	85	297	241	102	163	19	127
9 Skin, tissue, breast disorders	143,788	4.00	3.10	2,108	90	241	551	85	40	53	113	10	412	57	169	14	67	105	10	88
10 Endocrine, nutritional and metabolic disorders	41,066	1.14	4.68	3,136	136	412	943	184	90	78	126	100	320	90	228	14	96	160	15	143
11 Kidney, urinary tract disorders	540,416	15.03	1.53	891	29	109	257	41	30	13	81	13	84	25	97	4	28	40	3	37
12 Male reproductive disorders	45,991	1.28	2.49	2,006	75	227	454	72	31	20	110	13	531	44	173	17	69	96	11	65
13 Female reproductive disorders	134,308	3.73	2.10	1,778	74	201	378	65	14	15	76	7	564	20	153	13	57	84	8	47
14 Pregnancy, childbirth and puerperium	321,089	8.93	3.02	2,166	114	238	933	60	10	20	53	18	165	23	202	4	68	125	1	132
15 Newborns and other neonates	54,597	1.52	8.01	5,176	123	388	1,195	232	72	61	125	2,029	74	29	247	5	149	264	3	181
16 Blood disorders	60,268	1.68	2.30	1,598	51	189	449	143	38	28	224	25	95	44	121	7	44	67	16	59
17 Neoplastic disorders	161,886	4.50	1.80	1,327	33	151	323	102	36	26	330	15	64	14	91	6	32	50	15	39
18 Infectious, parasitic diseases	47,431	1.32	4.80	3,299	117	383	1,004	245	106	78	295	168	132	133	227	7	89	162	13	139
19 Mental disorders	65,364	1.82	7.38	3,605	278	512	1,458	61	24	144	85	10	52	71	303	3	127	227	8	242
20 Alcohol/drug disorders	18,895	0.53	3.69	1,931	104	241	695	70	22	52	60	22	22	155	139	1	73	112	2	161
21 Injuries and poisoning	105,315	2.93	2.81	2,389	88	214	503	97	83	68	97	319	292	193	143	24	75	114	11	67
22 Burns	5,689	0.16	5.43	5,335	169	424	1,712	170	39	263	286	613	412	147	563	67	126	210	19	117
23 Health factors/contacts	91,669	2.55	3.72	1,908	102	211	539	44	29	207	60	10	202	21	163	19	67	128	25	82
24 Error DRGs	11,983	0.33	8.19	6,091	218	601	1,709	247	260	189	342	400	714	85	473	91	163	287	46	266
Total	3,596,739	100.0	3.35	2,488	95	266	660	104	70	61	128	177	302	71	192	45	74	120	26	97

Note: Abbreviations: MDC—Major Diagnostic Category, DRG—Diagnosis Related Group, ALOS—average length of stay, OR—operating room, Pros—prosthetics, Deprec—depreciation, SPS—specific procedure suites.

Table A10.8: Core and overhead costs by component, public hospitals, AR-DRGs version 4.1, 1998–99

Component	Core cost		Overhead cost		Total cost	
	\$	%	\$	%	\$	%
Ward medical	215	12.04	51	7.24	266	10.69
Ward nursing	514	28.80	146	20.74	660	26.53
Pathology	86	4.82	18	2.56	104	4.18
Imaging	58	3.25	12	1.70	70	2.81
Allied health	47	2.63	14	1.99	61	2.45
Pharmacy	107	5.99	21	2.98	128	5.14
Critical care	140	7.84	37	5.26	177	7.11
Operating rooms	238	13.33	64	9.09	302	12.14
Emergency department	53	2.97	18	2.56	71	2.85
Supplies	110	6.16	82	11.65	192	7.72
Prostheses	41	2.30	4	0.57	45	1.81
Depreciation	32	1.79	42	5.97	74	2.97
Staff on-cost	59	3.31	61	8.66	120	4.82
Specific procedure suites	19	1.06	7	0.99	26	1.05
Hotel	32	1.79	63	8.95	95	3.82
Other	33	1.85	64	9.09	97	3.90
Total	1,785	100.00	704	100.00	2,488	100.00

Table A10.9: Percentage of total costs by component, public hospitals, AR-DRGs version 4.1, 1998–99

Component	Core cost %	Overhead cost %	Total cost %
Ward medical	8.64	2.05	10.69
Ward nursing	20.66	5.87	26.53
Pathology	3.46	0.72	4.18
Imaging	2.33	0.48	2.81
Allied health	1.89	0.56	2.45
Pharmacy	4.30	0.84	5.14
Critical care	5.63	1.49	7.11
Operating rooms	9.57	2.57	12.14
Emergency department	2.13	0.72	2.85
Supplies	4.42	3.30	7.72
Specific procedure suites	1.65	0.16	1.81
Prostheses	1.29	1.69	2.97
Depreciation	2.37	2.45	4.82
On-costs	0.76	0.28	1.05
Hotel	1.29	2.53	3.82
Other	1.33	2.57	3.90
Total			100.00

Table A10.10: NHCDC average cost per separation, private hospitals, 1996–97 to 1998–99

	Round 1 (1996–97, Version 3.1)	Round 2 (1997–98, Version 4.0)	Round 3 (1998–99, Version 4.1)
Average cost per separation	2,060	1,932	1,870
Average length of stay	3.60	3.57	3.32
Population separations	1,651,467	1,507,579	1,547,755

Table A10.11: NHCDC sample private hospital participation rate relative to population hospitals, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)

	Round 1 (1996–97)	Round 2 (1997–98)	Round 3 (1998–99)
Sample hospitals	22	46	52
% increase		109	13
Population hospitals	302	271	271
% sample to population	7	17	19

Note: The change in population hospitals from Round 1 (1996–97) to Round 2 (1997–98) was due to a change in hospitals in scope from bed size of 15 to separations exceeding 200 to more accurately reflect throughput.

Table A10.12: Separations for sample private hospitals and overall population hospitals, States and Territories, Round 1 (1996–97), Round 2 (1997–98) and Round 3 (1998–99)

	Round 1 (1996–97)		Round 2 (1997–98)		Round 3 (1998–99)				
	Sample	Sample as % of	Sample	Sample as % of	Sample	Sample as % of			
		Population		Population		Population	Population		
Total	244,455	1,651,467	15	482,115	1,507,579	32	381,629	1,547,755	25

Table A10.13: Number of DRGs by standard error range, private hospitals, AR-DRGs, version 4.1, 1998–99

Standard error	Number of DRGs	Separations	% of DRGs	% of total separations
0.010–0.039	60	98,678	9.1	6.4
0.040–0.099	198	1,021,083	30.0	66.0
0.100–0.149	112	201,733	16.9	13.0
0.150–0.199	65	87,377	9.8	5.6
0.200–0.399	127	105,984	19.2	6.8
0.400 +	99	32,902	15.0	2.1
Total	661	1,547,757	100.0	100.0

Table A10.14: Average component costs by Major Diagnostic Category, private hospitals, AR-DRGs version 4.1, 1998–99

Major Diagnostic Category	Separations			Average cost per separation (\$)	Average DRG component cost (\$)															
	Number	ALOS % (days)	ALOS (days)		Hotel	Ward Med	Ward Nurs	Path	Imag	Allied	Pharm	Critic-al	OR	Emerg Dept	Supp- lies	Pros	Dep- rec	On- Costs	SPS	Other
0 Pre MDC	1,265	0.08	26.48	40,621	2,433	195	5,240	0	79	147	787	21,194	2,234	31	1,747	307	3,096	2,123	917	93
1 Nervous systems disorders	54,946	3.55	5.67	2,552	217	37	971	0	10	37	33	221	421	14	223	36	149	150	21	12
2 Eye disorders	76,085	4.92	1.16	1,419	82	13	207	0	11	1	8	3	683	11	117	122	83	73	2	2
3 Ear, nose and throat disorders	116,385	7.52	1.33	1,222	100	15	288	0	5	3	13	24	481	14	106	30	60	65	12	7
4 Respiratory disorders	70,052	4.53	5.31	1,911	187	17	867	0	9	7	42	130	104	13	176	13	128	122	73	23
5 Circulatory disorders	110,667	7.15	4.43	3,025	160	48	767	0	64	8	39	543	425	16	211	86	229	164	254	10
6 Digestive disorders	245,363	15.85	2.28	1,273	109	13	373	0	9	3	18	66	376	11	96	34	73	69	18	6
7 Hepatobiliary/pancreas disorders	26,236	1.70	4.19	2,617	208	18	724	0	21	4	36	131	774	19	251	87	163	142	27	12
8 Musculoskeletal /connective tissue disorders	210,843	13.62	4.25	2,828	181	26	764	0	10	34	30	60	757	10	238	410	128	147	21	10
9 Skin, tissue, breast disorders	89,246	5.77	2.73	1,673	149	19	477	0	4	9	23	20	599	10	143	14	90	98	13	7
10 Endocrine, nutritional and metabolic disorders	14,063	0.91	4.91	2,648	210	29	852	0	11	11	40	175	645	11	233	93	163	146	16	12
11 Kidney, urinary tract disorders	103,753	6.70	1.84	938	71	12	262	0	6	2	14	35	230	8	122	16	49	53	53	5
12 Male reproductive disorders	28,641	1.85	2.64	1,504	121	19	449	0	7	3	18	37	488	5	120	29	94	90	16	8
13 Female reproductive disorders	70,207	4.54	2.62	1,617	147	15	423	0	10	2	20	17	539	25	163	30	117	88	11	9
14 Pregnancy, childbirth and puerperium	58,898	3.81	4.37	2,219	230	11	1,083	0	11	6	27	22	187	69	193	15	132	176	2	55
15 Newborns and other neonates	12,420	0.80	5.25	1,894	211	27	903	0	8	5	9	31	47	7	224	7	205	136	2	71
16 Blood disorders	14,400	0.93	2.47	1,072	89	9	420	0	11	5	31	48	178	11	105	13	78	61	8	5
17 Neoplastic disorders	53,079	3.43	1.82	896	64	4	281	0	26	6	58	31	168	13	87	30	75	38	8	5
18 Infectious, parasitic diseases	9,306	0.60	6.09	2,244	226	21	1,009	0	11	11	61	192	160	22	213	12	146	132	14	14
19 Mental disorders	16,718	1.08	5.29	1,492	94	10	915	0	5	17	15	11	69	5	104	4	45	136	2	60
20 Alcohol/drug disorders	9,715	0.63	3.53	1,070	25	4	699	0	0	1	8	6	36	2	112	0	51	72	37	16
21 Injuries and poisoning	17,191	1.11	3.75	1,874	159	17	678	0	10	12	26	118	383	24	172	28	110	107	20	10
22 Burns	274	0.02	5.74	2,174	195	9	1,147	0	3	60	47	36	200	18	205	2	72	173	5	3
23 Health factors/contacts	118,433	7.65	4.97	1,702	128	46	600	0	2	409	11	15	96	3	169	5	47	140	5	26
24 Error DRGs	19,570	1.26	3.78	2,966	298	14	916	0	6	67	70	190	551	70	271	149	134	142	81	7
Total	1,547,755	100	3.32	1,870	142	21	568	0	13	42	25	108	422	15	161	88	106	108	38	13

Note: Abbreviations: MDC—Major Diagnostic Category, DRG—Diagnosis Related Group, ALOS—average length of stay, OR—operating room, Pros—prosthetics, Deprec—depreciation, SPS—specific procedure suites.

Table A10.15: Core and overhead costs by component, private hospitals, AR-DRGs version 4.1, 1998–99

Component	Core cost		Overhead cost		Total cost	
	\$	%	\$	%	\$	%
Ward medical	17	1.44	4	0.58	21	1.12
Ward nursing	404	34.24	164	23.77	568	30.37
Pathology	0	0.00	0	0.00	0	0.00
Imaging	10	0.85	3	0.43	13	0.70
Allied health	29	2.46	13	1.88	42	2.25
Pharmacy	22	1.86	3	0.43	25	1.34
Critical care	77	6.53	31	4.49	108	5.78
Operating rooms	296	25.08	127	18.41	423	22.62
Emergency department	11	0.93	4	0.58	15	0.80
Supplies	61	5.17	100	14.49	161	8.61
Prostheses	74	6.27	15	2.17	89	4.76
Depreciation	44	3.73	61	8.84	105	5.61
Staff on-cost	74	6.27	34	4.93	108	5.78
Specific procedure suites	28	2.37	10	1.45	38	2.03
Hotel	27	2.29	116	16.81	143	7.65
Other	8	0.68	5	0.72	13	0.70
Total	1,180	100.00	690	100.00	1,870	100.00

Table A10.16: Percentage of total costs by component, private hospitals, AR-DRGs version 4.1, 1998–99

Component	Core cost %	Overhead cost %	Total cost %
Ward medical	0.91	0.21	1.12
Ward nursing	21.60	8.77	30.37
Pathology	0.00	0.00	0.00
Imaging	0.53	0.16	0.70
Allied health	1.55	0.70	2.25
Pharmacy	1.18	0.16	1.34
Critical care	4.12	1.66	5.78
Operating rooms	15.83	6.79	22.62
Emergency department	0.59	0.21	0.80
Supplies	3.26	5.35	8.61
Specific procedure suites	3.96	0.80	4.76
Prostheses	2.35	3.26	5.61
Depreciation	3.96	1.82	5.78
On-costs	1.50	0.53	2.03
Hotel	1.44	6.20	7.65
Other	0.43	0.27	0.70
Total			100.00

Appendix 11: Public hospital peer groups

When making comparisons it is useful if the units being compared have been grouped into categories so that variation in the variable of interest is explained by the attributes defining the group (Hindle 1999). The peer groups in this publication are designed to explain variability in the average cost per casemix-adjusted separation and to group hospitals into broadly similar groups in terms of their range of admitted patient activities.

It is also helpful to understand why there are differences in cost between peer groups. Understanding why the average cost per casemix-adjusted separation is more in one group of hospitals than another aids interpretation of benchmarking information.

The Australian Institute of Health and Welfare worked with the National Health Ministers' Benchmarking Working Group (NHMBWG) to develop the initial national hospital peer group classification. This work was overseen by the NHMBWG and was undertaken in consultation with State and Territory health authorities. The Institute chaired a subcommittee consisting of representatives from New South Wales Health, the Queensland Health Department and the Victorian Healthcare Association to develop the classification further. A draft paper was prepared and circulated to the members of that subcommittee and comments were received from the members. Subsequently, the NHMBWG was replaced by the National Health Performance Committee. After consultation and discussion within the National Health Performance Committee the attached classification was developed. The NHPC in its meeting of 29 March 2000 approved the attached classification. The NHPC determined that although teaching status had superior statistical performance in explaining variation in the cost per casemix-adjusted separation, the difficulties inherent in the definition of teaching hospital, together with the associated policy issues, made classification by size a better option. However, it was decided that teaching hospitals would be reported on 'below the line' as a separate category.

Existing classifications

There are a number of existing classifications and approaches that are currently used to group hospitals. The following classifications were analysed for their applicability in the national context:

- national peer groups as defined by the NHMBWG;
- the National Hospital Cost Data Collection peer groups;
- New South Wales' Hospital Peer Groups (NSW Health 1999);
- Victorian peer groups used in the Victorian Hospital Comparative Data/Rainbow Hospital Indicators series (Victorian Hospitals' Association to 1996 and subsequently Department of Human Services Victoria 1999);
- a number of groupings used in a variety of South Australian studies;
- other approaches including geographic and cluster analysis approaches; and
- international descriptions of hospitals.

In addition, there are ad hoc groups of hospitals formed within and across jurisdictions for the purposes of benchmarking where certain policy or other criteria form the basis of the group. For example, small remote hospitals have been formed into collaborative groups in Queensland to facilitate benchmarking.

One method for generating peer groups adopts a cluster analysis approach that uses average distance metrics on hospitals' DRG profiles to generate peer groups, to select closest pairs and to analyse the performance of peer groups generated using other methods. New South Wales used this approach to analyse the performance of its peer groupings (Aisbet 1998). The use of the DRG profiles in this manner has shown that factors such as hospital size and teaching status do not always detect similar peers on the basis of the proportional DRG profile (Diers et al, 1998). A cluster-based approach such as this can be used on any set of dimensions, such as the DRG profile, the age profile or the ICD-9-CM chapter profile of the hospital to determine the distance measurement. There is no limitation on the number of classes that can be derived.

Internationally, teaching hospital status, hospital size (based on number of beds or separations) and membership of associations are frequently used in describing hospitals and as a consequence describing the class of peers to which the hospital belongs.

A note on hospital networks

Networking of hospitals by some jurisdictions has made it impossible to determine classification and performance indicator information at the campus level for some indicators using the information available to the Institute. The extent of this problem varies across jurisdictions as networks vary in size and scope. The jurisdiction most affected by this is Victoria. Some networks consist of a single large hospital with small satellite units, others consist of hospitals that are co-located within very close geographical proximity and other networks consist of large hospitals within a wider geographic region. Conversely there are some hospitals that are located within other hospitals. The level of data that is available on networks and campuses is also variable. For example, in the National Public Hospital Establishments Database held by the Institute, some networks have activity and bed data at the campus level and expenditure data at the network level. Other networks only have single records provided at the network level. In other databases such as the National Hospital Cost Data Collection, the level at which data are held may be at a different level of aggregation so hospitals which are separately identified in one collection may be held at a network level in the other and vice versa.

At this stage, networks have been grouped based on the available characteristics, and are treated as a single hospital. This is consistent with the approach taken for the *Third National Report on Health Sector Performance Indicators* (NHMBWG 1999).

Parameters considered

A number of parameters were considered as potential classification variables, including:

- size;
- resource intensity and acuity;
- demographic characteristics of major patient groups, e.g. Women's and children's, Aboriginal and Torres Strait Islander status;

- specialty, role and clinical expertise;
- geography, e.g. rurality and remoteness;
- teaching and research status; and
- proportions of acute, rehabilitation, palliative care and non-acute patients treated.

The correlation between the average cost per casemix-adjusted separation and the above variables was analysed using the SAS generalised linear modelling procedure to perform various analyses of variance. This analysis showed that although size was one of the more frequently used variables in hospital classification it was relatively poor at explaining variance in cost. Rural hospitals have slightly lower costs per casemix-adjusted separation than metropolitan hospitals, but remote hospitals have higher costs per casemix-adjusted separation. Teaching hospitals have higher costs per casemix-adjusted separation than non-teaching hospitals; women's and children's hospitals are also relatively higher in cost per casemix-adjusted separation.

Teaching status, as defined in the NHDD (NHDC 1999), identifies those hospitals for which teaching (associated with a university) is a major program activity of the establishment. It is primarily intended to relate to teaching hospitals affiliated with universities providing undergraduate medical education as advised by the relevant State or Territory health authority.

Use of teaching status or university hospital in the description and classification of hospitals is widespread throughout hospital-based literature. The classification of hospitals into teaching and non-teaching is probably a proxy measure of the expertise of the clinical staff and hence a proxy measure of the complexity of the cases referred to them, complexity that may not be fully accounted for by the DRG weighting process. The amount of research being undertaken can be understood in a similar manner. It is also possible that the level of innovation and research undertaken in teaching institutions is driving higher costs, leading to better outcomes and other improvements in care over the longer term.

Only if a hospital teaches medical students is it classified as a teaching hospital (NHDC 1999). Given that the salary payments to medical staff (including VMOs) account for less than a quarter of the public hospital system's total salary payments, this leads to teaching activity by other health professionals being less acknowledged as a possible classification variable.

There are some teaching hospitals that appear atypical of the group, including four hospitals with less than 10,000 acute casemix-adjusted separations per annum. The strict delineation between what is and what is not a teaching hospital remains problematic. A definition based on the number of RMOs or teaching staff may be more appropriate than the existing definition, especially as more rural hospitals become involved in programs such as the Rural Health Support Education and Training grants.

Teaching hospitals account for over half of the expenditure in the public hospital system. In the future it may be advantageous therefore to investigate splitting this group into two as in earlier editions of the Victorian rainbow book (VHA 1996). Unfortunately this also may lead to there being too few hospitals in some jurisdictions in the terminal classes to perform inter-state comparisons.

Defining the classification

The hospital peer classification is summarised below. These peer groups have been allocated names that are broadly descriptive of the types of hospitals included in each category.

National peer group classification

Peer group	Definition
A Principal referral	<p>A1 Metropolitan hospitals with >20,000 acute casemix-adjusted separations and rural hospitals with >16,000 acute casemix-adjusted separations per annum.</p> <p>A2 Specialised acute women's and children's hospitals with >10,000 acute casemix-adjusted separations per annum, possible further sub-groups for:</p> <p style="padding-left: 40px;">A2.1 Obstetric and women's specialist</p> <p style="padding-left: 40px;">A2.2 Women's and children's</p> <p style="padding-left: 40px;">A2.3 Paediatric specialist</p>
A9 Un-peered and other	Prison medical services, special circumstance hospitals, hospitals, metropolitan hospitals with <2,000 acute casemix-adjusted separations, hospitals with < 200 separations, etc.
B Major	<p>B1 Metropolitan acute hospitals treating more than 10,000 acute casemix-adjusted separations per annum.</p> <p>B2 Rural acute hospitals treating >8,000 acute casemix-adjusted separations per annum and remote hospitals with > 5,000 casemix-weighted separations.</p>
C Medium	<p>C1 Medium group 1 acute hospitals, treating between 5,000 and 10,000 acute casemix-adjusted separations per annum.</p> <p>C2 Medium group 2 acute hospitals, treating between 2,000 and 5,000 acute casemix-adjusted separations per annum, plus acute hospitals treating < 2,000 casemix-adjusted separations per annum but with >2,000 separations per annum.</p>
D Small hospitals	<p>D1 Small rural acute hospitals (mainly small country town hospitals) acute hospitals treating <2,000 separations per annum, and with less than 40% non-acute and outlier patient days of total patient days.</p> <p>D2 Small non-acute hospitals, treating <2,000 separations per annum, and with more than 40% non-acute and outlier patient days of total patient days. (Community non-acute).</p> <p>D3 Small remote hospitals (<5,000 acute casemix-weighted separations but not 'MPS' and not 'community non-acute'). Most are <2,000 separations.</p>
E Sub- and non-acute	<p>For this category, a majority of patient days are generally accounted for by rehabilitative, palliative care and non-acute patients:</p> <p>E1 Residential aged care facilities—not in scope of collection</p> <p>E2 Multi-purpose services</p> <p>E3 Hospices</p> <p>E4 Rehabilitation</p> <p>E5 Mothercraft</p>
E6	Other non-acute (e.g. geriatric treatment centres combining rehabilitation and palliative care with a few acute patients).
F	Psychiatric

There are a number of hospitals that are clearly able to be identified as specialty hospitals which are homogenous, numerous and undertake enough activity to justify the existence of a separate group. Groupings are generally proposed for:

- Sub- and non-acute, with sub-groups for:
 - Residential aged care facilities

- multi-purpose services
- hospices
- rehabilitation hospitals
- mothercraft hospitals
- other sub-acute (eg geriatric care centres providing a mix of rehabilitation and nursing home type care)
- Psychiatric
- Large specialised acute women's and children's hospitals
- Un-peered and other.

There are a number of issues that may need further consideration in the grouping and sub-grouping of some of these hospital types. In particular:

- The average length of stay in public psychiatric hospitals ranged from 345.1 days in Queensland to 19.1 days in Victoria (Table 4.2). This indicates that, as a national category, psychiatric hospitals may be more appropriately treated as separate groups such as acute, long term, psychogeriatric and forensic hospitals, all of which belong to different higher level groupings.
- The multi-purpose service (MPS) category is based on a legal definition rather than an operational one. The hospitals in this category are classified as such because they are part of a multi-purpose service health program. As a result some of the hospitals are whole MPSs, some are only the hospital part of an MPS and some are hospitals that are part of networks that are MPSs. This leads to some inconsistencies across jurisdictions.
- The identification of specialist women's and children's hospitals was restricted to align with the definition of principal referral hospitals that they are most similar to in level of expertise. This was done using a size boundary of 10,000 separations. The remaining small women's and children's hospitals (with the exception of the Mothercraft hospitals) were classified according to size.
- The 'un-peered and other' group is not a uniform group as it is a catch-all group for hospitals that do not have any logical peers. This group mainly contains hospitals that are unusual in some respect, for example, prison medical services, dental hospitals, small women's hospitals and the hospitals with less than 200 separations (which do not have stable data in any year because of their small turnover). This group also contains hospitals in unusual circumstances; for example, hospitals affected by major fires, floods or earthquakes, and hospitals in their last year of operation.
- Small hospitals are divided into acute and non-acute by examining the proportion of patient days that relates to: patients other than acute; and outlier patient days. If the proportion of 'patient days other than acute and outlier patient days' is over 40% the hospital is classified as a non-acute hospital. The trim points were determined on the basis of 1.5 inter-quartile ranges from the third quartile, with a global minimum trim point of 3 days and a global maximum of 60 days. This is to say that AR-DRGs with an inter-quartile range of 0 (usually due to a predominance of same day cases, e.g. dialysis) were assigned a trim point of 3 days, and where the trim point would have exceeded 60 days the trim point was set to 60 days. This is the method used in the Casemix Standards for New South Wales 1998–99 (New South Wales Health 1998) to determine outlier days.

After separating off the specialised hospitals, size and teaching status are the most consistently used parameters for determining boundaries in peer groupings of hospitals. Our analysis has shown that grouping hospitals by size is more in agreement with cluster

analysis of activity statistics rather than basing the top of the hierarchy on teaching status. This indicates that this grouping is better than teaching status at selecting a homogenous group in terms of the range of services provided by the hospital, ie the range of services provided. Teaching status on the other hand is better at explaining the cost per casemix-adjusted separation.

The 6 teaching hospitals that do not group to the *Very large metropolitan (>20,000 acute weighted separations)* & *rural (>16,000 acute weighted separations)* group include some hospitals that clearly do not appear to be similar in size, activity or structure to the remainder of the teaching hospitals. The 11 hospitals that are very large in size but are not teaching hospitals were split evenly between metropolitan and rural areas.

One important feature is that the 20,000 acute weighted separation barrier effectively divides a majority of teaching and non-teaching hospitals. Seventy-seven per cent of teaching hospitals are larger than 20,000 acute casemix-adjusted separations and vice versa. It is surprising then to note that the size classification performed so poorly in the analysis of variance for cost per casemix-adjusted separation when teaching status performed so well.

The NHPC in its meeting of 29 March 2000 determined that, although teaching status had superior statistical performance in explaining variation in the cost per casemix-adjusted separation, the difficulties inherent in the definition of teaching hospital, together with the policy issues, made classification by size a better option. In particular there was a degree of discussion about the reasons why teaching hospitals were apparently more expensive than non-teaching hospitals, though no definitive answer was given. (This reflects the general controversy over why teaching hospitals are more expensive.) As a compromise, due to statistical and policy considerations, it was decided that teaching hospitals would be reported on below the total line in addition to above the line in the peer groups.

In the preparation of *Australian Hospital Statistics 1997-98* (AIHW 1999a) it was accepted by all jurisdictions that the hospitals satisfying the New South Wales definition of 'community non-acute' hospitals should be excluded from the calculation of cost per casemix-adjusted separation. It is clear that the current methodology does not provide an accurate casemix-adjustment for the activity of these hospitals.

This peer group classification seems to perform reasonably well at explaining cost but there remains some room for improvement. Unavoidably, the largest hospitals in peer group C1 ('medium group 1 acute hospitals') are probably more similar to the smallest hospitals in peer groups B1 ('metropolitan acute hospitals') than they are to the smallest hospitals in peer group C ('medium acute hospitals'). Another question raised by these data is whether the 'un-peered and other' category needs to be further split and added to. Some of the groups can be identified clearly (eg metropolitan hospitals with <2,000 separations and all hospitals with <200 separations). There are other examples in the New South Wales' classification added to their 'other' group which seem to have been based on having unusual clinical profiles. These would have to be identified through a more rigorous process.

A number of hospitals may or may not be in the correct groupings due to their individual circumstances. For example, a 5,000 separation public hospital co-located with a 5,000 separation private hospital may be more similar to a stand-alone 10,000 separation public hospital than a stand-alone 5,000 separation public hospital.

There have been 3 manual assignments. In Victoria, the New Latrobe Regional hospital was scaled up the classification to the principal referral peer group as it operated for only 10 months. The old Latrobe Regional hospital was re-assigned to the 'unpeered and other' category as it operated for only a few months and its statistics would have been unduly affected by wind up items. In New South Wales, Springwood hospital was reassigned as a

small acute rural hospital even though it was a technically in a metropolitan area as it is on the very outer urban fringe and is more like a small rural hospital than a small metropolitan hospital.

There is some inconsistency in the use of the rurality and remoteness indicators within the classification. There is no rurality split at the top (A level) of the hierarchy. In the 'major' group (hospitals of >10,000 acute casemix-adjusted separations), hospitals are split by rurality, and then amongst small hospitals we have effectively taken the small metropolitan hospitals out and created a separate group for the remote small hospitals. There is no rurality split in the medium-sized group of hospitals (2,000–10,000 acute casemix-adjusted separations).

The boundary of 20,000 acute casemix-adjusted separations was chosen for consistency with the earlier national peer group classification. The New South Wales classification uses a 25,000 acute weighted separation limit. There are 10 hospitals between the 20,000 acute casemix-adjusted separations and 25,000 acute weighted separation limits. The limit for rural hospitals was set at 16,000 as comparison of the data against the results of the cluster analysis indicated that rural hospitals provided a wider range of services.

Table A11.1 shows the variation within and between the different peer groups. Table A11.2 reports the data at the individual State level.

Victorian data are not as comparable as other jurisdictions as for example the Victorian metropolitan networks are all classified as Principal referral and teaching hospitals. In reality the networks also contain a variety of smaller hospitals which are neither principal referral nor teaching as well as the principal referral and teaching hospitals. The Victorian psychiatric hospital is a forensic psychiatric hospital and is not strictly comparable with the major psychiatric hospitals.

The Western Australian psychiatric hospitals are a mix of one major psychiatric teaching hospital and four psychogeriatric centres. The Western Australian psychiatric teaching hospital was not counted with the rest of the Teaching hospital group in line with the scope of the cost per casemix-adjusted separation calculations.

Confidentialisation

Data have been confidentialised by suppressing detail data. Data for 4 South Australian hospitals, all 3 Australian Capital Territory hospitals, the Victorian psychiatric hospital and 1 Tasmanian record were suppressed by placing a 'n.p.' over the financial information. The data for the Specialised Women's & children's hospitals in Western Australia and South Australia was confidentialised by putting a 'n.p.' over the data financial information at the detail level and only reporting the 'Total principal referral and specialised women's & children's hospitals' lines.

In addition a few small hospitals with missing expenditure data were excluded (1 in Western Australia, 2 in New South Wales and all except the 3 major hospitals in Tasmania).

Table A11.1: Average costs^(a) and selected parameters by hospital peer group, Australia, ^(b) 1998–99

	Number of Establishments	Average beds	Average separations	Average cost weight	Cost per separation	Cost per patient day	Average length of stay	Total expenditure (\$'000)	Cost per casemix-adjusted separation (\$)		
									Average	Q3	Q1
Principal referral. -Metropolitan (>20,000 separations) & rural (>16,000 separations)	49	515	45,210	1.06	2,749	722	3.8	8,073,877	2,661	2,925	2,338
Mothers' & children's >10,000 separations	10	249	23,715	1.02	2,740	898	3.1	904,759	2,774	2,981	2,451
<i>Total principal referral</i>	<i>59</i>	<i>470</i>	<i>41,567</i>	<i>1.06</i>	<i>2,748</i>	<i>736</i>	<i>3.7</i>	<i>8,978,635</i>	<i>2,671</i>	<i>2,957</i>	<i>2,388</i>
Large metropolitan, >10,000 separations	20	171	14,743	1.00	2,269	615	3.7	880,216	2,353	2,660	2,016
Large rural (>8,000 separations) & remote (>5,000 separations)	20	156	13,254	0.89	2,200	643	3.4	769,111	2,512	2,836	2,215
<i>Total other large metro and rural</i>	<i>40</i>	<i>163</i>	<i>13,998</i>	<i>0.95</i>	<i>2,236</i>	<i>627</i>	<i>3.6</i>	<i>1,649,327</i>	<i>2,424</i>	<i>2,756</i>	<i>2,069</i>
Medium 5,000–10,000 separations	31	95	7,611	0.90	2,263	650	3.5	710,081	2,584	2,864	2,302
Medium 2,000–5,000 separations	73	51	3,646	0.81	1,871	544	3.4	642,191	2,387	2,630	2,049
<i>Total Medium</i>	<i>104</i>	<i>64</i>	<i>4,828</i>	<i>0.85</i>	<i>2,055</i>	<i>594</i>	<i>3.5</i>	<i>1,352,272</i>	<i>2,487</i>	<i>2,769</i>	<i>2,076</i>
Small rural acute <2,000 separations	103	24	1,055	0.83	1,900	444	4.3	273,469	2,355	2,807	2,023
Remote acute <5,000 separations	57	24	1,204	0.79	2,218	655	3.4	220,724	2,858	3,648	1,914
<i>Total Small rural and remote acute</i>	<i>160</i>	<i>24</i>	<i>1,108</i>	<i>0.82</i>	<i>2,023</i>	<i>514</i>	<i>3.9</i>	<i>494,193</i>	<i>2,545</i>	<i>2,977</i>	<i>2,011</i>
Small non-acute <2,000 separations	99	25	614	n.a.	2,859	285	10.0	213,747	n.a.	n.a.	n.a.
Muti-purpose service	44	19	483	n.a.	3,017	470	6.4	87,235	n.a.	n.a.	n.a.
Hospice	3	62	1,297	n.a.	6,434	535	12.0	32,057	n.a.	n.a.	n.a.
Rehabilitation	4	69	594	n.a.	16,428	530	31.0	49,958	n.a.	n.a.	n.a.
Mothercraft	7	26	1,850	n.a.	871	262	3.3	12,480	n.a.	n.a.	n.a.
Other non-acute	17	54	785	n.a.	7,674	394	19.5	142,655	n.a.	n.a.	n.a.
<i>Total non-acute (includes small non-acute)</i>	<i>174</i>	<i>28</i>	<i>659</i>	<i>n.a.</i>	<i>3,627</i>	<i>355</i>	<i>10.2</i>	<i>538,132</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
Unpeered and other acute (includes hospitals <200 separations)	114	8	218	n.a.	2,717	407	6.7	196,771	n.a.	n.a.	n.a.
Psychiatric ^(c)	19	153	1,009	n.a.	20,120	313	64.3	440,492	n.a.	n.a.	n.a.
Total	670	80	5,747	n.a.	2,662	634	4.2	13,649,821	n.a.	n.a.	n.a.
<i>Teaching hospitals (excluding psychiatric)</i>	<i>51</i>	<i>483</i>	<i>42,835</i>	<i>1.07</i>	<i>2,831</i>	<i>752</i>	<i>3.8</i>	<i>8,273,567</i>	<i>2,715</i>	<i>540</i>	<i>3,646</i>

(a) Expenditure data excludes depreciation.

(b) Excludes a few small hospitals with missing expenditure data: 1 in Western Australia, 2 in NSW and all except the 3 major hospitals in Tasmania. Victorian data reported at network level. Metropolitan networks contain many smaller, specialised and non-acute hospitals.

(c) Psychiatric hospitals consist of a mix of short term acute, long term, psychogeriatric and forensic psychiatric hospitals (see Appendix 11).

n.a. Not available.

Table A11.2: Average costs and selected data by hospital peer group, Australia^(a), 1998–99

	NSW	Vic ^(b)	QLD	WA	SA	Tas	ACT	NT	Total
Principal referral (>20,000 acute weighted separations) & rural (>16,000 acute weighted separations)									
Number of hospitals	17	11	11	3	3	2	1	1	49
Average beds per hospital	448	719	450	594	474	355	538	297	515
Separations per hospital	38,671	62,785	35,536	57,159	54,167	32,889	47,098	29,508	45,210
Average cost weight ^(c)	1.09	1.04	1.09	1.03	1.08	1.01	0.97	0.82	1.06
Cost per separation	2,999	2,490	2,729	n.p.	2,482	2,354	n.p.	n.p.	2,749
Cost per patient day	770	636	727	n.p.	735	649	n.p.	n.p.	722
Cost per casemix-adjusted separation	2,870	2,447	2,538	n.p.	2,349	2,427	n.p.	n.p.	2,661
Total expenditure (\$'000)	2,661,631	2,435,658	1,254,925	n.p.	499,749	214,800	n.p.	n.p.	8,073,877
Women's & children's >10,000 separations									
Number of hospitals	3	1	4	1	1	0	0	0	10
Average beds per hospital	174	511	163	489	311	..	..	..	249
Separations per hospital	18,299	58,084	13,429	36,865	33,588	..	..	..	23,715
Average cost weight ^(c)	1.04	1.02	1.03	1.07	0.94	..	..	..	1.02
Cost per separation	2,792	2,410	2,597	n.p.	n.p.	..	..	..	2,740
Cost per patient day	898	892	851	n.p.	n.p.	..	..	..	898
Cost per casemix-adjusted separation	2,850	2,451	2,579	n.p.	n.p.	..	..	..	2,774
Total expenditure (\$'000)	232,727	197,152	187,319	n.p.	n.p.	..	..	..	904,759
Total Principal referral and specialist Women's & children's									
Number of hospitals	20	12	15	4	4	2	1	1	59
Average beds per hospital	407	701	374	568	433	355	538	297	470
Separations per hospital	35,615	62,394	29,640	52,086	49,022	32,889	47,098	29,508	41,567
Average cost weight ^(c)	1.09	1.04	1.08	1.04	1.06	1.01	0.97	0.82	1.06
Cost per separation	2,983	2,484	2,713	3,198	2,521	2,354	n.p.	n.p.	2,748
Cost per patient day	778	650	740	859	765	649	n.p.	n.p.	736
Cost per casemix-adjusted separation	2,869	2,447	2,543	3,153	2,445	2,427	n.p.	n.p.	2,671
Total expenditure (\$'000)	2,894,358	2,632,810	1,442,244	841,638	622,386	214,800	n.p.	n.p.	8,978,635
Large metropolitan, >10,000 acute weighted separations									
Number of hospitals	13	0	3	0	3	0	1	0	20
Average beds per hospital	165	..	171	..	199	..	162	..	171
Separations per hospital	13,930	..	16,213	..	17,879	..	11,500	..	14,743
Average cost weight ^(c)	1.01	..	0.95	..	1.01	..	1.09	..	1.00
Cost per separation	2,305	..	1,711	..	2,415	..	n.p.	..	2,269
Cost per patient day	604	..	577	..	623	..	n.p.	..	615
Cost per casemix-adjusted separation	2,374	..	1,822	..	2,559	..	n.p.	..	2,353
Total expenditure (\$'000)	551,357	..	113,741	..	167,230	..	n.p.	..	880,216
Large rural (>8,000 acute weighted separations) & remote (>5,000 acute weighted separations)									
Number of hospitals	7	5	4	2	0	1	0	1	20
Average beds per hospital	162	149	177	116	..	136	..	160	156
Separations per hospital	13,146	13,628	14,733	9,890	..	8,313	..	17,886	13,254
Average cost weight ^(c)	0.96	0.91	0.81	0.83	..	1.13	..	0.70	0.89
Cost per separation	2,548	2,073	1,665	1,931	..	n.p.	..	n.p.	2,200
Cost per patient day	692	594	543	644	..	n.p.	..	n.p.	643
Cost per casemix-adjusted separation	2,733	2,335	2,054	2,345	..	n.p.	..	n.p.	2,512
Total expenditure (\$'000)	290,891	188,600	148,592	53,612	..	n.p.	..	n.p.	769,111
Total Large rural, remote and metropolitan									
Number of hospitals	20	5	7	2	3	1	1	1	40
Average beds per hospital	164	149	175	116	199	136	162	160	163
Separations per hospital	13,655	13,628	15,367	9,890	17,879	8,313	11,500	17,886	13,998
Average cost weight ^(c)	0.99	0.91	0.87	0.83	1.01	1.13	1.09	0.70	0.95
Cost per separation	2,387	2,073	1,686	1,931	2,415	n.p.	n.p.	n.p.	2,236
Cost per patient day	633	594	558	644	623	n.p.	n.p.	n.p.	627
Cost per casemix-adjusted separation	2,492	2,335	1,943	2,345	2,559	n.p.	n.p.	n.p.	2,424
Total expenditure (\$'000)	842,248	188,600	262,333	53,612	167,230	n.p.	n.p.	n.p.	1,649,327

(continued)

Table A11.2 (continued): Average costs and selected data by hospital peer group, Australia^(a), 1998–99

	NSW	Vic ^(b)	QLD	WA	SA	Tas	ACT	NT	Total
Medium 5,000 to 10,000 acute weighted separations									
Number of hospitals	11	5	4	7	4	0	0	0	31
Average beds per hospital	91	84	91	121	78	..	..	..	95
Separations per hospital	7,253	7,493	6,610	8,944	7,405	..	..	..	7,611
Average cost weight ^(c)	0.98	0.89	0.89	0.81	0.87	..	..	..	0.90
Cost per separation	2,620	2,035	1,881	2,190	2,086	..	..	..	2,263
Cost per patient day	719	638	602	581	664	..	..	..	650
Cost per casemix-adjusted separation	2,775	2,334	2,140	2,734	2,448	..	..	..	2,584
Total expenditure (\$'000)	280,873	100,492	74,945	173,802	79,970	..	..	..	710,081
Medium 2,000 to 5,000 acute weighted separations									
Number of hospitals	29	16	14	5	9	0	0	0	73
Average beds per hospital	54	51	48	42	52	..	..	..	51
Separations per hospital	3,590	3,646	3,978	3,073	3,630	..	..	..	3,646
Average cost weight ^(c)	0.8	0.8	0.7	0.8	0.9	..	..	..	0.8
Cost per separation	2,273	1,731	1,226	2,099	1,834	..	..	..	1,871
Cost per patient day	584	546	426	620	531	..	..	..	544
Cost per casemix-adjusted separation	2,818	2,169	1,784	2,618	2,151	..	..	..	2,387
Total expenditure (\$'000)	305,308	129,712	95,573	41,580	70,018	..	..	..	642,191
Total Medium									
Number of hospitals	40	21	18	12	13	0	0	0	104
Average beds per hospital	64	59	58	88	60	..	..	..	64
Separations per hospital	4,597	4,562	4,563	6,498	4,792	..	..	..	4,828
Average cost weight ^(c)	0.90	0.85	0.76	0.81	0.87	..	..	..	0.85
Cost per separation	2,424	1,850	1,437	2,172	1,954	..	..	..	2,055
Cost per patient day	640	582	486	588	591	..	..	..	594
Cost per casemix-adjusted separation	2,799	2,237	1,923	2,712	2,292	..	..	..	2,487
Total expenditure (\$'000)	586,180	230,204	170,518	215,382	149,987	..	..	..	1,352,272
Small rural acute <2,000 acute weighted separations less than 40% not acute or outlier beddays									
Number of hospitals	27	28	15	16	17	0	0	0	103
Average beds per hospital	29	20	19	20	28	..	..	..	24
Separations per hospital	1,351	1,051	921	646	1,094	..	..	..	1,055
Average cost weight ^(c)	0.84	0.84	0.81	0.80	0.86	..	..	..	0.83
Cost per separation	2,047	1,795	1,700	2,152	1,787	..	..	..	1,900
Cost per patient day	420	411	547	603	424	..	..	..	444
Cost per casemix-adjusted separation	2,537	2,200	2,143	2,754	2,193	..	..	..	2,355
Total expenditure (\$'000)	100,118	66,760	32,498	35,654	38,438	..	..	..	273,469
Remote acute <5,000 acute weighted separations									
Number of hospitals	5	0	26	19	4	0	0	3	57
Average beds per hospital	29	..	23	25	19	..	..	37	24
Separations per hospital	1,407	..	990	1,355	649	..	..	2,497	1,204
Average cost weight ^(c)	0.70	..	0.77	0.81	0.79	..	..	0.85	0.79
Cost per separation	1,806	..	1,720	2,696	2,111	..	..	2,712	2,218
Cost per patient day	399	..	535	839	674	..	..	753	655
Cost per casemix-adjusted separation	2,610	..	2,267	3,369	2,711	..	..	3,226	2,858
Total expenditure (\$'000)	17,905	..	72,455	93,936	7,875	..	..	28,553	220,724
Total small rural and remote acute									
Number of hospitals	32	28	41	35	21	0	0	3	160
Average beds per hospital	29	20	21	23	26	..	..	37	24
Separations per hospital	1,360	1,051	965	1,031	1,009	..	..	2,497	1,108
Average cost weight ^(c)	0.81	0.84	0.79	0.80	0.85	..	..	0.85	0.82
Cost per separation	2,008	1,795	1,713	2,540	1,827	..	..	2,712	2,023
Cost per patient day	417	411	539	766	447	..	..	753	514
Cost per casemix-adjusted separation	2,546	2,200	2,223	3,198	2,249	..	..	3,226	2,545
Total expenditure (\$'000)	118,023	66,760	104,953	129,590	46,314	..	..	28,553	494,193

(continued)

Table A11.2 (continued): Average costs and selected data by hospital peer group, Australia^(a), 1998–99

	NSW	Vic ^(b)	QLD	WA	SA	Tas	ACT	NT	Total
Small non-acute <2,000 acute weighted separations more than 40% not acute or outlier bed days									
Number of hospitals	39	5	33	4	18	0	0	0	99
Average beds per hospital	25	23	24	20	30	..	..	..	25
Separations per hospital	555	686	693	403	626	..	..	..	614
Cost per separation	3,550	2,220	2,354	4,306	2,547	..	..	..	2,859
Cost per patient day	280	239	335	499	222	..	..	..	285
Total expenditure (\$'000)	91,435	10,851	66,851	9,233	35,378	..	..	..	213,747
Multi-purpose service									
Number of hospitals	15	6	5	17	1	0	0	0	44
Average beds per hospital	21	16	16	17	54	..	..	..	19
Separations per hospital	319	944	663	403	634	..	..	..	483
Cost per separation	4,401	2,096	2,005	3,191	n.p.	..	..	..	3,017
Cost per patient day	303	553	446	880	n.p.	..	..	..	470
Total expenditure (\$'000)	26,648	16,821	8,963	31,545	n.p.	..	..	..	83,977
Hospice									
Number of hospitals	3	0	0	0	0	0	0	0	3
Average beds per hospital	62	..	..	..	..	..	..	..	62
Separations per hospital	1,297	..	..	..	..	..	..	..	1,297
Cost per separation	6,434	..	..	..	..	..	..	..	6,434
Cost per patient day	535	..	..	..	..	..	..	..	535
Total expenditure (\$'000)	32,057	..	..	..	..	..	..	..	32,057
Rehabilitation									
Number of hospitals	3	0	0	0	1	0	0	0	4
Average beds per hospital	46	..	..	..	140	..	..	..	69
Separations per hospital	468	..	..	..	971	..	..	..	594
Cost per separation	20,594	..	..	..	n.p.	..	..	..	16,428
Cost per patient day	733	..	..	..	n.p.	..	..	..	530
Total expenditure (\$'000)	35,381	..	..	..	n.p.	..	..	..	49,958
Mothercraft									
Number of hospitals	2	3	0	0	1	0	1	0	7
Average beds per hospital	35	28	..	..	15	..	10	..	26
Separations per hospital	1,888	2,830	..	..	685	..	793	..	1,850
Cost per separation	1,052	619	..	..	n.p.	..	n.p.	..	871
Cost per patient day	222	227	..	..	n.p.	..	n.p.	..	262
Total expenditure (\$'000)	4,410	6,021	..	..	n.p.	..	n.p.	..	12,480
Other non-acute									
Number of hospitals	15	2	0	0	0	0	0	0	17
Average beds per hospital	51	71	..	..	..	..	..	..	54
Separations per hospital	748	1,060	..	..	..	..	..	..	785
Cost per separation	7,494	8,629	..	..	..	..	..	..	7,674
Cost per patient day	392	403	..	..	..	..	..	..	394
Total expenditure (\$'000)	121,582	21,073	..	..	..	..	..	..	142,655
Total non-acute									
Number of hospitals	77	16	38	21	21	0	1	0	174
Average beds per hospital	32	27	23	18	36	..	10	..	28
Separations per hospital	607	1,231	689	403	646	..	793	..	659
Cost per separation	5,134	2,184	2,310	3,403	3,102	..	n.p.	..	3,627
Cost per patient day	362	353	344	743	246	..	n.p.	..	355
Total expenditure (\$'000)	311,512	54,766	75,814	40,778	53,789	..	n.p.	..	538,132
Unpeered and other acute^(a) (includes hospitals with fewer than 200 separations)									
Number of hospitals	19	8	62	12	13	0	0	0	114
Average beds per hospital	13	11	3	15	14	..	..	..	8
Separations per hospital	132	754	115	314	411	..	..	..	218
Cost per separation	7,192	3,110	1,218	3,448	1,675	..	..	..	2,717
Cost per patient day	288	794	314	819	248	..	..	..	407
Total expenditure (\$'000)	24,364	81,144	57,934	19,903	13,425	..	..	..	196,771

(continued)

Table A11.2 (continued): Average costs and selected data by hospital peer group, Australia^(a), 1998–99

	NSW	Vic ^(b)	QLD	WA	SA	Tas	ACT	NT	Total
Psychiatric^(e)									
Number of hospitals	8	1	4	5	1	0	0	0	19
Average beds per hospital	138	73	207	85	465	..	..	..	153
Separations per hospital	1,279	570	372	626	3,744	..	..	..	1,009
Cost per separation	15,108	23,344	62,662	15,742	n.p.	..	..	..	20,120
Cost per patient day	328	863	182	368	n.p.	..	..	..	313
Total expenditure (\$'000)	196,201	13,306	97,866	57,849	n.p.	..	..	..	440,492
Total									
Number of hospitals	216	91	185	91	76	3	3	5	670
Average beds per hospital	87	127	58	59	67	282	237	113	80
Separations per hospital	5,890	10,642	3,831	3,929	4,682	24,697	19,533	10,977	5,747
Cost per separation	2,926	2,381	2,449	2,955	2,559	2,533	3,257	2,562	2,662
Cost per patient day	635	625	571	738	627	689	882	737	634
Total expenditure (\$'000)	4,972,886	3,267,590	2,211,662	1,358,753	1,128,399	254,025	273,216	183,289	13,649,821
Teaching (Excluding psychiatric)									
Number of hospitals	17	9	10	4	4	3	2	2	51
Average beds per hospital	425	845	382	568	433	282	350	229	461
Separations per hospital	36,795	76,223	28,854	52,086	49,022	24,697	29,299	23,697	40,757
Average cost weight ^(d)	1.11	1.05	1.16	1.04	1.06	1.02	0.99	0.77	1.07
Cost per separation	3,088	2,509	3,031	3,198	2,521	2,533	3,232	2,539	2,831
Cost per patient day	796	661	779	859	765	689	875	734	752
Cost per casemix-adjusted separation	2,901	2,453	2,646	3,153	2,445	2,569	3,328	3,307	2,715
Total expenditure (\$'000)	2,660,907	2,407,708	1,060,425	841,638	622,386	254,025	271,743	154,736	8,273,567

(a) Expenditure data excludes depreciation

(b) Victorian data reported at network level. Metropolitan networks contain many smaller, specialised and non-acute hospitals.

(c) Excludes a few small hospitals with missing expenditure data: 1 in Western Australia, 2 in NSW and all except the 3 major hospitals in Tasmania

(d) Average cost weight from the National Hospital Morbidity Database, based on acute and unspecified separations and newborn episodes of care with qualified days, using the 1998–99 AR-DRG v 4.0/4.1 combined cost weights (DHAC, Unpublished). New South Wales, Victoria, the Australian Capital Territory and the Northern Territory report in ICD-10-AM grouped to AR-DRG v4.1. Queensland, Western Australia, South Australia and Tasmania report in ICD-9-CM grouped to AR-DRG v4.0. (see appendix 4.)

(e) Psychiatric hospitals consist of a mix of short term acute, long term, psychogeriatric and forensic psychiatric hospitals (see appendix 11).

n.p. Not published.

.. Not applicable

Appendix 12: Abbreviations

ABS	Australian Bureau of Statistics
ACHS	Australian Council on Healthcare Standards
AGPS	Australian Government Publishing Service
AHSAC	Australian Hospital Statistics Advisory Committee
AIHW	Australian Institute of Health and Welfare
ALOS	average length of stay
AN-DRG	Australian National Diagnosis Related Group
AN-SNAP	The Australian National Sub-Acute and Non-Acute Patient Classification
AR-DRG	Australian Revised Diagnosis Related Group
ASGC	Australian Standard Geographical Classification
CC	complications and comorbidities
CDE	common bile duct exploration
CGC	Commonwealth Grants Commission
DHSH	Department of Human Services and Health
dis.	diseases
DPIE	Department of Primary Industry and Energy
DRG	Diagnosis Related Group
DVA	Department of Veterans' Affairs
ECMO	extracorporeal membrane oxygenation
exp.	Exposure to
FTE	full time equivalent
HASAC	Health and Allied Services Advisory Council
ICD-9-CM	International Classification of Diseases, 9th revision, Clinical Modification
ICD-10-	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification
IFRAC	admitted patient fraction
mal.	malignant
MBS-E	Extended medical benefits schedule
MDC	Major Diagnostic Category
MPS	Multi Purpose Service
n.a.	not available
nec	not elsewhere classified
NHCDC	National Hospital Cost Data Collection
NHMBWG	National Health Ministers' Benchmarking Working Group
NIOOS	non-inpatient occasions of service
n.p.	not published
OECD	Organisation for Economic Co-operation and Development
op.	operation
procs	procedures
re.	related to
RMOs	resident medical officers
SCRSSP	Steering Committee for the Review of Commonwealth/State Service Provision
SLA	Statistical Local Area
VMO	visiting medical officer
W	with
W/O	without
..	not applicable