



VARIATIONS IN ELECTIVE SURGERY PROCEDURE RATES: INTRA-STATE AND INTER-STATE COMPARISONS

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KEY FINDINGS

- ◆ In 1993/94, Queensland residents, overall, experienced remarkably similar elective surgery rates, irrespective of whether they lived in urban or rural areas of the State. This indicates that the combined public and private hospital system in Queensland provides relatively equal access for most of the population. However, elective surgery procedure rates for the Aborigines and Torres Strait Islander population living in remote areas are substantially different from that of the total Queensland population.
- ◆ In contrast to the findings in Queensland, New South Wales Health have reported considerable variation in procedure rates across health areas and districts¹. However, the NSW study used smaller areas of analysis (33 areas/districts) which may, at least partially, account for the larger variation in rates observed.
- ◆ In Queensland, for 1993/94 there was little variation in age standardised separation ratios (SSRs) by urban/

rural areas of residence for each of the elective surgery procedures. The degree of variation was consistent across the procedures with the ratios of highest SSR to lowest ranging from 1.1 to 1.5 for all but two procedures. The highest ratio was for hip replacement (2.0).

- ◆ There was also little variation by socioeconomic group for many of the procedures. When the most advantaged were compared with the least advantaged, there were some marginally significant findings for some of the elective surgery procedures. The most advantaged had higher ratios than the least advantaged for tonsillectomy, endoscopy of the large intestine, caesarean section, and inductions. In contrast, the least advantaged had ratios which were higher than the most advantaged for endoscopy of the bladder, endoscopy of the bronchus, and cholecystectomy.
- ◆ Elective surgery procedure rates for the Aboriginal and Torres Strait Islander population are substantially different from that of the total Queensland population. When compared to all Queensland, areas where greater than 50% of the population are Aborigines or Torres Strait Islanders were significantly more likely to have lower ratios for all procedures examined, except lens extraction.
- ◆ For all procedures examined with the exception of caesarean section, Queensland rates were found to be lower than the rates for the average of comparison states in 1992/93.

1. INTRODUCTION

The Australian Institute of Health and Welfare have released interstate comparisons of separation rates for various surgical and investigative procedures². To complement and extend their analysis, we have considered intrastate comparisons of separation rates for these procedures. Total hospital separations were analysed by combining public and private separations. Separations were grouped according to the patient's place of residence (not according to the location of the treating hospital) in three ways: by areas of equivalent socioeconomic status, by areas with high and low proportions of Aborigines or Torres Strait Islanders, and by urban/rural areas of residence (see Appendices 1 - 5).

Two quantities were calculated from hospital separations data for the 1993/94 financial year:

- ◆ Standardised separation ratios (SSRs) - the ratio of observed separations to expected separations based on all Queensland rates - for each combination of procedure and area (see Appendix 2 for detailed definition).
- ◆ The proportion of all separations which occurred in the public system for each elective procedure.

Observed variations in hospital separation rates may reflect the combined effects of a number of variables including underlying regional morbidity patterns, local clinical practice, hospital admissions policy, coding practices, and access to alternative services.

2. DIFFERENTIALS BY SOCIOECONOMIC STATUS

Socioeconomic differentials were measured using the Australian Bureau of Statistics' Index of Relative Socioeconomic Disadvantage (see Appendix 3). Overall, there was little variation by socioeconomic index for the elective surgery procedures. The main findings are highlighted below (Table 1):

- ◆ There was little variation in the ratio of the most advantaged to the least advantaged for most procedures. The ratios ranged from 0.8 to 1.3, with the exception of endoscopy of the bronchus (0.5).
- ◆ The most advantaged had significantly higher ratios than the least advantaged for tonsillectomy (1.3 times higher), endoscopy of the large intestine (1.3 times higher), caesarean section (1.3 times higher) and inductions (1.2 times higher).
- ◆ The least advantaged had ratios which were significantly higher than the most advantaged for endoscopy of the bladder (1.3 times higher), endoscopy of the bronchus (1.9 times higher) and cholecystectomy (1.2 times higher).

3. DIFFERENTIALS BY AREA OF RESIDENCE

Figures 1 to 13 show SSRs for each procedure by urban/rural areas of residence (see Appendix 4 for definition) together with 95% confidence intervals. A robust estimate of the ratio between the largest and the smallest SSR for

each procedure was also calculated. The main findings are highlighted below:

- ◆ There was only a small amount of variation in standardised separation ratios (SSRs) for most procedures. The ratios of largest SSR to smallest ranged from 1.1 to 2.0 but were mostly less than 1.5. The larger high/low values were all associated with relatively low SSRs for *Remote Other*.
- ◆ SSRs tended to be lower for increasing degrees of rurality and remoteness, so that values for *Rural other* and *Remote other* were generally lower than for larger population centres. Exceptions were lens extraction, where residents in *Remote other* had the highest rates, and hip replacement, where *Rural other* residents had the highest rates.
- ◆ Brisbane residents had the highest rates for most procedures. Exceptions were endoscopy of the bronchus, where *Other major urban* was much larger; appendicectomy, where rates for *Rural major* residents were much higher; and lens extraction, where *Rural major* was higher.

4. DIFFERENTIALS BETWEEN INDIGENOUS POPULATIONS AND ALL QUEENSLANDERS

Separation rates were examined for all people who live in areas where more than 50% of the population identified as Aborigines or Torres Strait Islanders (see Appendix 5 for definition of areas). These areas were selected for analysis because identification of Aborigines or Torres Strait Islanders on hospital records for these areas is known to be relatively accurate, unlike for other areas of the State. Overall, Aborigines or Torres Strait Islanders comprised approximately 73% of the total population in these areas combined (1991 Census information).

The main findings are highlighted below (Table 2):

- ◆ There were no reported tonsillectomies, coronary artery bypass grafts or hip replacements for people who identified as Aborigines or Torres Strait Islanders in 1993/94.
- ◆ For lens extraction, areas which had greater than 50% Aborigines or Torres Strait Islanders had a separation ratio which was more than double the ratio for all Queensland (232%), and this was significant.

- ◆ Areas with greater than 50% Aborigines or Torres Strait Islanders had significantly lower ratios for tonsillectomies, endoscopies and inductions. Compared to the Queensland average, the SSR for tonsillectomies was 2%, for endoscopies it was 36%, and for inductions it was 76%.

5. PROPORTION OF ELECTIVE PROCEDURES PERFORMED IN PUBLIC HOSPITALS

Table Three presents the proportion of separations for each procedure performed in public hospitals. The main findings are highlighted below:

- ◆ The percentage of public separations for all elective surgery procedures was 54% and, for all separations, it was higher at 69%.
- ◆ Endoscopy of the bronchus, caesarean section and inductions had the highest proportion of public separations, which were over 70% for each of these procedures. These were followed closely by appendicectomy at 69%. Lens extraction (38%) and endoscopy of the large intestine (40%) had the lowest proportion of public hospital separations. For the remaining procedures, the proportion of public hospital separations ranged from 50 to 65%.

6. INTERSTATE COMPARISONS FOR 1992/1993

Interstate comparisons were based on data provided by the National Health Ministers' Working Group which was established in March 1994 by the Australian Health Ministers' Conference to develop health sector benchmarks² (Table 4).

The National Health Ministers' Benchmarking Working Group found that the quality of available data was highly variable, and in only a few cases were collected data based on nationally consistent definitions. Private hospital data were not available for the Northern Territory, and morbidity data for Victorian private hospitals were not sufficiently complete to permit reliable estimation of rates for this procedure. Therefore, definite conclusions regarding the relative level of care between the States and Territories cannot be drawn from the data.

The main findings are highlighted below:

- ◆ For all of the elective surgery procedures with the exception of caesarean section, Queensland had lower

standardised separation rates than the average of the other states (Table 4).

- ◆ Queensland and South Australia had the second highest rate (3.1 per 1000) for caesarean section after the A.C.T. (3.3 per 1000).
- ◆ Queensland had the lowest standardised separation rate for coronary artery bypass graft (0.7 per 1000) which was well below the other states. However, since 1992/93, there has been a large increase in Queensland separation rates for coronary artery bypass graft.
- ◆ Queensland had the lowest rate for hip replacement (0.6 per 1000).
- ◆ Queensland had the lowest rate for hysterectomy (1.8 per 1000), along with NSW and Tasmania.
- ◆ Queensland had the second lowest rate for lens insertion (2.4 per 1000) after W.A. (2.1 per 1000), and also the second lowest rate for tonsillectomy (1.7 per 1000) after Tasmania (1.5 per 1000).
- ◆ For cholecystectomy, there was little variation in standardised separation rates amongst the states, and Queensland was close to the Australian rate.

REFERENCES

1. New South Wales Health Department, Epidemiology and Health Services Evaluation Branch. Health Indicators for NSW, 1993. *NSW Public Health Indicators Supplement*, April (No.2), 1994.
2. The Australian Institute of Health and Welfare. *First National Report on Health Sector Performance Indicators: 'Public Hospitals - the State of Play'*. A report of the National Health Ministers' Benchmarking Working Group to the Australian Health Ministers' Conference, February, 1996.

Indirect standardised separation ratios for selected procedures by urban/rural area of residence

Figure 1: Tonsillectomy

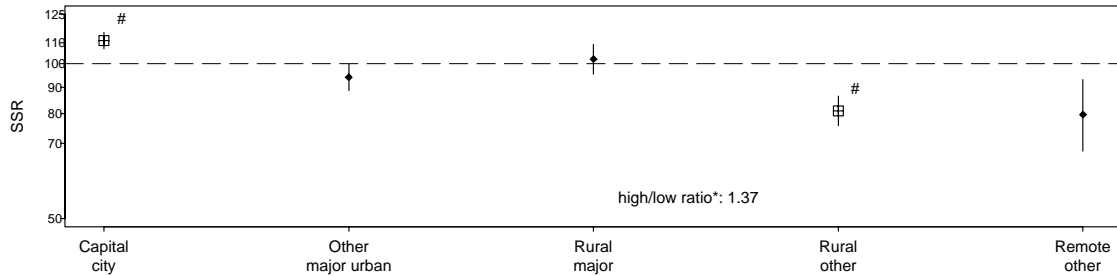


Figure 2: Coronary artery bypass graft

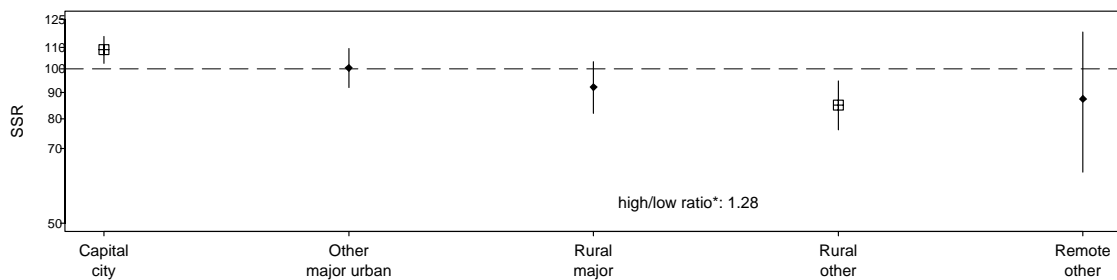


Figure 3: Endoscopy - Bladder

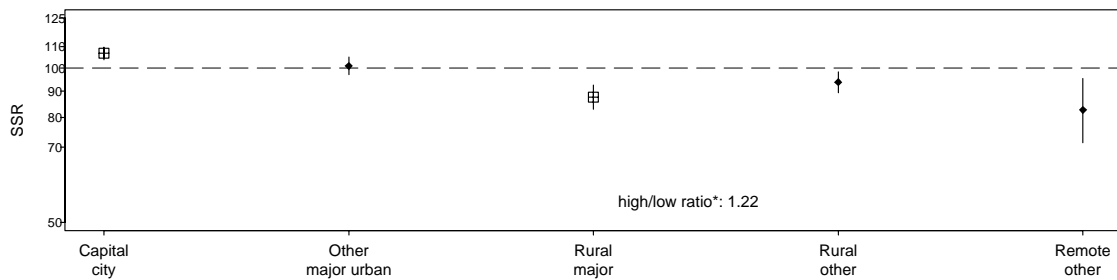


Figure 4: Endoscopy - Bronchus

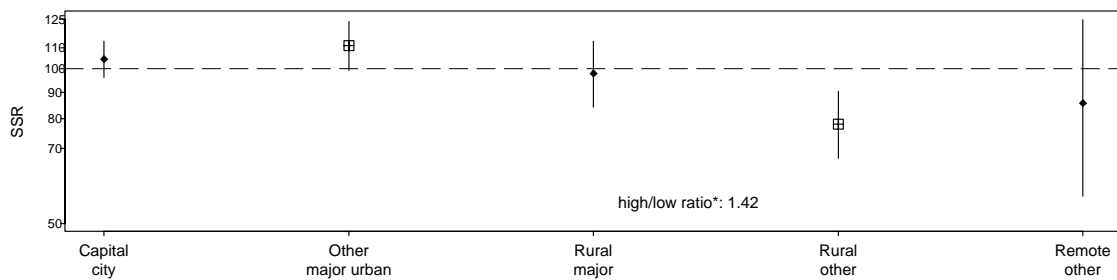
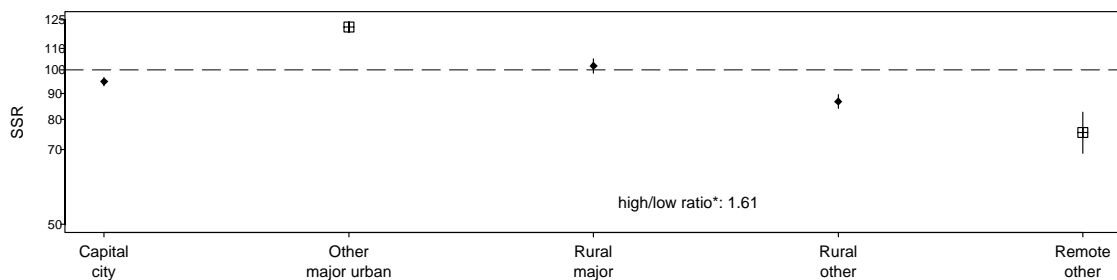


Figure 5: Endoscopy - Large intestine



* - robust estimate of ratio of highest to lowest SSR

- high/low pair

Indirect standardised separation ratios for selected procedures by urban/rural area of residence

Figure 6: Endoscopy - Stomach, oesophagus, small intestine

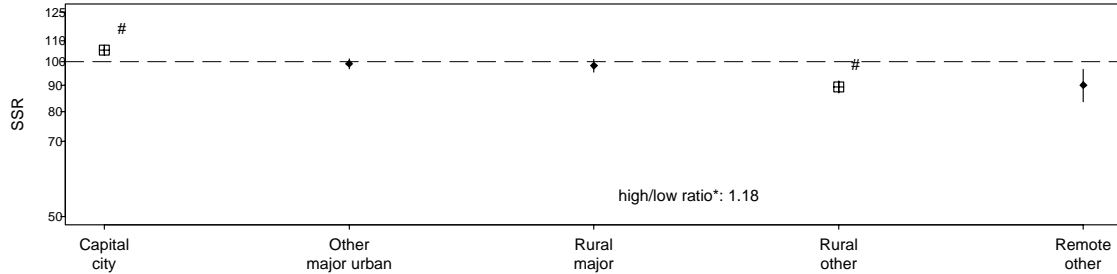


Figure 7: Hip replacement

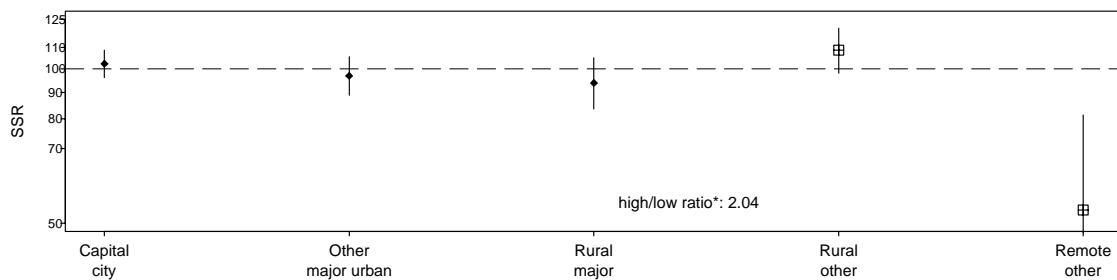


Figure 8: Lens extraction

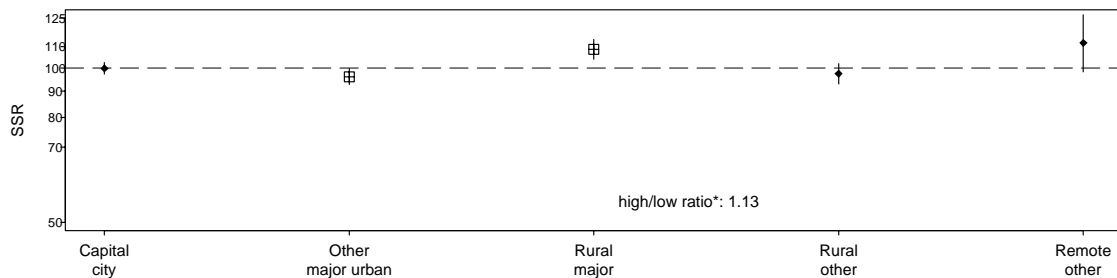


Figure 9: Cholecystectomy

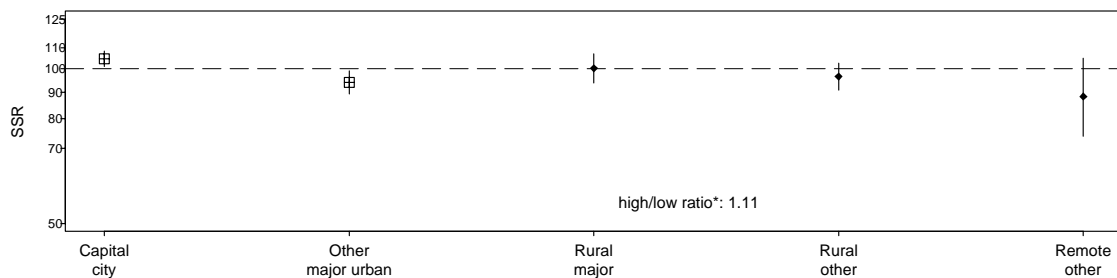
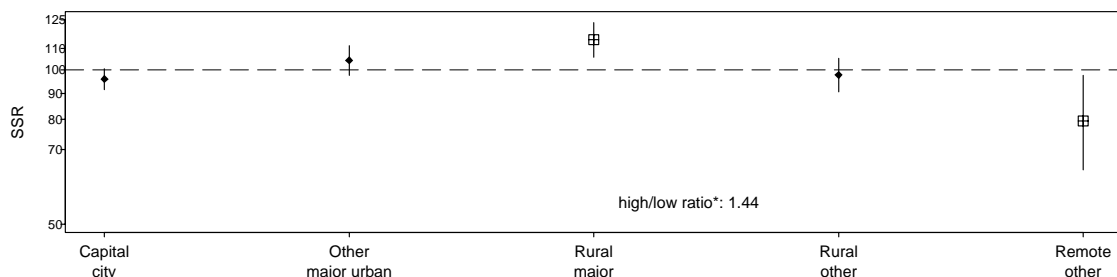


Figure 10: Appendicectomy



* - robust estimate of ratio of highest to lowest SSR
- high/low pair

Indirect standardised separation ratios for selected procedures by urban/rural area of residence

Figure 11: Hysterectomy

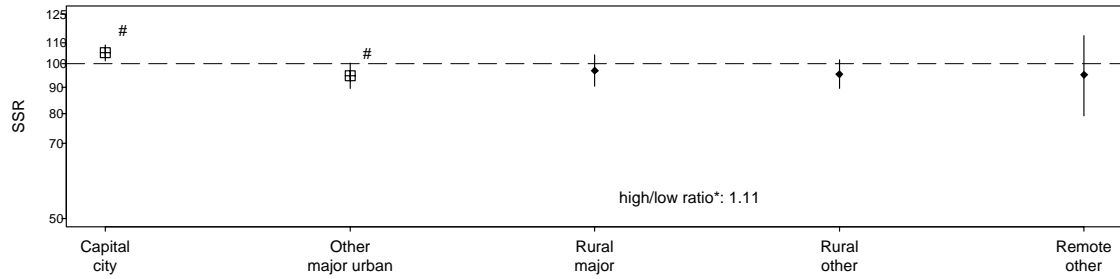


Figure 12: Caesarean section**

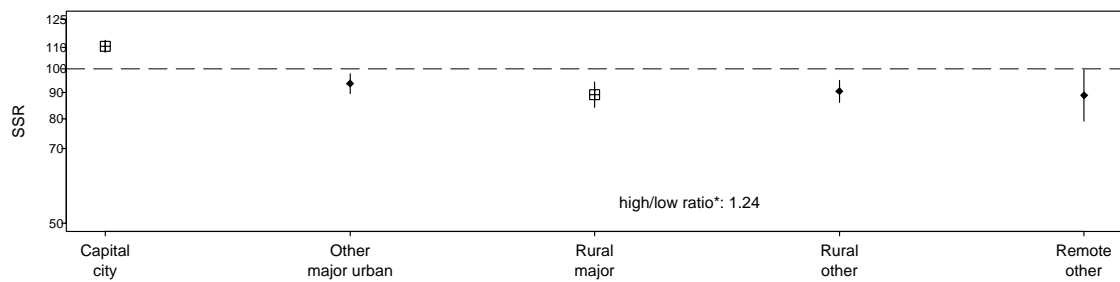
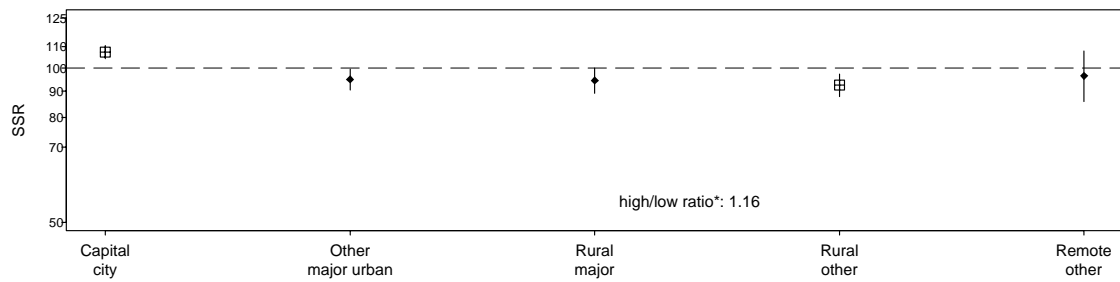


Figure 13: Induction**



** - denominator = live births

* - robust estimate of ratio of highest to lowest SSR

- high/low pair

Table 1

Indirect standardised separation ratios for the most advantaged and the least advantaged compared to all Queensland, by procedure

Procedure	SSR (LL, UL)* Most advantaged		SSR (LL, UL)* Least advantaged		Ratio**
	Tonsillectomy	114	(104, 125)	88	
Coronary artery bypass graft	113	(95, 133)	84	(69, 100)	1.4
Endoscopy - Bladder	86	(79, 94)	109	(102, 117)	0.8***
Endoscopy - Bronchus	69	(52, 91)	131	(108, 158)	0.5***
Endoscopy - Large intestine	111	(106, 116)	84	(79, 88)	1.3***
Endoscopy - Stomach, oesophagus, small intestine	97	(93, 101)	106	(101, 110)	0.9
Hip replacement	86	(70, 106)	109	(93, 127)	0.8
Lens extraction	91	(83, 99)	102	(95, 109)	0.9
Cholecystectomy	87	(80, 96)	108	(98, 118)	0.8***
Appendicectomy	91	(80, 102)	95	(84, 107)	1.0
Hysterectomy	99	(90, 108)	98	(88, 108)	1.0
Caesarean Section	121	(112, 130)	94	(87, 101)	1.3***
Induction	105	(96, 114)	86	(79, 93)	1.2***

Source: Epidemiology and Health Information Branch, 1993/94.

* Lower and upper 95% confidence intervals.

** Ratio of the SSR for the most advantaged to the SSR for the least advantaged.

*** The difference between the most advantaged and the least advantaged is statistically significant.

Table 2

Indirect standardised separation ratios for all persons living in areas where more than 50% of the population identified as Aborigines or Torres Strait Islanders* compared to all Queensland, by procedure

Procedure	Identified as A/TSI No. (%)		SSR (LL, UL)**	
	Tonsillectomy	0	(0)	2
Coronary artery bypass graft	0	(0)	53	(0, 296)
Endoscopies***	43	(61)	36	(28, 45)
Hip replacement	0	(0)	0	(0, 356)
Lens extraction	11	(79)	232	(106, 441)
Cholecystectomy	13	(81)	93	(53, 151)
Appendicectomy	9	(56)	68	(39, 111)
Hysterectomy	10	(83)	61	(31, 106)
Caesarean section	61	(85)	83	(65, 104)
Induction	61	(90)	76	(59, 96)

Source: Epidemiology and Health Information Branch, 1993/94.

* Those aged less than 55 years.

** Lower and upper 95% confidence intervals.

*** Endoscopies included bladder, bronchus, large intestine, stomach, oesophagus and small intestine.

Table 3**Total number of separations for each procedure and proportion performed in public hospitals, 1993/94**

Procedure	Total separations (Public and Private)	% Public separations
Tonsillectomy	6,123	50
Coronary artery bypass graft	2,443	55
Endoscopy - Bladder	11,102	61
Endoscopy - Bronchus	1,401	75
Endoscopy - Large intestine	29,506	40
Endoscopy - Stomach, oesophagus, small intestine	34,566	55
Hip replacement	1,995	56
Lens extraction	13,190	38
Cholecystectomy	6,813	61
Appendicectomy	4,192	69
Hysterectomy	6,244	51
Caesarean section	10,201	73
Induction	9,427	72
All elective procedures*	137,203	54
All separations	863,716	69

Source: Epidemiology and Health Information Branch

* All elective procedures considered in this paper.

Table 4**Separation rates for sentinel procedures, Australian States and Territories, 1992/93***

Procedure	QLD	NSW	VIC	WA	SA	TAS	NT	ACT	AUS**
Tonsillectomy	1.7	1.8	n/a	2.1	2.9	1.5	n/a	1.8	2.0
Coronary artery bypass graft	0.7	1.3	n/a	1.0	1.4	1.1	n/a	n/a	1.3
Endoscopy	18.0	21.0	n/a	15.5	16.2	21.5	n/a	19.6	19.4
Hip replacement	0.6	0.8	n/a	1.0	0.9	1.0	n/a	1.5	0.9
Lens insertion	2.4	3.7	n/a	2.1	3.7	4.1	n/a	3.8	3.5
Cholecystectomy	2.1	2.2	n/a	2.0	2.4	2.0	n/a	2.1	2.2
Appendicectomy	1.4	1.7	n/a	1.7	1.7	1.4	n/a	1.1	1.7
Hysterectomy	1.8	1.8	n/a	2.4	2.3	1.8	n/a	2.0	2.0
Caesarean section	3.1	2.6	n/a	2.8	3.1	2.6	n/a	3.3	2.7

Source: Epidemiology and Health Information Branch for Queensland data (1992/93) and the AIHW for the remaining states and Australia.

* Age-sex-standardised rate per 1000 population.

** The Australian rate was based on NSW, WA, SA, TAS and ACT only.

Appendix 1. Identification of elective surgery procedure

Data for each hospital episode may include up to 10 procedure codes. All procedure codes for each episode are examined for each elective surgery procedure to determine membership of the set of records for that procedure. Records could be counted into more than one procedure group, but in practice this rarely occurred. For caesareans and inductions, the reference population for an area is all births to women resident in the area rather than all women.

Appendix 2. Direct and indirect standardised separation ratios

The direct and indirect standardised rate for a given population are weighted sums of the age-sex specific rates for that population. Direct and indirect standardisation differ in the way that the weights are calculated. In this circular, indirect standardised separation rates are calculated for intrastate comparisons, and direct standardised separation rates are calculated for interstate comparisons.

For direct standardisation, age-sex specific rates for each group are multiplied by the corresponding age-sex specific populations of a standard or reference population and summed, yielding an expected count for the reference population. This expected count is divided by the total reference population to give the directly standardised rate.

For indirect standardisation, age-sex specific rates from a reference population are multiplied by the corresponding age-sex specific populations for each group and summed, yielding an expected count for each group. The observed number of cases for each group is divided by the expected number and multiplied by 100 to give a standardised ratio (further technical details are available on request). An SSR value of 110 indicates separation rates 10 per cent above that of the reference group, whereas an SSR of 90 indicates separation rates 10 per cent below that of the reference group.

Appendix 3. Socioeconomic indexes for areas

The Australian Bureau of Statistics (ABS) has derived five summary indexes from the *1991 Population Census* to measure different aspects of socioeconomic conditions by geographic areas. Together, these indexes make up the Socio-Economic Index for Areas (SEIFA). The Index of Relative Socio-Economic Disadvantage is used for this analysis. It is a general socioeconomic index, and summarises variables related to the economic resources of households, education and occupation. The variables focus on attributes such as low income, low educational attainment and high unemployment (see ABS Cat No. 1356.0 for further detail).

Appendix 4. Urban/rural area of residence

The Department of Human Services and Health Rural and Remote Areas classification allocates SLAs to one of seven groups: (i) *Capital city* (all SLAs in Brisbane SD); (ii) *Other major urban* (SLAs which form part of a non-capital city urban area with a combined population exceeding approximately 80,000 eg. Townsville); (iii) *Rural major* (SLAs within a few hundred kilometres of a capital city or major urban centre are 'Rural' and the criteria for 'Major' are firstly population size and secondly a population density of 30 persons per square kilometre); (iv) *Rural other* ('Rural' SLAs with smaller population and lower population density than for 'Rural major'); (v) *Remote major* (SLAs that are not within a Capital City Statistical Division, a Major Urban Area, or a 'reasonable' proximity to one are 'Remote', and population size and density are the criteria for 'Major'); (vi) *Remote other* ('Remote' SLAs with smaller population and lower population density than for 'Remote major'); (vii) *Other offshore areas* (the SLA (code 9779) 'Offshore areas and migratory' has been allocated to this special category).

In the analysis in this circular, *Remote major* (which comprises only Mt Isa) is combined with *Rural major*. *Other offshore areas* has been omitted from the analysis as it contains an extremely small population.

Appendix 5. Identification of areas with a high proportion of Aborigines and Torres Strait Islanders

Areas in Queensland where more than 50% of the population identified as Aborigines or Torres Strait Islanders include six Statistical Local Areas (SLAs) - Arukun, Burke, Carpentaria, Mornington, Torres, and Townsville (C) Balance (Palm Island).