Eye health among Australian children

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Any enquiries about or comments on this publication should be directed to:
Robert Long
Australian Institute of Health and Welfare
GPO Box 570
Canberra ACT 2601
Phone: (02) 6244 1133
Email: Robert.Long@aihw.gov.au

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Contents

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Abbreviations

ABS	Australian Bureau of Statistics
ACHI	Australian Classification of Health Interventions
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ALOS	average length of stay
AR-DRG	Australian Refined Diagnosis Related Group
ASGC	Australian Standard Geographical Classification
BEACH	Bettering the Evaluation And Care of Health
CSTDA	Commonwealth State/Territory Disability Agreement
GP	general practitioner
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th revision
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian Modification
MBS	Medicare Benefits Schedule
NHS	National Health Survey
NMDS	National Minimum Data Set
NSW	New South Wales
NT	Northern Territory
OTC	over-the-counter
Qld	Queensland
SA	South Australia
Tas	Tasmania
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

Summary

Eye health among Australian children is the second in a series of national reports providing an overview of eye health in Australia, following on from a report about eye hospitalisations. This report contains the most recent national information from a range of data sources.

Some of the main findings in this report are given below.

Key findings

- Along with allergies and asthma, eye disorders are the most common long-term health problems experienced by children.
- There are more than 411,000 cases of long-term eye disorders among children in Australia. Most of these are long- and short-sightedness.
- About one in six 10–14 year olds wear glasses or contact lenses to correct sight.
- About 420,000 GP encounters a year deal with eye problems for children. Most of these encounters (62%) are for conjunctivitis infections.
- In addition to the 420,000 GP encounters, there were about 600,000 other eye-related Medicare services provided to children in 2006–07. The vast majority of these were for optometric services.
- There were nearly 9,000 hospitalisations for children with eye diseases and disorders in 2006–07. One-year-olds had the highest rates of these hospitalisations among children.
- Aboriginal and Torres Strait Islander children had a similar rate of eye hospitalisations to other Australian children, although Indigenous girls had a significantly lower rate of hospitalisations for eye disorders. Infectious problems such as trachoma, as well as eye-related head injuries, are more common among Indigenous children.

Introduction

Previous AIHW publications, such as *Vision problems among older Australians* and *Eye health in Australia: a hospital perspective*, have highlighted the strong relationship between age and vision loss (AIHW 2005; 2008). Because of this relationship, much attention in the field of eye health is focused on older people. The ageing of the Australian population reinforces such a focus, yet eye problems can occur across all age groups. Accordingly, this report investigates the current state of children's eye health in Australia. It looks at a variety of data sources to provide a general picture of the prevalence, incidence, and management of eye problems among children.

This report mostly defines a child as being under the age of 15 years. However, for some data sources this may not be appropriate, and the definition may change slightly. There were just over 4 million children in Australia in 2007 (ABS 2008).

Although child eye health problems are not rare, some data sources have small numbers and interpretation of the data requires care.

Context of the report

Following on from *Eye health in Australia: a hospital perspective*, this report is the second in a series of national reports providing an overview of eye health in Australia. These reports were commissioned by the Australian Government Department of Health and Ageing through the National Eye Health Initiative (see Box 1).

Structure of the report

This report has four major components:

- an introduction
- five sections providing an overview of different aspects of child eye health in Australia, with selected summary tables and figures
- appendixes comprising data sources and methods, and detailed statistical tables
- glossary and reference sections.

The five sections deal with the prevalence of eye disorders, primary care, hospitalisations, cancer incidence and mortality.

Appendix 1 includes descriptions of a range of data sources used for this report: the National Health Survey, the AIHW National Hospital Morbidity Database, the AIHW National Mortality Database, the Australian Congenital Anomalies Monitoring System, the Bettering the Evaluation and Care of Health Program, the Commonwealth State/Territory Disability Agreement, the Medicare Benefits Scheme, the National Aboriginal and Torres Strait Islander Health Survey, the

Sydney Myopia Study, the population estimates used in this report, and a section on the age standardisation used in this report.

Appendix 2 includes additional tables that provide detailed statistics for the interest of researchers.

Box 1: Background to this report

In response to the World Health Assembly resolution WHA56.26 on the elimination of avoidable blindness in member states, the Australian Health Ministers' Conference endorsed the National Framework for Action to Promote Eye Health and Prevent Avoidable Blindness and Vision Loss *(the* Framework*). The* Framework *focuses on eliminating avoidable blindness and vision loss in Australia, providing an outline for nationally coordinated action by governments, health professionals, non-government organisations, industry and individuals to work in partnership (Commonwealth of Australia 2005).*

In the 2006 Federal Budget, the Australian Government allocated $13.8 million over 4 years to a new National Eye Health Initiative. This initiative supports a range of activities to raise public awareness of eye health issues and to strengthen the delivery of eye health care.

The Australian Government Department of Health and Ageing commissioned the AIHW through the National Eye Health Initiative to do this report. This follows on from work done for earlier publications: Vision problems among older Australians, *released in July 2005,* A guide to Australian eye health data, *released in May 2007, and* Eye health in Australia: a hospital perspective*, released in August 2008.*

The key areas for action within the Framework *provide a brief outline of the challenges to be tackled and a series of actions that might be used to meet these challenges.*

The key area for action 5 – Improving the evidence base – outlines a need to look at existing health data sets for relevance to eye health, and to identify eye health research gaps. This report informs this action area by compiling statistics related to children's eye health.

Prevalence

The prevalence of eye disorders among children in Australia is not known with certainty. This is mainly because many eye disorders, mostly refractive errors, go undiagnosed. To estimate the prevalence of eye disorders, it is necessary to use both self-reported data and surveys which include eye examinations.

Glasses and contact lens use

The Australian Bureau of Statistics (ABS) National Health Survey (NHS) provides self-reported data on child eye disorders. In 2004–05 approximately 16% of 10–14 year olds wore lenses (glasses or contact lenses) to correct sight. This is much lower than the proportion wearing glasses in the general population (Table 1).

The number of 0–4 year olds wearing lenses was extremely low. The proportion of boys and girls aged 5–9 years wearing lenses was the same, while girls were more likely to wear lenses than boys in the 10–14 years age group, although this difference was not statistically significant (Table 1).

Table 1: Persons wearing lenses to correct sight, by age and sex, 2004–05 (per cent)

Age	Male	Female	Persons
5–9	6.9	7.0	6.9
10–14	13.2	18.3	15.7
General population	42.2	52.8	47.6

Source: AIHW analysis of NHS 2004–05.

There was some variation among jurisdictions regarding lens use among children. For example, compared with the national average, New South Wales had a higher proportion of children wearing lenses, while Western Australia had a lower proportion.

The two most common sight problems corrected by lenses were long-sightedness and short-sightedness. One in 20 children aged 5–14 years wore lenses to correct short-sightedness, and the same proportion used lenses to correct long-sightedness. Lenses were used to treat astigmatism—where light rays cannot be focused clearly on a point on the retina, leading to blurred vision—by just over 1% of all children. Girls were more likely than boys to use lenses to correct short-sightedness, while boys and girls were each as likely to use lenses to correct long-sightedness.

Although self-reported surveys can give an indication of the prevalence of eye disorders, surveys which include eye examinations provide more accurate data. The most recent study to concentrate on eye health among children was the Sydney Myopia Study, conducted in 2003–05. Although the study only involved children

aged 6 and 12 years in Sydney, it still provides an insight into the extent of eye problems among children in Australia.

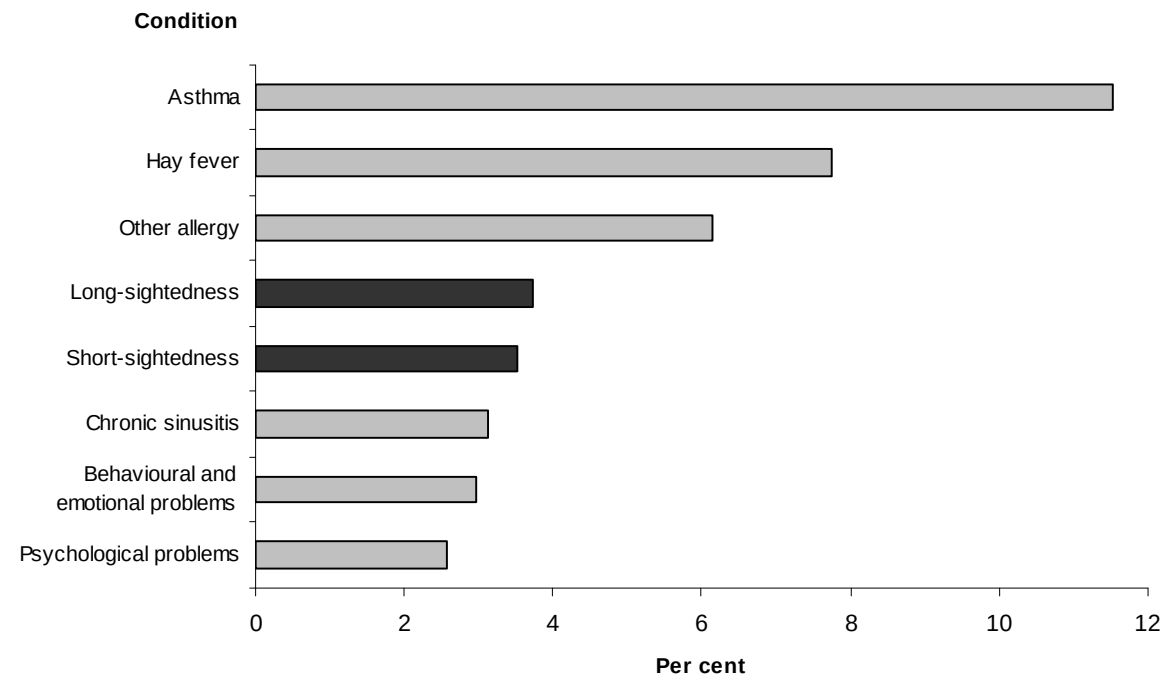
The study found that 19% of 12 year olds used lenses. In general, there was a low prevalence of most types of vision impairment in the sample. Among 12 year olds, astigmatism was the most common refractive error and in its mild form was found in about a quarter of children, while myopia (short-sightedness) was found in about 12% of the sample (Huynh et al. 2007).

Although the figures for lenses use were similar between the NHS and the Sydney study (16% and 19% respectively), the Sydney study suggests that prevalence of astigmatism is much higher than the NHS figures indicate. This may be due to the condition only being diagnosed and treated in its more severe forms when symptoms are more apparent.

Long-term conditions

The NHS also provides information on respondents reporting long-term conditions. 'Long-term' is defined here as a condition that has lasted for 6 months or more (or for which a person expects to suffer for 6 months or more). These types of conditions were less common among children than among other age groups. However, vision problems were some of the most common long-term conditions among children (Figure 1).

Overall, there were about 411,000 cases of long-term eye disorders among children in Australia. In 2004–05, 3.7% and 3.5% of children reported suffering from long- and short-sightedness respectively. As expected, these were similar to the proportions reported by lens users in the same survey (see previous section). Around 1% suffered from astigmatism, while 1% suffered from other refractive and accommodation disorders. Levels of blindness, cataract and glaucoma were very low.



Source: NHS 2004–05.

Figure 1: Most frequently reported long-term conditions for children aged under 15 years, 2004–05

Prevalence estimates for Indigenous children

Data relating to eye health among Indigenous children are relatively limited. Obtaining an accurate picture of the prevalence of eye disorders among Indigenous children involves using disparate data sources, often with small numbers, and therefore the statistics should be used with care. For example, the only recent survey to focus on Indigenous children was restricted to Western Australia in 2001–02 (Zubrick et al. 2004). This found that about 8% of Indigenous children aged 4–17 years did not have normal vision in both eyes, and that nearly 5% were prescribed glasses or contact lenses.

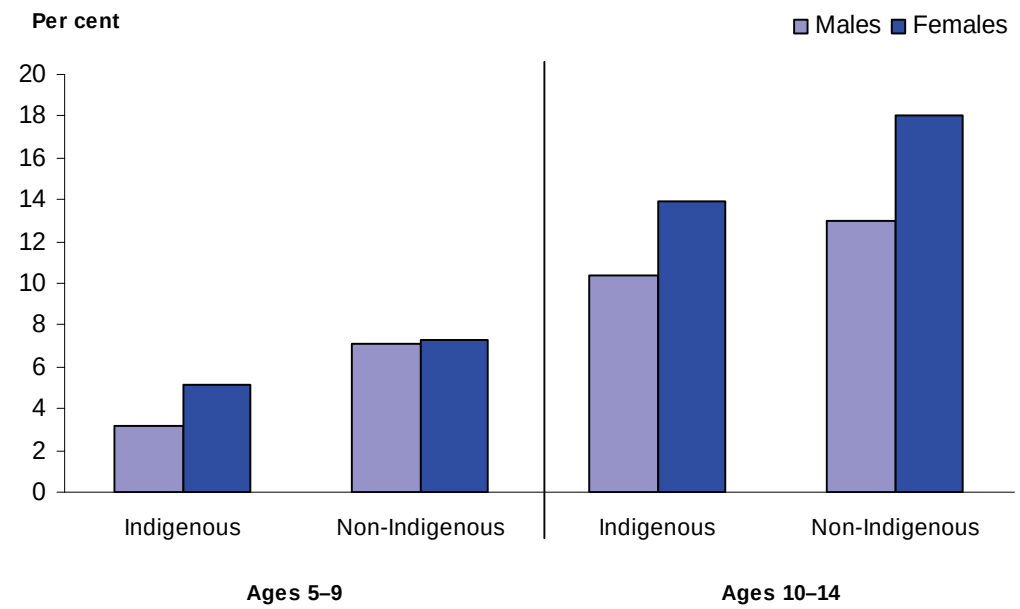
Previous research has found that Indigenous people generally have high levels of visual acuity and a low prevalence of refractive error, especially away from urban areas (Taylor 1997). These findings suggest that Aboriginal and Torres Strait Islander children have less myopia and astigmatism than non-Indigenous children.

Levels of blindness and diabetes (associated with diabetic retinopathy) are higher within Indigenous populations. Trachoma—a form of conjunctivitis which can lead to blindness—is found exclusively among Indigenous populations, and is still

common among children in remote areas. Prevalence estimates from 1988–1996 among children in Western Australia and the Northern Territory ranged from 15% in the Kimberly to 55% in the Pilbara region (Thomson & Paterson 1998). The National Trachoma Surveillance and Reporting Unit was established in 2006, and found prevalence levels of about 20% in the Kimberly and 53% in the Pilbara (Tellis et al. 2007). Thus, although progress has been made in treating trachoma in some areas, it appears that many Indigenous children are still afflicted with the disease.

Recent data (as of May 2008) from the Northern Territory Emergency Response Child Health Checks indicate that 7% of Indigenous children aged 6–15 years had trachoma in at least one eye (AIHW & DoHA 2008). Visual impairment (below 6/12) was found to be very low among children aged 6–15 years in the Northern Territory, at just under 1%.

According to the 2004–05 ABS National Aboriginal and Torres Strait Islander Health Survey, Indigenous children aged 0–14 years were about as likely as non-Indigenous children to report long-term eye conditions (8% compared to 10% respectively) (ABS 2006). About 8% of Indigenous children aged 5–14 years wore glasses or contact lenses. Indigenous children were less likely to be wearing glasses or contact lenses than non-Indigenous children (Figure 2), although this difference was not statistically significant.



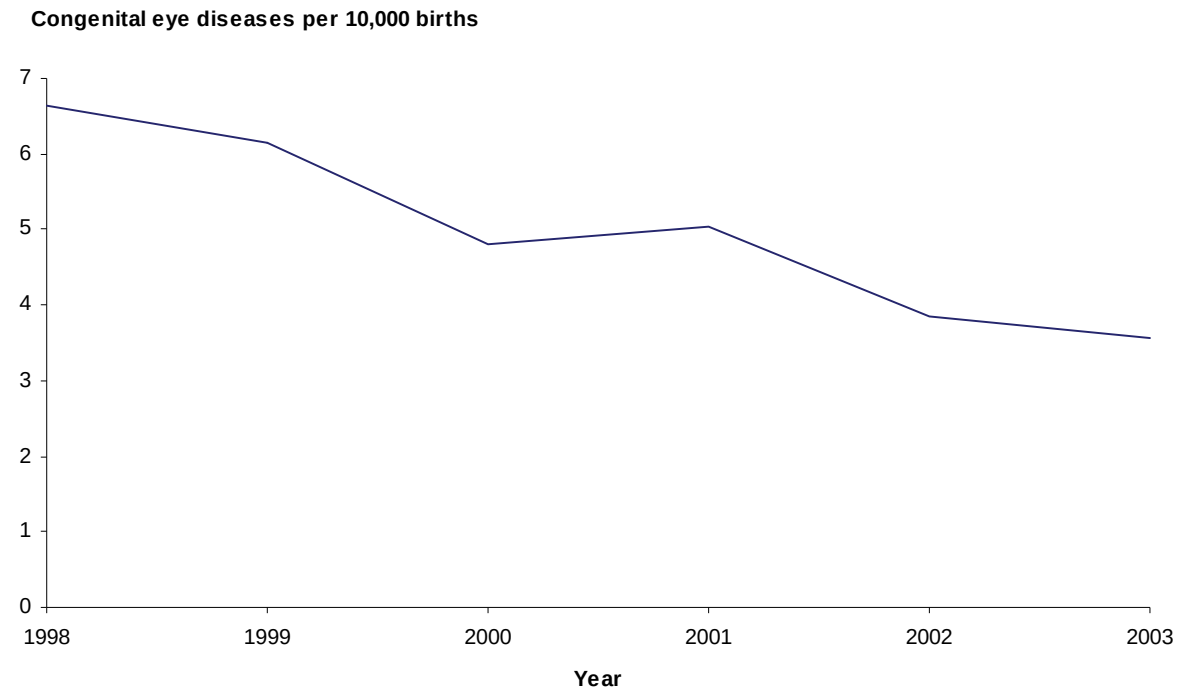
Source: AIHW analysis of National Aboriginal and Torres Strait Islander Health Survey 2004–05.

Figure 2: Proportion who wear glasses or contact lenses, by Indigenous status and sex, ages 5–9 and 10–14 years, 2004–05

Congenital anomalies

Congenital eye diseases are relatively uncommon and make up less than 1.5% of all congenital anomalies. There were 90 reported cases of congenital eye diseases in 2003, or 3.6 cases per 10,000 births (Table A2.1). Some congenital eye diseases (particularly eye conditions of the posterior chamber or lens) could be missed during the birth episode and the actual prevalence of congenital eye diseases could be somewhat higher.

The rate of congenital eye disease among births has fallen steadily over the period 1998–2003 (Figure 3).



Source: Australian Congenital Anomalies Monitoring System.

Figure 3: Rate of congenital eye diseases among births, 1998–2003

Disability services

In 2005–06 there were 774 children aged 0–14 years who accessed disability services provided under the Commonwealth State/Territory Disability Agreement (CSTDA) with a primary disability group of 'vision' or 'deafblind'. The service types provided included accommodation support, community support (such as therapy and case management), and respite care.

There were 422 male children with a vision disability accessing CSTDA services, representing 1.4% of male child service users. There were fewer females with a vision disability accessing services (347 children), although they represented a higher proportion (2.3%) of female child service users. Across all age groups, those with a vision disability represented 3.0% of all service users (AIHW 2007).

The most common service provided to all children with any vision disability accessing CSTDA services was community support (4,295 services), followed by respite care (1,270 services). The most common form of community support was therapeutic care services, which includes help with functional performance and equipment for independent living.

Primary care and ophthalmology

General practice

The Bettering the Evaluation And Care of Health (BEACH) program is a continuous national study of general practice activity in Australia. The following analysis is based on data for the period April 2006 to March 2007, using details of 91,805 encounters between general practitioners (GPs) and patients (about a 0.1% sample of all general practice encounters) from a random sample of 930 practising GPs across the country.

Children aged 0–14 years make up nearly 20% of the Australian population and accounted for approximately 9% of all problems encountered by GPs. Eye problems, however, were proportionately more common among the young, with children accounting for 15% of all eye problems.

About four out of every 1,000 GP encounters dealt with eye problems for children, which translates into about 420,000 GP encounters a year (Table 2). Most of these encounters (62%) were for conjunctivitis infections (Table A2.2).

Table 2: Eye-related GP services, ages 0–14 years, 2006–07

Measure	Problems managed	Problems requiring medications	Total medications	Referrals	Pathology
Number in survey	375	204	289	40	10
Number per 1,000 GP encounters[(a)]	4.1	2.3	3.2	0.4	0.1
Estimated national numbers[(b)]	420,000	230,000	320,000	45,000	10,000

(a) Based on 91,805 GP encounters and 136,333 problems managed.

(b) Based on 102,800,000 general practice Medicare items claimed in 2006–07.

Source: 2006–07 BEACH survey, Australian General Practice Statistics and Classification Centre, University of Sydney.

More than half of problems required at least one medication and most of these were prescribed (Table 2; Table A2.4). Nearly 80% of medications were for chloramphenicol (Table A2.3). A little more than 10% of problems required a referral and most of these were to ophthalmologists, while 12% were to optometrists (Table A2.5).

Optometry and ophthalmology

The Medicare Benefits Schedule (MBS) (DoHA 2007) provides information on health services for which benefits may be paid, including optometric and ophthalmological services. It should be noted that Medicare data will not include all those accessing health services (it excludes, for instance, clients of the Department of Veterans

Affairs). The following analysis concentrates mainly on optometric and ophthalmology services (referred to as 'eye-related services'). It excludes routine GP consultations where eye problems are managed (for information on this see the previous section). It also excludes Medicare items pertaining to therapeutic and surgical procedures, aspects of which are covered in the 'Hospitalisations' section of this report.

There were nearly 600,000 eye-related Medicare services provided to children in 2006–07 (Table 3). The vast majority of these were for optometric services.

Item 109—specialist paediatric attendance by an ophthalmologist—was introduced in 2005–06 and is comprised of a comprehensive eye examination for children aged 8 years or under (or for children less than 14 years with a developmental delay). Of the diagnostic ophthalmology services provided (group D1), only a very small proportion (0.3%) were for children. The most common item in this group—full quantitative computerised perimetry (determining the limits of the field of vision)—was performed 702 times for children. This service was also provided by optometrists on 1,385 occasions (Table A2.10).

Table 3: Eye-related MBS services, by MBS group, ages 0–14 years, 2006–07

MBS group/item	MBS description	No. of child services	Per cent of all services[(a)]
A10	Optometric Services	571,451	10.4
D1 (subgroup 2)	Diagnostic Procedures and Investigations—Ophthalmology	1,294	0.3
A9	Contact Lenses—Attendances	11	4.7
A3—Item 106	Specialist Attendance (Ophthalmologist)	261	9.4
—Item 109	Specialist Attendance (Ophthalmologist Paediatric)	22,711	100.0
Total eye-related MBS items		595,728	10.1
All MBS items		22,076,998	8.6

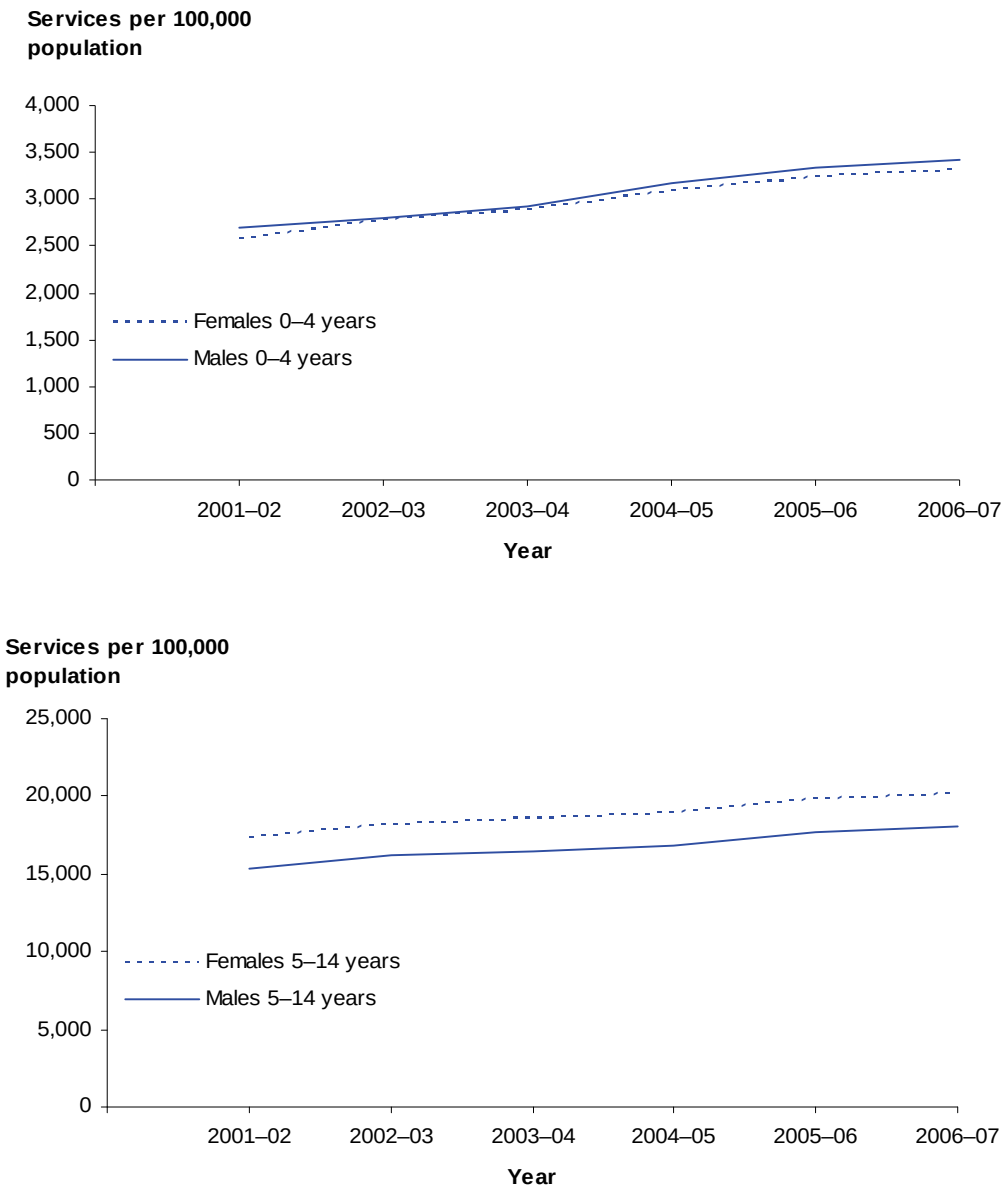
(a) Proportion of group/item services which are for children.

Source: Medicare Australia 2008.

Within optometry, the most common service for children was a comprehensive initial consultation (306,000 services), while subsequent consultations were the second most common (171,000) (Table A2.10). The children's vision assessment was the fourth most common optometry service (22,900). This involves testing for significant binocular or accommodation disorders in children aged 3 to 14 years of age.

While children accounted for approximately 10% of all optometry patients, there was some variation between individual services. For example, children comprised nearly one-third of referred comprehensive initial consultations (where a patient has been referred by another optometrist), while they accounted for less than 1% of computerised perimetry patients.

There has been a gradual increase in the optometry service rates for children since 2001–02 (Figure 4). Older children (aged 5–14 years) had much higher rates than younger children (aged 0–4 years). Amongst older children, girls had consistently higher rates than boys. The difference was much smaller for younger children, where boys had slightly higher rates than girls. Only 8% of all child optometrist services were for those aged 0–4 years, despite this group comprising about one-third of the total child population.



Notes

1. Based on the population registered with Medicare.
2. Note the different scales on the y axis.

Source: Medicare Australia 2008.

Figure 4: Optometry service rates, by year and sex, ages 0–4 and 5–14 years, 2001–02 to 2006–07

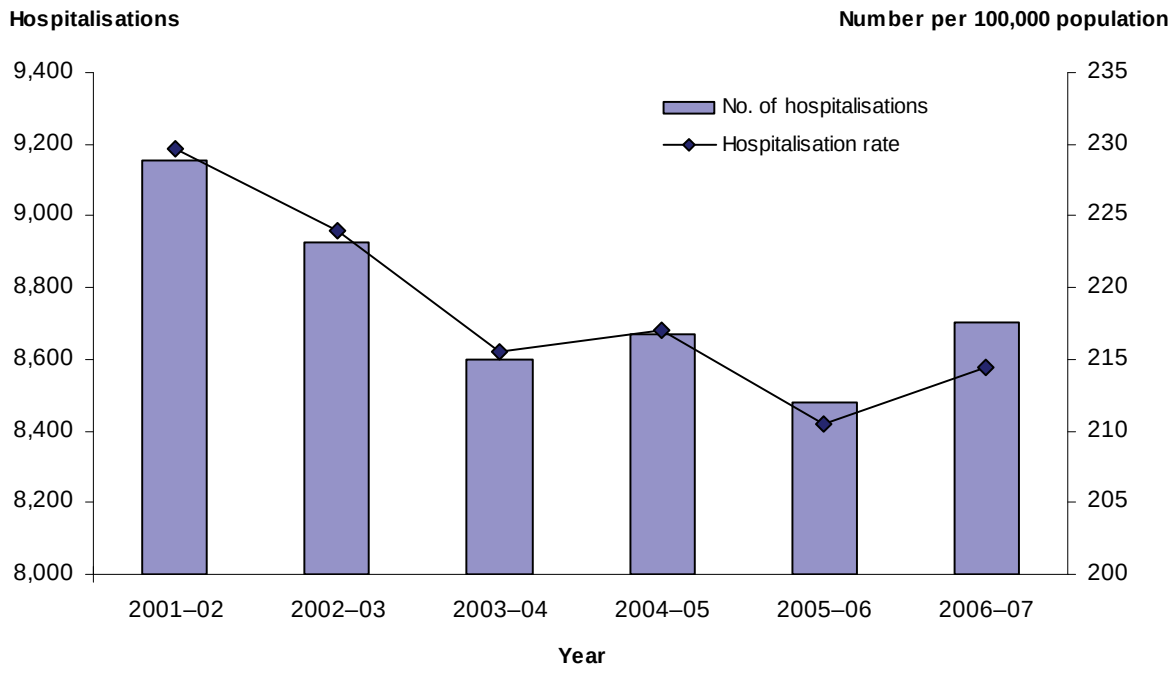
Hospitalisations

Recent trends

The following section presents data for hospitalisations involving children aged 0–14 years across the period 2001–02 to 2006–07. These figures only apply to children admitted to Australian hospitals with eye diseases and disorders with a Major Diagnostic Category 02 ('Diseases and disorders of the eye'), as defined by the Australian Refined Diagnosis Related Groups (DoHA 2004). Hospitalisations may not accurately reflect the general prevalence of eye problems in the child population because children with undiagnosed conditions or who were not admitted to hospital are not counted in these data, and children who were admitted more than once are counted on each occasion.

There were 8,705 hospitalisations for children with eye diseases and disorders in 2006–07 (Figure 5; Table A2.6). This was a slight increase from the previous year, although lower than the number of hospitalisations in 2001–02 and 2002–03. The hospitalisation rate for 2006–07 was the second lowest for the six-year period. Male and female hospitalisation rates were very similar, with boys having slightly higher rates than girls for all years. The hospitalisation rate for all children declined marginally over this time period.

Eye diseases and disorders accounted for a relatively small proportion of all hospitalisations for children (about 1.6%). This was lower than the proportion for all ages, where eye problems accounted for about 3.4% of all hospitalisations (AIHW 2008).

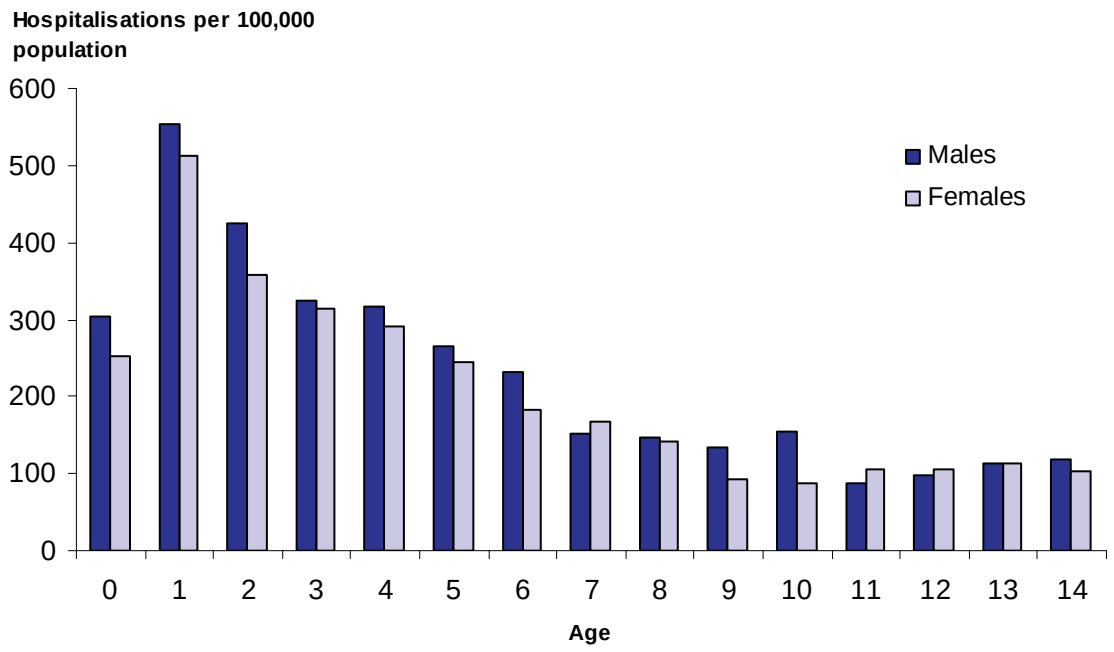


Source: AIHW National Hospital Morbidity Database.

Figure 5: Hospitalisations for eye diseases and disorders, by year, ages 0–14 years, 2001–02 to 2006–07

Hospitalisations in 2006–07

In 2006–07, one-year-olds had the highest hospitalisation rates for eye diseases and disorders among children, with the rate declining thereafter until age 10, where it levelled off (Figure 6; Table A2.7). Those aged less than 1 year had a higher rate than the child average, although lower than those aged 1–4 years.



Source: AIHW National Hospital Morbidity Database.

Figure 6: Hospitalisations for eye diseases and disorders, by age and sex, 2006–07

Nearly 30% of child eye disease and disorder hospitalisations were in private hospitals. This is in contrast to hospitalisations due to eye disease and disorders for all ages, where nearly two-thirds occur in private hospitals. Furthermore, about 40% of all child eye disease and disorder hospitalisations occurred in specialist women's and children's public hospitals.

Approximately one-third of all child eye disease and disorder hospitalisations were for medical reasons as opposed to surgical reasons (Table 4). This profile is markedly different from that of all ages where only about 5% of eye disease and disorder hospitalisations were for medical reasons (AIHW 2008). One reason for this is that most eye hospitalisations for older adults are for lens procedures, such as cataract surgery. Lens procedures are rare among children, accounting for about 2% of all procedures.

Three-quarters of child eye hospitalisations were same-day episodes. For cases that involved overnight treatment, the average length of stay (ALOS) for children hospitalised for medical reasons was 2.4 days, and for surgical reasons 2.0 days (Table 4).

Table 4: Hospitalisations for eye diseases and disorders, by surgical/medical partition and sex, ages 0–14 years, 2006–07

	Surgical			Medical		
Measure	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Hospitalisations	3,046	2,785	5,831	1,655	1,219	2,874
Patient days	3,629	3,259	6,888	2,505	1,912	4,417
ALOS (days)	1.2	1.2	1.2	1.5	1.6	1.5
Excluding same-day separations						
Patient days	1,240	919	2,159	1,507	1,114	2,621
ALOS (days)	1.9	2.1	2.0	2.3	2.6	2.4

Source: AIHW National Hospital Morbidity Database.

Just over a quarter of child hospitalisations for eye diseases and disorders had a principal diagnosis of disorders of ocular muscles, binocular movement, accommodation and refraction (Table A2.8). This diagnosis includes conditions such as strabismus (a lack of coordination between the eyes) and myopia (short-sightedness).

The second most common principal diagnosis was disorders of the eyelid, lacrimal system and orbit. This includes conditions such as chalazion (a cyst in the eyelid caused by the obstruction of the meibomian glands) and stenosis of the lacrimal passages (narrowing of the tear ducts).

Congenital malformations of the eye was the fourth most common eye-related diagnosis for children in hospitals, and the most common diagnosis for infants (aged under 1 year) (Table 5). The most common diagnosis for those aged 1–9 years was disorders of ocular muscles, binocular movement, accommodation and refraction. The most common diagnosis for those aged 10–14 years was disorders of the eyelid, lacrimal system and orbit, with eye-related injuries to the head being the second most common diagnosis for this age group.

Table 5: Top five principal diagnoses for eye diseases and disorders hospitalisations, by age group, ages 0–14 years, 2006–07

Age under 1		Ages 1–9		Ages 10–14	
Principal diagnosis	**Number**	**Principal diagnosis**	**Number**	**Principal diagnosis**	**Number**
Congenital malformations	206	Disorders of refraction and accommodation, etc.	1,982	Disorders of the eyelid, lacrimal system and orbit	372
Disorders of the eyelid, lacrimal system and orbit	137	Disorders of the eyelid, lacrimal system and orbit	1,525	Injuries to the head	285
Disorders of refraction and accommodation, etc.	77	Injuries to the head	762	Disorders of refraction and accommodation, etc.	247
Other disorders	59	Congenital malformations	705	Visual disturbances and blindness	95
Disorders of choroid and retina	58	Malignant neoplasms	240	Benign neoplasms	89

Source: AIHW National Hospital Morbidity Database.

Eye-related injuries to the head accounted for 12% of child hospitalisations, while this figure drops to 2% when looking at all ages (Table A2.8). Boys had higher rates than girls for most head injury hospitalisations. The most common eye-related head injury, which accounted for over half of such hospitalisations, was for open wounds to the eyelid and area around the eye. The second most common diagnosis was for contusion (bruising) of the eyeball and orbital tissues.

Nearly 40% of all procedures on children for an eye hospitalisation involved administering cerebral (general) anaesthesia (Table 6). Conduction (local or regional) anaesthesia represented only 0.5% of all procedures (performed 92 times), while for all ages this accounted for 16.5% of all eye procedures (AIHW 2008).

The most common procedure performed on the eye was strabismus repair, which reflects the large number of diagnoses for this condition among children.

Table 6: Leading procedures for eye diseases and disorder hospitalisations, ages 0–14 years, 2006–07

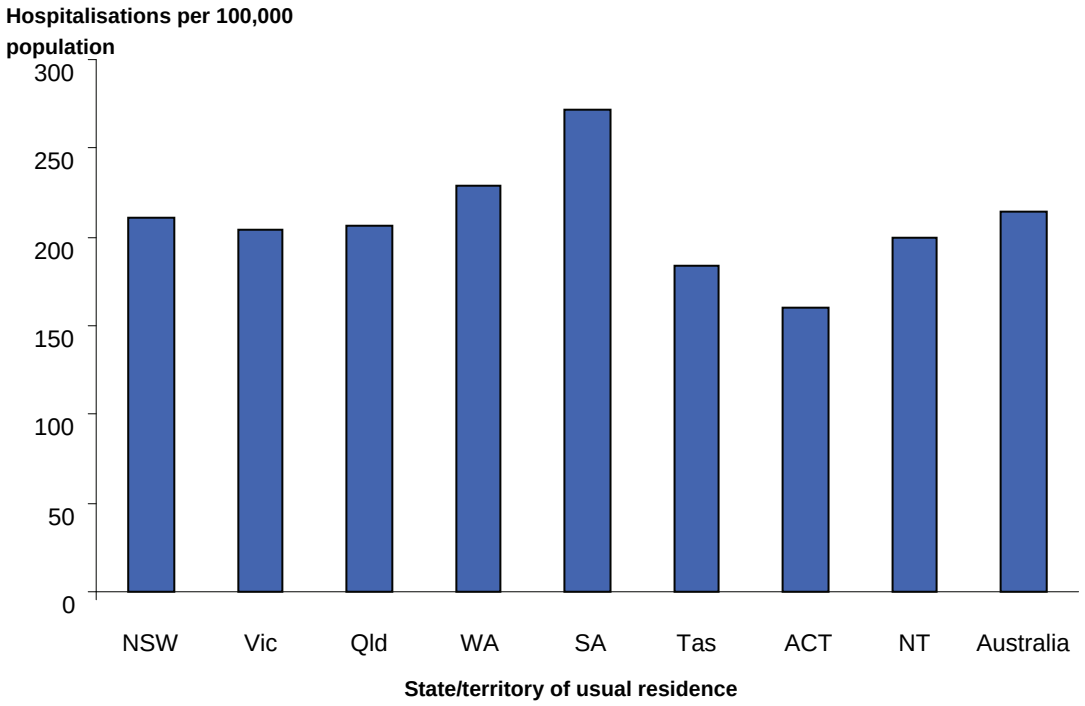
Rank	Procedure	ACHI block[(a)]	Number	Per cent of total
1	Cerebral anaesthesia	1910	7,012	39.8
2	Strabismus repair	216	1,954	11.1
3	Probing of lacrimal passages	241	1,001	5.7
4	Other excision procedures on eyelid	233	843	4.8
5	Examination procedures on eyeball	160	811	4.6
6	Generalised allied health interventions	1916	387	2.2
7	Magnetic resonance imaging	2015	329	1.9
8	Other repair procedures on eyelid	236	296	1.7
9	Repair of wound of skin and subcutaneous tissue	1635	275	1.6
10	Excision of lesion of skin and subcutaneous tissue	1620	235	1.3
	All procedures for eye diseases and disorders		**17,629**	**100.0**

(a) Australian Classification of Health Interventions (ACHI), 5th edition.

Source: AIHW National Hospital Morbidity Database.

Regional variation in hospitalisations

The rate of child eye disease and disorder hospitalisations was not uniform across states and territories in 2006–07. South Australia had the highest rate among the jurisdictions, while the lowest rates were in Tasmania and the Australian Capital Territory (Figure 7). However, South Australia's is the only rate to be significantly different from the other jurisdictions.



Notes

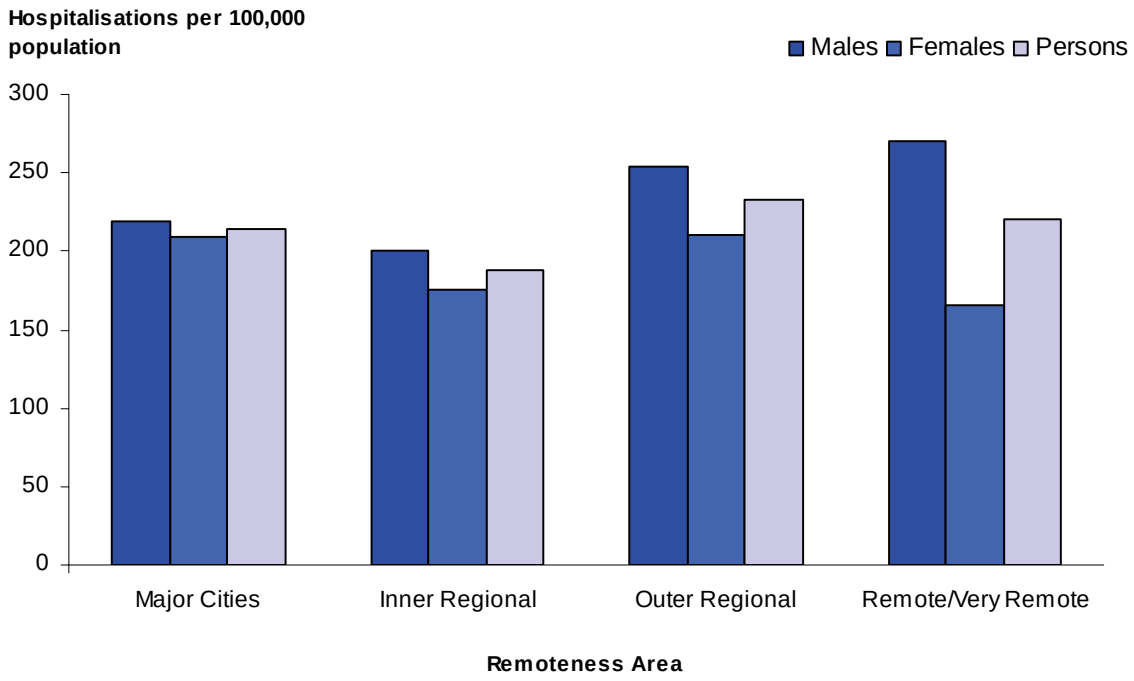
1. Directly age standardised to the 2001 Australian population.
2. Separations are counted by state of residence (regardless of the state of hospitalisation), and the denominator used is the state-specific population.

Source: AIHW National Hospital Morbidity Database.

Figure 7: Hospitalisations for eye diseases and disorders, by state/territory of usual residence, ages 0–14 years, 2006–07

It is also possible to look at hospitalisations by the remoteness of the patient's usual residence. This is done by using the Australian Standard Geographical Classification Remoteness Area categories. This classification is based on how far certain areas are, by road, from urban centres of various sizes. It is therefore an approximation of how accessible essential services are for residents of a particular area. There are five categories in the classification: Major Cities, Inner Regional, Outer Regional, Remote and Very Remote. In 2006 an estimated two-thirds of children lived in Major Cities. A further 31% lived in Regional areas, while only 3% lived in Remote and Very Remote areas.

There was no clear pattern regarding regional differences in child eye hospitalisations. Children in Outer Regional and Remote/Very Remote areas had hospitalisation rates slightly higher than the national average, while children in Inner Regional areas had the lowest rates (Figure 8; Table A2.9). Boys and girls had similar rates in Major Cities, but their rates diverged with increasing remoteness.



Note: Directly age standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Figure 8: Hospitalisations for eye diseases and disorders, remoteness area by sex, ages 0–14 years, 2005–06

There was some variation in principal diagnosis among the different areas. For example, the most common diagnosis in Major Cities was disorders of the eyelid, lacrimal system and orbit. In Inner and Outer Regional areas and Remote areas, the most common diagnosis was disorders of ocular muscles, binocular movement, accommodation and refraction. In Very Remote areas, the most common diagnosis was eye-related injuries to the head.

Hospitalisations by Indigenous status

The hospitalisation rate for Indigenous children was slightly lower than the rate for all children, although this difference was not statistically significant (Table 7). However, there was a large difference between boys and girls. While Indigenous boys had a higher rate of hospitalisation than the general population, Indigenous girls had a significantly (23%) lower rate.

Table 7: Hospitalisations for eye diseases and disorders among Aboriginal and Torres Strait Islander peoples, ages 0–14 years, 2006–07

Sex	Number of hospitalisations	Standardised hospitalisation ratio[(a)]	95% confidence interval
Males	210	1.08	0.94–1.23
Females	142	0.77	0.65–0.90
Persons	352	0.93	0.83–1.03

(a) The standardised separation ratio is the ratio of the observed number of separations to the number of expected separations of Indigenous Australians, stratified by age and sex.

Note: Data are for hospitalisations in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory (public hospitals only). These are the jurisdictions with the most complete Indigenous identification in hospital, but significant under-identification remains. These numbers underestimate the actual Indigenous separations for eye diseases and disorders.

Source: AIHW National Hospital Morbidity Database.

The principal diagnosis profile was also quite different for Indigenous children when compared to all Australian children. For example, the most common diagnosis for Indigenous children was eye-related injuries to the head, while the most common diagnosis for all children was disorders of ocular muscles, binocular vision, accommodation and refraction. Disorders of conjunctiva comprised 13% of Indigenous child hospitalisations, compared with 2% of all child hospitalisations.

Cancer incidence

Cancer of the eye and adnexa (accessory organs of the eye) is relatively rare, comprising only 0.3% of all new cases of cancer in 2004. Cancer (malignant neoplasm) incidence of the eye and adnexa among children has fallen slightly in the period 2000–2004 (Table 8). Most of these cancer cases were infants and 1–4 year olds.

Table 8: Incidence of malignant neoplasm of the eye and adnexa[(a)], 2000–2004

Age	2000	2001	2002	2003	2004
<1	7	7	6	6	4
1–4	16	10	5	8	12
5–9	1	2	1	3	1
10–14	2	2	0	1	2
0–14	**26**	**21**	**12**	**18**	**19**

(a) ICD-10 codes C69.

Source: National Cancer Statistics Clearing House database.

There were no cases of malignant melanoma of the eyelid (including the corners of the eye) among children aged 0–14 years in the period 2000–2004. Other types of malignant skin cancer (including those for the eye) are not routinely collected by the state and territory cancer registries, and are therefore not included in the National Cancer Statistics Clearing House database.

Mortality

Very few children die from diseases of the eye and adnexa (as defined by ICD-10 chapter VII) in Australia (WHO 1992). There was only one death in the period 1997–2006 with an underlying cause of an eye disease (see Box 2). There were, however, 30 deaths where an eye disease contributed to death (Table 9). A large proportion of these deaths were babies.

Table 9: Deaths from diseases of the eye and adnexa[(a)], underlying or associated causes of death, 1997–2006

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	1997–2006
0	1	1	0	3	2	3	1	1	1	0	13
1–4	2	0	0	0	1	0	1	0	1	2	7
5–9	0	2	1	1	0	0	0	1	0	0	5
10–14	0	0	2	1	1	0	0	0	0	1	5
0–14	**3**	**3**	**3**	**5**	**4**	**3**	**2**	**2**	**2**	**3**	**30**

(a) ICD-10 codes H00–H59.

Source: AIHW National Mortality Database.

Eye mortality can also include such things as injuries, cancers and congenital malformations which are not coded to ICD-10 chapter VII (Diseases of the eye and adnexa). Child mortality remained low even when these causes are included, with a total of 59 children dying of underlying or associated eye-related deaths in the 10 years between 1997 and 2006 (Table 10).

Table 10: Eye-related deaths, underlying or associated causes of death, by broad cause group, ages 0–14 years, 1997–2006 combined

	Diseases of the eye (H00–H59)	Cancer of the eye (C69)	Cancer of the eyelid (C431, C441)	Eye injuries (S001, S002, S011, S05)	Congenital malformations of the eye (Q10–Q15)
Underlying	1	5	0	—[(a)]	2
Associated	29	1	0	2	21
Total[(b)]	**30**	**6**	**0**	**2**	**23**

(a) Injuries are never the underlying cause of death; preference is given to the circumstances of death, that is, the accident that caused the injury.

(b) Two children had both a disease of the eye and a congenital malformation contribute towards their death.

Source: AIHW National Mortality Database.

Box 2: Understanding causes of death

The World Health Organization maintains and publishes the International Classification of Diseases (ICD) in order to help standardise cause of death coding worldwide (WHO 1992). This classification is divided into chapters based on body systems, disease types and injury and poisoning. Chapter VII of the classification (codes H00–H59) is devoted to diseases and disorders of the eye and its accessory organs. However, this chapter excludes some eye-related conditions which are listed elsewhere in the classification. For example, cancer of the eye is listed in chapter II ('Neoplasms').

Causes of death can also be classified as 'underlying' or 'associated' causes of death. Underlying causes are those which are deemed to have initiated the train of events which lead to a death. For each death there is only one underlying cause. Associated causes are conditions that contribute to the death, but which are not the originating factor in causing the death.

Appendix 1: Data sources and methods

A variety of data sources was used to compile this report, including administrative sources and sample surveys. Some of these are outlined below, followed by the methodology used in this report.

AIHW National Hospital Morbidity Database

The National Hospital Morbidity Database contains demographic, diagnostic, procedural and duration of stay information on episodes of care for patients admitted to hospital. The data items are supplied by state and territory health authorities to the AIHW for storage and custodianship. The database provides information on the number of hospitalisations and therefore it is not possible to count patients individually.

There are some important points to note when interpreting hospital data. The information presented in this report refers to hospital separations, not patients. A separation is an episode of care, which can be a whole hospital stay, or part of a hospital stay ending in a change of type of care (for example, from acute care to rehabilitation care). The same patient can have multiple separations within the same year and indeed within the same hospitalisation period. For these reasons, the data do not represent the number or proportion of people in Australia with eye conditions admitted to hospital.

This report uses the Australian Refined Diagnosis Related Groups (AR-DRG) approach to define separations and procedures related to diseases and disorders of the eye. AR-DRGs are a means of classifying episodes into diagnostically meaningful groups of episodes that have similar costs. This approach allows us to confidently define the boundaries of diseases and disorders of the eye in hospital data, although it may not capture every eye-related hospitalisation.

All data for this report had a 'care type' of 1 (acute care), 7.1 (newborn—qualified days only), 7.2 (newborn—qualified and unqualified days) and 11 (unknown and not reported). This is standard for analysis by DRGs. Consequently, eye-related separations for patients receiving palliative, rehabilitation, psychogeriatric or maintenance care are excluded.

Hospitalisations for Aboriginal and Torres Strait Islander peoples were restricted to New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory due to data quality issues for the remaining jurisdictions. Northern Territory data were restricted to public hospitals only.

AIHW National Mortality Database

Registration of deaths in Australia is the responsibility of the state and territory Registrars of Births, Deaths and Marriages. Information on the cause of death is

supplied by the medical practitioner certifying the death or by a coroner. Other information about the deceased is supplied by a relative or other person acquainted with the deceased or by an official institution where the death occurred. Registration of death is a legal requirement in Australia, and compliance is virtually complete.

The Registrars provide deaths data to the ABS for coding and compilation into national statistics. The AIHW also holds these data without unique identifiers in a national mortality database.

Australian Congenital Anomalies Monitoring System

The data are based on notifications to birth defects registries in New South Wales, Victoria, Western Australia and South Australia, and on data collected by perinatal data collections in Queensland, Tasmania and the Australian Capital Territory. The Northern Territory was unable to provide unit record data on congenital anomalies. Therefore, no data for the Northern Territory are included in this report.

Information of births (live births and fetal deaths of at least 20 weeks gestation or at least 400 grams birthweight) with one or more congenital anomaly notified to state or territory birth defect registries or perinatal data collections are included in this report. The data are affected by the availability and use of prenatal screening programs and diagnostic testing services, and whether the results of prenatal diagnostic tests are notified to congenital anomaly collections. Therefore, the prevalence of some congenital anomalies could be under reported.

Bettering the Evaluation And Care of Health (BEACH) program

The BEACH program is a continuous national study of general practice activity in Australia. It uses details of about 100,000 encounters between GPs and patients (about a 0.1% sample of all general practice encounters) from a random sample of approximately 1,000 recognised practising GPs from across the country.

A random sample of GPs who claimed at least 375 general practice Medicare items of service in the previous 3 months is regularly drawn from Medicare Australia data by the Primary Care Division of the Australian Government Department of Health and Ageing. GPs are approached by letter and followed up by telephone recruitment. Each participating GP completes details for 100 consecutive GP–patient encounters on structured paper encounter forms. They each also provide information about themselves and their major practice.

Commonwealth State/Territory Disability Agreement (CSTDA) National Minimum Data Set (NMDS)

Under the CSTDA, the Australian Government (Commonwealth) is responsible for the planning, policy setting and management of services for those with disability. The states and territories are responsible for all other disability support services.

The national minimum data set covers disability support services receiving some funding under the CSTDA. The CSTDA NMDS was implemented in 2002, with data on disability services collected on a full-year basis. Data are available for both service types and service users.

Medicare Benefits Schedule (MBS) dataset

The MBS is part of the Medicare Benefits Scheme, the aim of which is to provide an entitlement to benefits for medical and hospital services for all Australian residents. These benefits are based on fees determined for each service provided. These services are itemised, forming the schedule of fees. Statistics on each item are collected through claims to Medicare Australia.

It should be noted that not all medical services will be captured by the MBS. Examples of this include when a practitioner is not eligible to provide services attracting a Medicare benefit, when a patient is ineligible for Medicare, or for services which are not listed in the schedule.

National Aboriginal and Torres Strait Islander Health Survey

The 2004–05 National Aboriginal and Torres Strait Islander Health Survey is the largest health survey of Indigenous Australians conducted by the ABS. The sample size was 10,439 persons (or about one in 45 of the total Indigenous population), considerably larger than the supplementary Indigenous samples in the 1995 and 2001 National Health Surveys. This survey, which was conducted in remote and non-remote areas throughout Australia, was designed to collect a range of information from Indigenous Australians about health-related issues, including health status, risk factors and actions, and socioeconomic circumstances.

National Health Survey (NHS)

The NHS, conducted every 3 years by the ABS, is designed to obtain national information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle (ABS 2006). The most recent survey was conducted in 2007–08, with previous surveys being conducted in 2004–05, 2001, 1995, 1989–90, 1983 and 1977. The survey is community based and does not include information from people living in non-private dwellings or institutions (such as nursing homes, hospitals or prisons).

Data available from the NHS include self-reports of various long-term conditions, health risk factors and use of health services. For some conditions, information about age at diagnosis, medications used and other actions taken for treatment or management is also available.

Sydney Myopia Study

The Sydney Myopia Study studied a sample of about 4,000 six and 12 year old school children in the Sydney Metropolitan Area during 2003–05. A comprehensive eye examination was conducted for each participant, as well as a questionnaire completed by the parents of the child.

The study provides detailed, population-based clinical data on eye problems among children. Clinical studies may record disorders not known to the subject or their parents. Such problems may be missed in self-reported surveys. However, this is a geographically limited study and may not represent a national picture of children's eye health.

Estimated resident population

The Australian Bureau of Statistics estimated resident population was used in the calculation of rates. Where possible, the December estimated resident population for the relevant financial year was used (for example, December 2006 for use with 2006–07 hospital data).

Aboriginal and Torres Strait Islander peoples

The Indigenous estimated resident population is considered to be experimental because satisfactory data on births, deaths and migration are not generally available and because of the volatility of counts of the Indigenous population between censuses (ABS 2004). Analysis for the population data for Aboriginal and Torres Strait Islander peoples was limited to New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory due to data quality in the remaining jurisdictions in the National Hospital Morbidity Database. The average of the June 2005 and June 2006 populations were used.

Urban, rural and remote areas

Remoteness was categorised using the Australian Standard Geographical Classification (ASGC) Remoteness Area categories. The ASGC uses the Accessibility/Remoteness Index of Australia (ARIA), which is based on how distant a place is by road from urban centres of different sizes, and therefore provides a relative indication of how difficult it might be for residents to access certain services such as health care and education. The categories used in this report are 'Major cities of Australia', 'Inner regional Australia', 'Outer regional Australia', and 'Remote and Very remote Australia'.

Age standardisation

Age-standardised rates were used to remove the influence of age when comparing populations with different age structures. There are two methods used for age-standardising: direct and indirect.

Direct age standardisation

Direct age standardisation is used when the populations under study are large and the age-specific rates are considered to be reliable.

The calculation of direct age-standardised rates comprises three steps:

1. Calculate the age-specific rate for each age group in each study population.
2. Calculate the expected number of cases in each age group by multiplying the age-specific rate by the corresponding standard population for each age group.
3. Sum the expected number of cases in each age group and divide by the total standard population to give the age-standardised rate.

The 2001 Australian population was used as the standard population for this report.

Indirect age standardisation

Indirect age standardisation is used when populations under study are small or where there is some uncertainty about the stability of age-specific rates. The method removes the influence of age structure, but does not provide a measure of prevalence in terms of a rate. Rather, the measure is a comparison of the number of observed cases compared with the number expected if the age-specific prevalence rates of the standard population are applied to the study population.

The calculation of direct age-standardised rates comprises three steps:

1. Calculate the age-specific rates for each age group in the standard population.
2. Calculate the expected number of cases in each age group by multiplying the age-specific rates by the corresponding study population for each age group. Sum these to derive the total expected number of cases for the study population.
3. Sum the observed number of cases in the study population and divide by the total expected cases to give the standardised ratio.

A standardised ratio of 1 indicates that the number of observed cases was the same as the expected number of cases, indicating that rates in the study and standard populations are similar. A result greater than 1 indicates that more cases were observed than expected, and a result less than 1 indicates fewer cases than expected.

In this report, indirect age standardisation was used for comparing separation rates between Indigenous and non-Indigenous Australians. The standard population used was all Australians.

Appendix 2: Statistical tables

Table A2.1: Number of congenital eye diseases (and number per 10,000 births), 1998–2003

Problem	1998	1999	2000	2001	2002	2003
All reported eye anomalies	167	156	122	126	97	90
	(6.6)	(6.1)	(4.8)	(5.0)	(3.9)	(3.6)
Anophthalmos and microphthalmos	25	33	25	23	16	15
	(1.0)	(1.3)	(1.0)	(0.9)	(0.6)	(0.6)
Congenital cataract and other lens anomalies	44	45	39	25	31	28
	(1.7)	(1.8)	(1.5)	(1.0)	(1.2)	(1.1)
Congenital anomalies of the anterior chamber	30	33	21	18	22	21
	(1.2)	(1.3)	(0.8)	(0.7)	(0.9)	(0.8)
Glaucoma	9	11	8	9	12	3
	(0.4)	(0.4)	(0.3)	(0.4)	(0.5)	(0.1)

Source: Australian Congenital Anomalies Monitoring System.

Table A2.2: Top four eye-related problems managed by GPs, ages 0–14 years, 2006–07

Problem	Per cent of all child eye problems managed[(a)]	Estimated number of national problem contacts[(b)]
Conjunctivitis infectious	61.7	260,000
Blepharitis/stye/chalazion	10.8	45,000
Conjunctivitis allergic	4.9	20,000
Strabismus	3.8	16,000

(a) Based on 375 eye problems for 0–14 year olds managed by GPs.

(b) Based on 102,800,000 general practice Medicare items claimed in 2006–07.

Source: 2006–07 BEACH survey, Australian General Practice Statistics and Classification Centre, University of Sydney.

Table A2.3: Top four eye-related medications prescribed, advised or supplied by GPs, ages 0–14 years, 2006–07

Prescription	Per cent of all medications for child eye problems[(a)]	Estimated number of national medications[(b)]
Chloramphenicol eye	77.6	250,000
Cephalexin	3.1	10,000
Saline bath/solution/gargle	2.8	9,000
Tobramycin ophthalmic	2.7	8,500

(a) Based on 289 medications for eye problems for 0–14 year olds managed by GPs.

(b) Based on 102,800,000 general practice Medicare items claimed in 2006–07.

Source: 2006–07 BEACH survey, Australian General Practice Statistics and Classification Centre, University of Sydney.

Table A2.4: Source of eye-related medications prescribed, advised or supplied by GPs, ages 0–14 years, 2006–07

Source	Per cent of all medications for child eye problems[(a)]	Estimated number of national medications[(b)]
Prescribed	93.4	300,000
GP-supplied	1.8	6,000
Advised over-the-counter	4.8	15,000

(a) Based on 289 medications for eye problems for 0–14 year olds managed by GPs.

(b) Based on 102,800,000 general practice Medicare items claimed in 2006–07.

Source: 2006–07 BEACH survey, Australian General Practice Statistics and Classification Centre, University of Sydney.

Table A2.5: Top three eye-related referrals by GPs, ages 0–14 years, 2006–07

Referral	Per cent of all referrals for youth eye problems[(a)]	Estimated number of national referrals[(b)]
Ophthalmologist	76.8	35,000
Optometrist	12.4	5,500
Hospital	5.5	2,500

(a) Based on 40 referrals for eye problems for 0–14 year olds managed by GPs.

(b) Based on 102,800,000 general practice Medicare items claimed in 2006–07.

Source: 2006–07 BEACH survey, Australian General Practice Statistics and Classification Centre, University of Sydney.

Table A2.6: Trends in hospitalisations for eye diseases and disorders, ages 0–14 years, 2001–02 to 2006–07

	Number of hospitalisations			Hospitalisations per 100,000 population[(a)]		
Years	Males	Females	Persons	Males	Females	Persons
2001–02	4,848	4,309	9,157	237.1	221.8	229.7
2002–03	4,680	4,248	8,928	228.9	218.7	223.9
2003–04	4,606	3,992	8,598	225.1	205.4	215.5
2004–05	4,741	3,930	8,671	231.2	202.1	217.1
2005–06	4,544	3,936	8,480	219.8	200.7	210.5
2006–07	4,701	4,004	8,705	225.5	202.7	214.4

(a) Directly age standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Table A2.7: Hospitalisations for eye diseases and disorders, by age and sex, ages 0–14 years, 2006–07

	Number of separations			Hospitalisations per 100,000 population		
Age	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
0	420	332	752	302.6	252.3	278.1
1	757	664	1,421	552.9	513.0	533.5
2	571	455	1,026	423.7	358.3	392.0
3	435	397	832	325.5	313.8	319.8
4	422	369	791	315.8	290.8	303.6
5	359	313	672	265.2	243.5	254.6
6	317	238	555	231.2	182.4	207.4
7	210	220	430	152.5	167.6	159.8
8	203	187	390	146.9	142.5	144.7
9	188	124	312	135.1	93.9	115.0
10	219	116	335	155.7	87.0	122.2
11	124	144	268	86.7	106.2	96.2
12	140	144	284	96.8	105.0	100.8
13	163	157	320	112.4	114.3	113.3
14	173	144	317	118.6	104.2	111.6
0–14	**4,701**	**4,004**	**8,705**	**225.5**	**202.6**	**214.3**
Age-standardised rate[(a)]	–	–	–	**225.5**	**202.7**	**214.4**

(a) Directly age standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Table A2.8: Leading principal diagnoses for eye diseases and disorder hospitalisations, ages 0–14 years, 2006–07

Rank	Principal diagnosis[(a)]	ICD-10-AM[(b)]	Number	Per cent of total
1	Disorders of ocular muscles, binocular movement, accommodation and refraction	H49–H52	2,306	26.5
2	Disorders of eyelid, lacrimal system and orbit	H00–H06	2,034	23.4
3	Injuries to the head	S00–S09	1,073	12.3
4	Congenital malformations of the eye	Q10–Q15	959	11.0
5	Benign neoplasms of the eyelid and eye	D22, D23, D31	331	3.8
6	Malign neoplasms of the eyelid and eye	C44.1, C69	284	3.3
7	Disorders of lens	H25–H28	250	2.9
8	Foreign body on external eye	T15	238	2.7
9	Disorders of chorois and retina	H30–H36	224	2.6
10	Disorders of sclera, cornea, iris and ciliary body	H15–H22	189	2.2
	All hospitalisations for eye diseases and disorders		**8,705**	**100.0**

(a) This includes 'diagnosis blocks' containing two or more similar diagnoses combined.

(b) Version 5.1.

Source: AIHW National Hospital Morbidity Database.

Table A2.9: Hospitalisations for eye diseases and disorders, by remoteness, ages 0–14 years, 2005–06

Remoteness area	Males	Females	Persons
	Hospitalisations per 100,000 population (95% confidence interval)		
Major Cities	218.8 (211.0–226.9)	208.8 (200.9–216.9)	213.9 (208.3–219.6)
Inner Regional	200.7 (187.5–214.6)	175.5 (162.9–188.9)	188.5 (179.3–198.0)
Outer Regional	254.1 (233.3–276.3)	210.2 (190.8–231.1)	232.8 (218.4–247.9)
Remote/Very Remote	270.7 (207.9–340.9)	166.0 (115.6–224.4)	220.1 (179.0–265.0)

Notes

1. Excludes 281 separations where remoteness was unknown or not applicable.
2. Directly age standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Table A2.10: Top 10 Medicare services for optometry, ages 0–14 years, 2006–07

Service number	Service description	Services	Per cent of total
10900	Comprehensive initial consultation	306,353	53.6
10918	Subsequent consultation	171,171	30.0
10916	Brief initial consultation	23,953	4.2
10943	Children's vision assessment	22,919	4.0
10907	Consultation by another optometrist[(a)]	22,795	4.0
10913	Attendance where patient has new symptoms[(a)]	7,551	1.3
10912	Attendance where patient has significant change of visual function[(a)]	6,022	1.1
10914	Attendance where patient has a progressive disorder[(a)]	5,433	1.0
10940	Computerised perimetry	1,385	0.2
10905	Initial consultation referred by another optometrist	1,277	0.2

(a) Within 24 months of an initial consultation.

Source: Medicare Australia 2008.

Glossary

Accommodation The adjustment of the eye to variations in distance.

Adnexa Appendages of an organ. For the eye these include eyelids, lashes, extrinsic muscles of the eye and tear ducts.

Age standardisation A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many separations vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same standard structure, then the separation rates that would have occurred with that structure are calculated and compared.

AR-DRG Australian Refined DRG. A patient classification scheme that provides a clinically meaningful way of relating the types of patients treated in a hospital to the resources required by the hospital.

Associated cause(s) of death Any condition(s), diseases and injuries—other than the underlying cause—considered to contribute to a death. See also *Cause of death*.

Astigmatism An optical defect, whereby vision is blurred due to the inability of the optics of the eye to focus a point object into a sharp, focused image on the retina.

Average length of stay (ALOS) The average of the length of stay for admitted patient episodes, usually expressed in days.

Blindness Either a total loss of vision, or when there is no possibility of correcting vision through medical intervention. In Australia legal blindness is defined as best corrected visual acuity of 6/60 or below in the better eye.

Cause of death From information reported on the medical certificate of cause of death, each death is classified by the underlying cause of death according to rules and conventions of the 10th revision of the *International Classification of Diseases*. Deaths from injury or poisoning are classified according to the circumstances of the violence which produced the fatal injury, rather than to the nature of the injury. See also *Underlying cause of death*.

Computerised perimetry The determination and mapping of the limits of the visual field.

Confidence interval A statistical term describing a range (interval) of values within which we can be 'confident' that the true value lies, usually because it has 95% or higher chance of doing so.

Cornea The transparent front part of the eye that covers the iris, pupil, and anterior chamber.

Glaucoma A condition in which there is elevated pressure within the eye caused by obstruction of the outflow of aqueous humour. The chronic form may progress slowly over a number of years, producing gradual loss of peripheral vision. Glaucoma is a leading cause of blindness worldwide.

Hyperopia The inability of the eye to focus on nearby objects due to the rays of light entering the eye being brought to focus behind the retina. Also called *long-sightedness* or *far-sightedness*.

ICD-10 A classification system in the WHO Family of International Classifications. It is the international standard diagnostic classification for all general epidemiological and many health management purposes. It is used to classify diseases and other health problems recorded on many types of health and vital records including death certificates and hospital records.

ICD-10-AM The Australian modification of the international standard ICD-10. It consists of a tabular list of diseases and accompanying index, a tabular list and index of procedures and Australian Coding Standards for the selection of codes.
The ICD-10-AM uses an alphanumeric coding scheme for diseases. It is structured by body system and aetiology. The ICD-10-AM procedures component is based on the Medicare Benefits Schedule (MBS). The classification is structured by body system, site and procedure type. Procedures not currently listed in the MBS have also been included (for example, allied health interventions and cosmetic surgery).

Indigenous A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander and is accepted as such by the community with which he or she is associated.

Long-sightedness See *Hyperopia*.

Major Diagnostic Category (MDC) A high level of groupings of patients used in the AR-DRG classification. MDCs are generally based on a single body system or aetiology that is associated with a particular medical speciality.

Medicare Benefits Schedule (MBS) A listing of the Medicare services subsidised by the Australian Government.

Medication Medication that is prescribed, provided by the GP at the encounter, or advised for over-the-counter purchase.

Myopia A type of refractive error whereby distant objects appear blurred, usually due to light rays entering the eye being focused in front of the retina. Also called *short-sightedness* or *near-sightedness*.

Optometry/optometric services Primary eye-care, including diagnosis and management of eye problems, testing for visual acuity and prescribing lenses.

Orbit Bony cavity containing the eye and its muscles, glands and associated structures.

Principal diagnosis The diagnosis describing the problem that was chiefly responsible for the patient's episode of care in hospital (or attendance at the health care facility). Many related diagnoses in this report are aggregated into 'diagnosis blocks'.

Public hospital A hospital controlled by a state or territory health authority. In Australia, public hospitals offer free diagnostic services, treatment, care and accommodation to all who need it.

Refractive error The inability of the lens of the eye to focus on an image correctly, such as occurs in far- and near-sightedness.

Sclera The opaque membrane covering the back of the eyeball. It is connected to the muscles that move the eyeball and is pierced by the optic nerve.

Separation An episode of care in a hospital. This can refer to either the total stay (from admission to discharge, transfer, or death) or a portion of the total stay that ends in a change in the type of care (for example, moving from acute care to rehabilitation).

Short-sightedness See *Myopia.*

Strabismus A disorder whereby the visual axes of the eye are not directed at the same point. May be paralytic or non-paralytic.

Surgical, Other and Medical partitions MDCs are sub-divided into one of these partitions. The presence or absence of 'Operating Room' and 'Non-Operating Room' procedures is generally responsible for the assignment of a record to one or another of these partitions.

Trachoma An infectious disease of the eye caused by *Chlamydia trachomatis*. If left untreated, follicles form on the upper eyelids and grow larger until the granulations invade the cornea, eventually causing blindness.

Underlying cause of death The condition, disease or injury initiating the sequence of events leading directly to death; that is, the primary, chief, main or principal cause. Compare with *Associated cause(s) of death.*

Visual acuity The ability to see clearly and at a distance. It is measured using an eye chart, and is usually expressed as a fraction. For example, 'normal' visual acuity is expressed as '6/6'.

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List of tables

List of figures