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Hospital admitted patient expenditure
2004–05 to 2012–13

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Abbreviations

ABDS	Australian Burden of Disease Study
ABS	Australian Bureau of Statistics
ACCD	Australian Consortium for Classification Development
AIHW	Australian Institute of Health and Welfare
AN-SNAP	Australian National Sub-Acute and Non-Acute Patient Classification
AR-DRG	Australian Refined Diagnosis Related Group
DCL	Diagnosis Complexity Level
ECCS	Episode Clinical Complexity Score
HASAC	Health and Allied Services Advisory Council
HMCM	hospital morbidity costing model
ICD	International Classification of Diseases
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification
IFRAC	admitted patient fraction
IHPA	Independent Hospital Pricing Authority
METeOR	AIHW's Metadata Online Registry
NAPOOS	non-admitted patient occasions of service
NEC	not elsewhere classified
NHCDC	National Hospital Cost Data Collection
NHMD	National Hospital Morbidity Database
NPHED	National Public Hospital Establishments Database
OECD	Organisation for Economic Co-operation and Development
WHO	World Health Organization

Symbols

. .	not applicable
n	number
—	nil or rounded to zero

Summary

There is substantial demand for information about the nature and drivers of health expenditure. In this context, the Australian Institute of Health and Welfare (AIHW) has prepared new estimates of expenditure on admitted patient care in Australia's hospitals, providing details about expenditure for different demographic groups in the population, and expenditure related to different disease groups. The information complements the overall health expenditure information in the AIHW's regular *Health expenditure Australia* reports.

The basis of the information is a new data set that provides an estimate of expenditure associated with every admitted patient separation from public and private hospitals, for the period 2004–05 to 2012–13. The purpose of this report is to outline the methods used to develop this data set and to highlight the key trends in the data.

Overall trends

In 2012–13, hospital admitted patient expenditure was estimated at $45.0 billion, and accounted for almost one-third (31%) of total health expenditure. This was $14.1 billion higher (in real terms) than in 2004–05, representing a 45.5% growth over the 9-year period. Both unit cost and volume factors played a role in this growth; however, volume was a much greater contributor.

Demographics

In 2012–13, admitted patient expenditure was highest in older age groups, with the highest in the 65–69 age group. In contrast, expenditure was highest in the 75–79 age group in 2004–05. Other peaks in expenditure over the period occurred in the youngest age group (under 1) and the 30–34 age group. All age groups experienced an increase in expenditure, with increases ranging from 25.9% in the 75–79 age group to 79.8% for patients aged 95 and over. Spending per person increased for all age groups, with an average growth of 22.4% over the period. Growth in per person spending was greatest in the 35–54 age range, peaking at 39.7% for males in the 45–49 age group.

Admitted patient expenditure in 2012–13 was estimated at $21.8 billion for males and $23.2 billion for females. Male expenditure was highest for the 65–69 age group while female expenditure was highest for the 80–84 age group. Females aged 10–14 experienced the highest growth rate, whereas for males it was the 45–49 age group.

In 2012–13, admitted patient expenditure for Aboriginal and Torres Strait Islander people was estimated at $2.1 billion—$955 million higher (in real terms) than in 2004–05. This represents growth of 84.4% over the 9-year period.

Diseases

In 2012–13, the percentage of admitted patient expenditure for *Cardiovascular diseases* was the highest at 11.1% ($5.0 billion). The next highest was *Injuries* at 9.0%, then *Reproductive and maternal conditions*, *Gastrointestinal diseases* (both 7.8%) and *Chronic musculoskeletal disorders* (7.7%).

The disease expenditure groups that accounted for the highest proportion of admitted patient expenditure for Aboriginal and Torres Strait Islander people in 2012–13 were *Mental and behavioural disorders* (11.7%), *Kidney and urinary diseases* (10.5%) and *Injuries* (9.5%).

1 Introduction

As part of the annual health expenditure series, the Australian Institute of Health and Welfare (AIHW) publishes estimates of expenditure at the national and state and territory levels. These data are used to monitor national health expenditure and assess the impact of policy changes, as well as being provided to the Organisation for Economic Co-operation and Development (OECD) and the World Health Organization (WHO) to assist in international comparisons.

In addition to the annual expenditure series, the AIHW has periodically conducted additional studies into the nature of health expenditure, including the analysis of expenditure by the demographic characteristics of the population and the diseases or conditions being managed. This work has apportioned expenditure to population groups based on age, sex and Indigenous status, and to disease expenditure groups using the International Classification of Diseases (ICD) and the AIHW's Australian Burden of Disease Study (ABDS) groups (AIHW 2015a). The AIHW has previously developed these 'disease expenditure' estimates for 2010–11 (AIHW 2013b), 2008–09 (AIHW 2011, 2013a, 2013c, 2014a, 2014b), 2004–05 (AIHW 2010a), 2000–01 (AIHW 2005a) and 1993–94 (AIHW: Mathers et al. 1998a).

These data provide important insights into the nature and drivers of health expenditure, including how an ageing population affects health expenditure and comparisons of health expenditure between Aboriginal and Torres Strait Islander and non-Indigenous Australians.

In this report, the development of a historical time series of hospital admitted patient expenditure is an improvement on the past, as has been the allocation of expenditure to additional diagnoses (as appropriate) as well as to the principal diagnoses recorded for each episode of admitted patient care. The expenditure on admitted patients is an important component of the AIHW's broader disease expenditure work as the expenditure represents more than one-third of total recurrent health expenditure in Australia. Further improvements, including use of the latest activity-based funding classifications and cost estimates could be included in the future.

The product of this work has been the creation of a new data set of hospital admitted patient expenditure estimates for 2004–05 to 2012–13. This data set adds expenditure information to the hospital activity data such that there is now an estimate of expenditure associated with every public and private admitted patient record in the AIHW National Hospital Morbidity Database (NHMD) throughout the period. Estimates in this report are based on admitted patient expenditure reported in the AIHW's regular *Health expenditure Australia* reports, with the disease expenditure reported using groups based on the ABDS groups.

The purpose of this report is to outline the methods used to develop this data set, to allow others to understand the potential uses for these data, and to provide insight into trends in admitted patient expenditure over the period. The first release of these data was included in *Australia's health 2016* (AIHW 2016b).

Chapter 2 outlines the data and methods used to create this data set; Chapter 3 focuses on an overview of total admitted patient expenditure; Chapter 4 presents analysis by age, sex, geographical location and Indigenous status; Chapter 5 presents analysis by disease expenditure groups; and Chapter 6 presents information on future directions. Additional analyses and methods are presented in the appendixes.

2 Method

The main objective of the admitted patient expenditure project has been to add estimated expenditure information to the NHMD for 2004–05 to 2012–13.

The NHMD is a compilation of summary records from admitted patient morbidity data collection systems in Australian hospitals. It provides information on each public and private episode of admitted patient care or separation in a given year. The information collected in the NHMD relates to the patient, the hospital, the activity that occurred during the patient's stay and the diagnoses that were associated with the separation—using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM).

The expenditure information that was added includes an estimate of the expenditure related to each separation as well as an indication of how much of the expenditure was related to each diagnosis.

The main steps used to create this new data set are outlined in the following sections and include:

1. estimating the cost of each separation
2. scaling costs to total hospital expenditure
3. assigning expenditure to diagnoses.

The main data sources that were used in this work were:

- the National Hospital Cost Data Collection (NHCDC) data set; specifically, cost information for the Australian Refined Diagnosis Related Groups (AR-DRGs) for 2004–05 to 2012–13. This was obtained from the Independent Hospital Pricing Authority (IHPA 2013)
- the IHPA's review of the AR-DRG case complexity process (ACCD 2014) which was used to identify the ICD-10-AM codes for which cost allocation was relevant
- the National Public Hospital Establishments Database (NPHED) which includes the total expenditure for each public hospital each year. It also provides an estimate of the fraction of the expenditure that was related to inpatient or admitted patient care (known as the admitted patient fraction or IFRAC)
- the Australian Bureau of Statistics (ABS) *Private hospitals Australia* report series (4390.0) which reports private hospital expenditure data
- the AIHW health expenditure database which provides the total expenditure on public and private hospitals within a jurisdiction in a given year. This allows integration with the total health system expenditure as published in *Health expenditure Australia* reports.

Details of the limitations of this method have been included in Appendix B.

Step 1: estimating the cost of each separation

A cost for every separation was estimated using the AIHW hospital morbidity costing model (HMCM). The HMCM estimates acute hospital admitted patient costs by apportioning the total admitted patient expenditure to individual episodes of hospitalisation with an adjustment for the resource intensity of treatment for the specific episode (using the AR-DRGs) and the length of stay. The length of stay adjustment is made in such a way as to reflect that some

costs are proportional to length of stay (for example, ward costs and meals), whereas others are independent of length of stay (for example, theatre costs). The subdivision of episode costs into these cost 'buckets' was made using NHCDC data. The HMCM employs different methodologies to estimate the cost of separations classified as acute or subacute and non-acute.

Cost weight information for the AR-DRG assigned to the separation forms the basis of the cost estimation method. State- and territory-level public costs were used for public hospitals while national private costs were used for private hospitals. The version of the AR-DRG cost weights that was used for each year is presented in Table 2.1.

Table 2.1: AR-DRG versions used in the HMCM for years 2004–05 to 2012–13

Year	AR-DRG cost weight files used
2004–05	2004–05 (AR-DRG 5.0) for public and private hospitals
2005–06	2005–06 (AR-DRG 5.0) for public and private hospitals
2006–07	2006–07 (AR-DRG 5.1) for public and private hospitals
2007–08	2007–08 (AR-DRG 5.1) for public and private hospitals
2008–09 to 2010–11	2008–09 (AR-DRG 5.2) for public and private hospitals
2011–12	2011–12 (AR-DRG 6.0x) for public hospitals and 2008–09 (AR-DRG 5.2) for private hospitals
2012–13	2012–13 (AR-DRG 6.0x) for public hospitals and 2008–09 (AR-DRG 5.2) for private hospitals

Costs were not allocated to hospital separations for which care type was reported as newborn with no qualified days (as costs are assumed to be included with those for the mother), hospital boarders and posthumous organ procurement.

1.1: Estimating the cost of acute separations

The NHCDC provides data for each AR-DRG relating to a range of cost components or cost buckets, such as surgical and accommodation costs (IHPA 2013). The AIHW's HMCM estimates the cost of accommodation for a given separation by dividing the average accommodation costs for the AR-DRG by the average length of stay from the NHCDC to obtain an estimate of the average accommodation cost per day. This estimate was then multiplied by the actual length of stay to provide an estimate of the cost of accommodation associated with the separation. The cost of accommodation was added to the costs associated with the other cost buckets to estimate the total cost of the separation.

1.2: Estimating the cost of subacute and non-acute separations

For subacute and non-acute separations, the cost estimates were based on the Australian National Sub-Acute and Non-Acute Patient Classification (AN-SNAP) study (Eagar et al. 1997). The AN-SNAP provided a base cost for each day of the hospital stay based on data collected in 1996–97. These base per diem costs were inflated to reflect the 'real' value of the dollar amount in the relevant financial year, using the implicit price deflator for final government consumption expenditure on hospital and nursing home care reported in *Health expenditure Australia 2013–14* (AIHW 2015b). These adjusted per diem costs were multiplied by the length of stay for the separation to provide the estimate of the total cost of the separation.

1.3: Application of Indigenous loading

The estimated cost of each separation was then adjusted according to the Indigenous status of the patient. Based on recent work by the IHPA that suggests that the cost of separations for Aboriginal and Torres Strait Islander people tends to be around 5% higher than the average cost for all separations within an AR-DRG, a 5% loading was added to the estimated cost for Aboriginal and Torres Strait Islander patients (IHPA 2012). This cost adjustment is independent of adjustment for under-identification of Indigenous patients that can be applied when reporting admitted patient expenditure for Aboriginal and Torres Strait Islander people.

Step 2: scaling costs to total hospital expenditure

The cost estimates for all separations were then scaled so that the total cost for a given hospital reflects the cost estimates of the admitted patient expenditure for that hospital.

2.1: Scaling costs for public hospital separations

Total expenditure for each public hospital was sourced from the NPHED. The admitted patient care component was then estimated using the IFRAC provided by the states and territories for each hospital.

Where an IFRAC was unavailable (55 of approximately 750 hospitals in the 2012–13 NPHED), the Health and Allied Services Advisory Council (HASAC) ratio (see Cooper-Stanbury et al. 1994) was used**.** With the HASAC method, the IFRAC was calculated using the following formula:

IFRAC = patient days/patient days + (NAPOOS/ratio)

where:

- NAPOOS = non-admitted patient occasions of service;
- IFRAC = the calculated IFRAC (or admitted patient fraction); and
- ratio = the ratio of non-admitted patient cost per service to admitted patient cost per service.

For each public hospital, its IFRAC ratio was applied to its total hospital expenditure to estimate its admitted patient expenditure. The estimated cost of each separation for the hospital was then summed. A scaling factor was then calculated by dividing the admitted patient expenditure by the sum of the estimated separation costs for that hospital.

The cost estimates for all separations in that hospital were then multiplied by the scaling factor to ensure the sum of the estimated separation costs matched the hospital's estimated admitted patient expenditure.

2.2: Scaling costs for private hospital separations

For private hospital separations, expenditure was scaled to match national private hospital expenditure from the ABS *Private hospitals Australia* report series (ABS cat. no. 4390.0). The HASAC ratio (above) was used to estimate an IFRAC for private hospitals in aggregate.

Similar to above, this IFRAC was applied to total private hospital expenditure to estimate total private hospital admitted patient expenditure. The estimated cost of each separation for the sector was then summed, and the scaling factor was calculated by dividing the admitted patient expenditure by the sum of the estimated separation costs. Finally, the cost estimates

for all private hospital separations were multiplied by the scaling factor to ensure the sum of all private hospital separation costs matched total private hospital admitted patient expenditure.

Step 3: assigning expenditure to diagnoses

Each separation in the NHMD has a principal diagnosis (id: 391326)—AIHW's Metadata Online Registry (METeOR)—which is the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of care in hospital. In many cases, there are also 1 or more additional diagnoses, defined as a 'condition or complaint either coexisting with the principal diagnosis or arising during the episode of care' (METeOR id: 391322).

Previous methods for allocating admitted patient expenditure attributed the patient's total cost to a single diagnosis, the principal diagnosis. This, however, ignores the issue of comorbidity as well as the potential for diseases and conditions to arise during a hospital stay. Essentially, both the principal and additional diagnoses can drive expenditure, but not in all cases. In some cases, the additional diagnoses may not be cost relevant (ACCD 2014).

3.1: Mapping to the ICD-10-AM Eighth Edition

Diagnosis codes in the NHMD are classified according to ICD-10-AM. During 2004–05 to 2012–13, there were a number of updates to the classification system. To allow for broad comparability over time, diagnosis codes in all years of the NHMD were mapped to the ICD-10-AM Eighth Edition using the mapping tables available from the Australian Consortium for Classification Development (ACCD) <https://www.accd.net.au/Downloads.aspx>. Table 2.2 shows the relevant ICD-10-AM editions from 2004–05 to 2012–13.

Stepwise mapping was performed for diagnoses coded in earlier editions. For example, for diagnoses classified to the ICD-10-AM Fifth Edition, mapping was performed first from the Fifth Edition to the Sixth Edition, with the results of this then mapped to the Seventh Edition, and finally a mapping to the Eighth Edition.

Table 2.2: ICD-10-AM editions, 2004–05 to 2012–13

Year	ICD-10-AM edition
2004–05 to 2005–06	Fourth Edition
2006–07 to 2007–08	Fifth Edition
2008–09 to 2009–10	Sixth Edition
2010–11 to 2012–13	Seventh Edition

This mapping allows admitted patient expenditure over time to be produced and analysed based on the ICD-10-AM Eighth Edition. Refer to Appendix F for an example of this.

3.2: Distributing separation costs to relevant diagnoses

The next step in the process of developing the hospital admitted patient expenditure data was to identify which diagnoses recorded for the separation were cost relevant. To identify those diagnoses that were cost relevant, work produced as part of the development of AR-DRG (version 8) was used (ACCD 2014).

A new approach to estimating the relative resource consumption of separations within an adjacent AR-DRG was identified (adjacent AR-DRGs are groups of AR-DRGs based on the

same diagnosis or procedure codes that are different in terms of their overall resource requirements).

The Episode Clinical Complexity Score (ECCS) was developed, which is an aggregation of the Diagnosis Complexity Level (DCL) scores that are applied to all diagnoses.

As part of the development of DCLs, a number of diagnoses were designated as 'out-of-scope' (given a DCL of 0) on the basis that they (ACCD 2014):

(a) are of ill-defined and/or transient conditions or symptoms that may be best classified to other more specific chapters within the classification

(b) provide context rather than information critical to the clinical description of an acute admitted episode of care

(c) or identify a characteristic that is already captured by other diagnosis codes present on the record of the acute admitted episode of care.

In developing the hospital admitted patient expenditure data, the principal diagnosis was always assumed to drive expenditure, even if excluded in the ACCD work, because of its role in occasioning the hospital stay. Some additional diagnoses were always considered out-of-scope regardless of the adjacent AR-DRG in which they occurred (unconditional exclusions). Some additional diagnoses were excluded conditionally based on the presence of other codes (conditional exclusions).

The excluded diagnoses were not assumed to drive any of the expenditure unless they were reported as the principal diagnosis. Excluded codes appeared as the principal diagnosis in 1.6 million separations in 2012–13 (17.6% of all separations).

The excluded codes that commonly appeared as a principal diagnosis were *R07.4 Chest pain unspecified*, or examinations, such as *Z08.0 Follow-up examination after surgery for other condition* and *Z09.0 Follow-up examination after surgery for malignant neoplasm* (Table 2.3).

Table 2.3: Most common excluded codes that appeared as the principal diagnosis, 2012–13

ICD-10-AM code	Description	Number of Separations
R07.4	Chest pain unspecified	98,443
Z08.0	Follow-up examination after surgery for other condition	42,110
Z09.0	Follow-up examination after surgery for malignant neoplasm	46,002

Source: Disease expenditure database.

With the non-cost-relevant diagnoses excluded, the expenditure for each separation was divided evenly between each of the cost-relevant diagnoses. This decision is discussed in some detail under 'Limitations of Step 3: Assigning expenditure to diagnoses' in Appendix B.

This change marks one of the key differences between the current method and previously used methods for determining disease expenditure. In sum, this method results in a redistribution of expenditure away from those diagnoses that are more commonly the principal diagnosis.

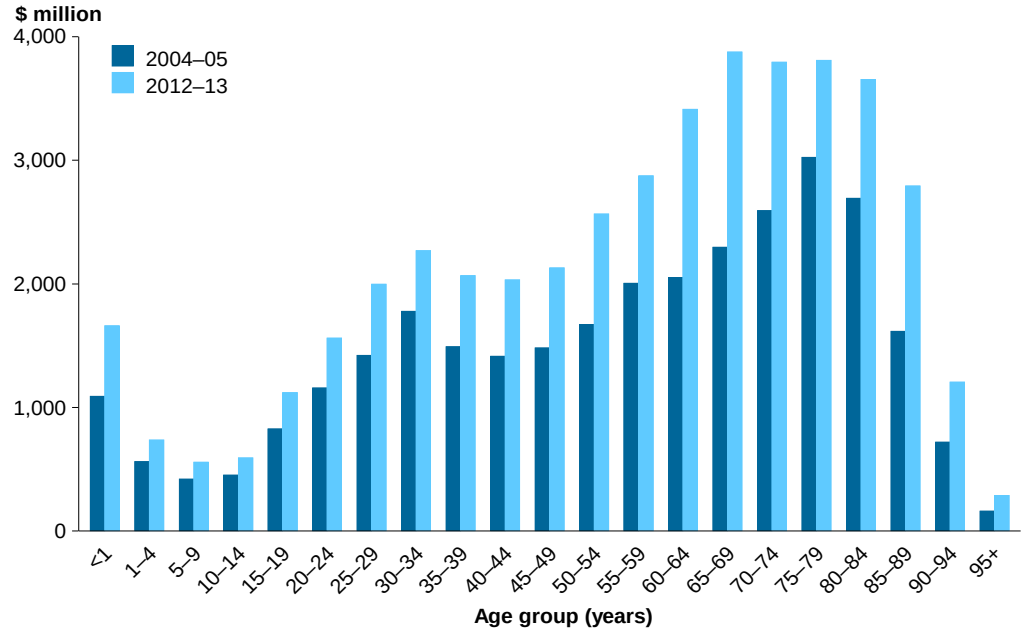
3 Overview of findings

Total admitted patient expenditure

In 2012–13, hospital admitted patient expenditure was estimated at $45 billion, accounting for almost one-third (31%) of total health expenditure (AIHW 2016c).

Age

For all age groups, total hospital admitted patient expenditure grew over the period from 2004–05 to 2012–13 (45.5% growth), and growth was mostly concentrated in the older age groups (Figure 3.1). With the exception of the under 1 age group, those aged 50 and over were the only other groups to experience above average growth.



(a) Constant price health expenditure, expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 3.1: Total hospital admitted patient expenditure[(a)], by age, 2004–05 and 2012–13

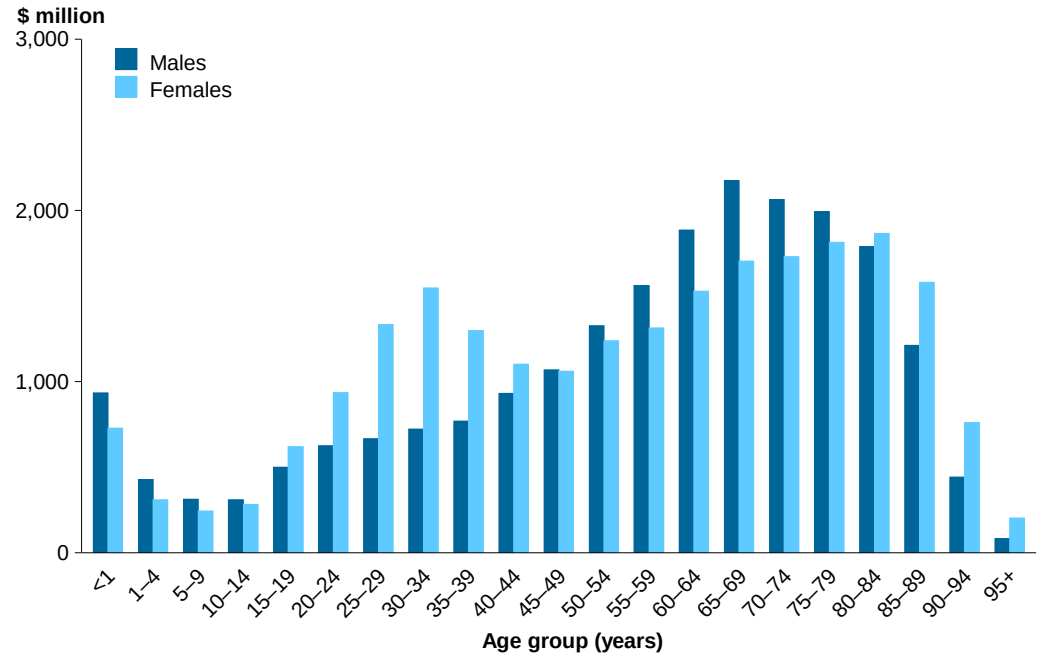
Sex

Total hospital admitted patient expenditure in 2012–13 was estimated at $21.8 billion for males and $23.2 billion for females. The pattern of expenditure across age groups varied between the sexes (Figure 3.2). Two-thirds (67%) of total male expenditure was on those aged 50 and over ($14.5 billion), with male expenditure highest for the 65–69 age group ($2.2 billion).

Expenditure for females aged 50 and over was estimated at $13.7 billion (59% of total female expenditure). The age of highest expenditure was for those aged 80–84 ($1.9 billion). A further $5.1 billion (22% of total female expenditure) was spent on those aged 20–39, likely

reflecting high expenditure on *Reproductive and maternal conditions* for females in this age group (see Chapter 5 for more details).

Total expenditure for females aged 85 and over was almost 1.5 times higher than that for males in the same age group ($2.5 billion compared with $1.7 billion, respectively).



Source: Disease expenditure database.

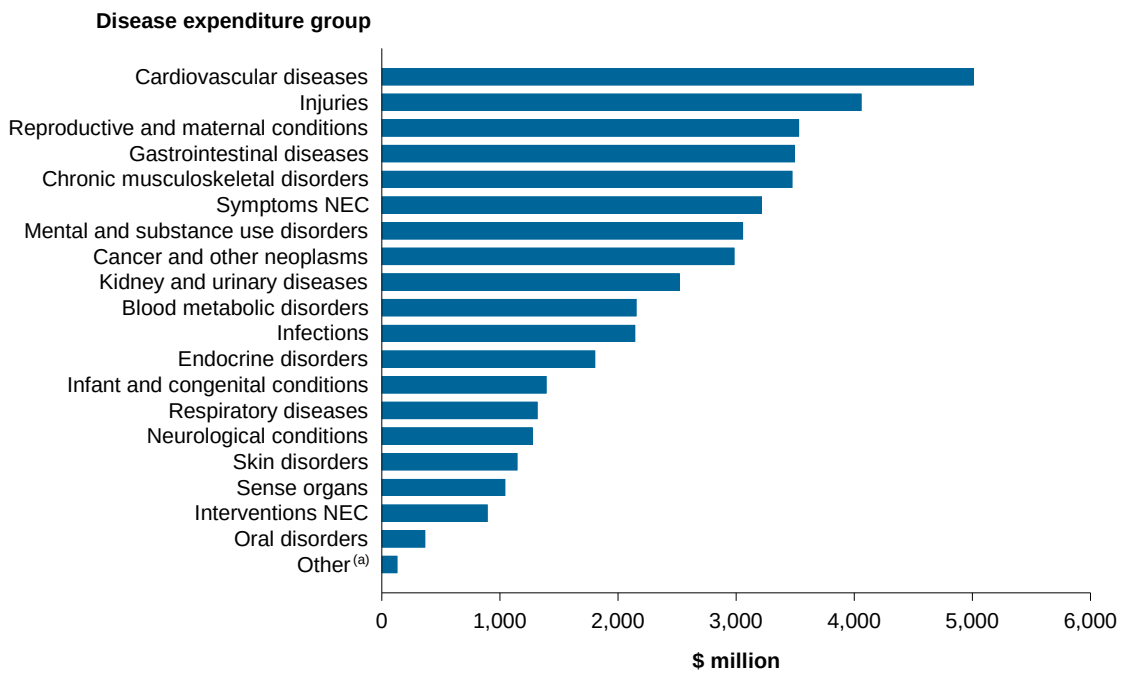
Figure 3.2: Total hospital admitted patient expenditure, by age and sex, 2012–13

Disease expenditure groups

The disease expenditure groups are based on the ABDS categorisation of diseases. See Chapter 5 for details.

In 2012–13, admitted patient expenditure for *Cardiovascular diseases* was estimated at $5.0 billion (11.1% of total expenditure), the highest of all the major disease expenditure groups. This was close to $1 billion more than the next highest group, which was *Injuries* at $4.1 billion (9.0% of total spending). These 2 groups accounted for about a fifth (20.2%) of total spending.

The next highest expenditure groups were *Reproductive and maternal conditions*, *Gastrointestinal diseases* and *Chronic musculoskeletal disorders*, which each comprised about $3.5 billion in spending. Together, these 5 major disease expenditure groups accounted for 43.5% of total hospital admitted patient expenditure (Figure 3.3).



(a) Includes Examination and observation NEC; and Physical, behavioural and social problems NEC.

Source: Disease expenditure database.

Figure 3.3: Hospital admitted patient expenditure by disease expenditure groups, 2012–13

Growth in expenditure

Hospital admitted patient expenditure in 2012–13 ($45.0 billion) was $14.1 billion higher (in real terms) than in 2004–05 ($30.9 billion). This represents a 45.5% growth over the 9-year period (Figure 3.4). This growth was faster than population growth over the same period. In 2012–13, hospital admitted patient expenditure was an estimated $1,962 per person in Australia, which was $421 higher (in real terms) per person than in 2004–05 (Figure 3.5). This suggests that 27.3% more was spent on hospital admitted patient services per Australian in 2012–13 than in 2004–05.

Both unit cost and volume factors played a role in this growth. That is, there was both an increase in expenditure per separation as well as in the number of separations. Volume, however, was a far greater contributor.

In 2012–13, hospital admitted patient expenditure per separation was estimated to be $397 higher than in 2004–05 (Figure 3.6). This represents 9.0% growth in per separation expenditure over the 9-year period, from $4,403 to $4,801.

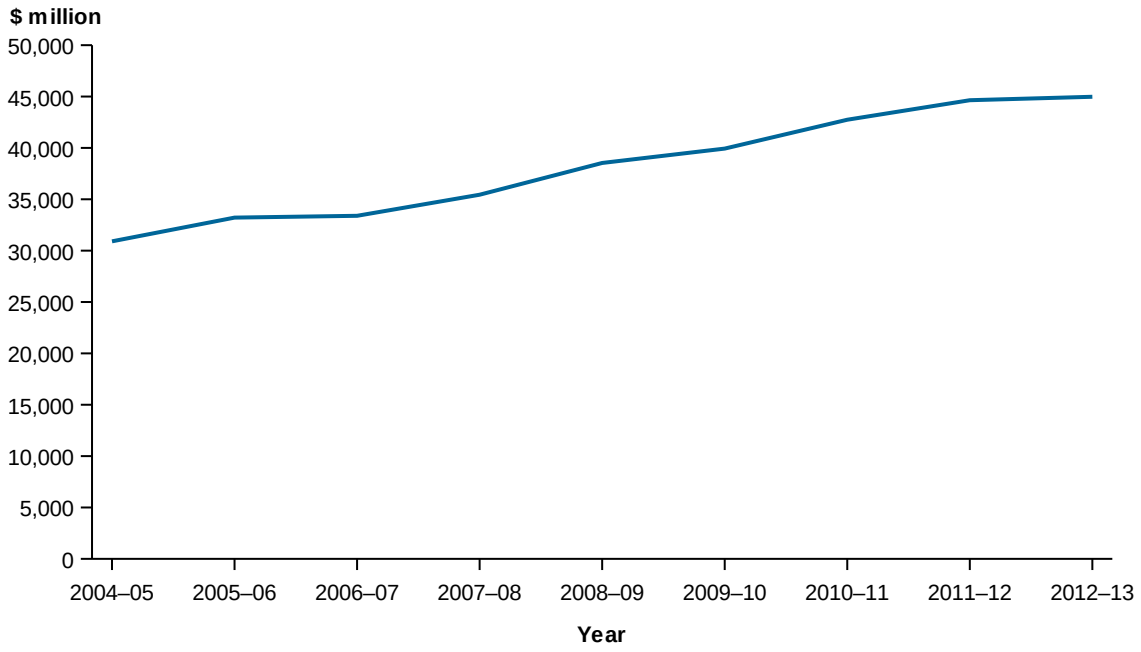
In 2012–13, hospital admitted patient expenditure was $1,624 per bed day—$327 higher than $1,297 in 2004–05 (Figure 3.7). This represents 25.2% growth in per bed day expenditure over the 9-year period.

The fact that the growth in expenditure per separation (9.0%) was lower than per bed day (25.2%) reflects that the average number of bed days per separation declined over the period by 12.9%, from 3.4 to 3.0.

Furthermore, the fact that the growth in expenditure per separation was much lower than either the growth in per person expenditure (27.3%) or total expenditure (45.5%) over the

same period suggests that the growth in spending was driven more by an increase in the volume of services than the cost of individual episodes of care.

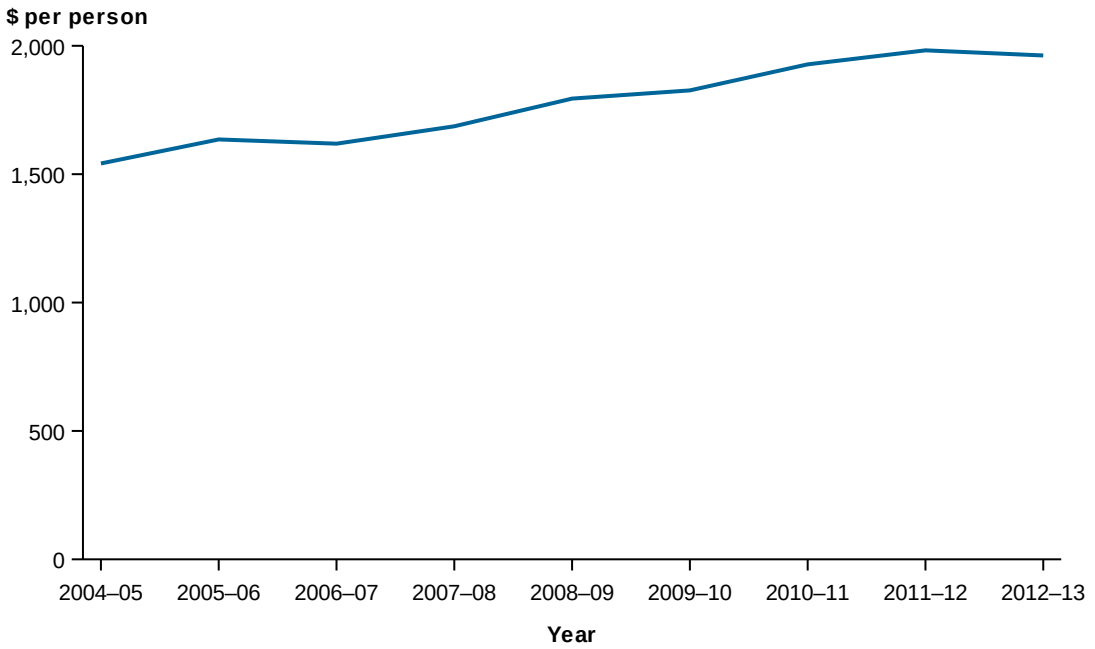
This is supported by the data showing that, over the same period, the number of hospital admitted patient separations grew by 33.5% (Table 4.1), with 16.7% growth in the number of separations per Australian, from 0.36 to 0.42 (crude rate).



(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 3.4: Hospital admitted patient expenditure[(a)], 2004–05 to 2012–13

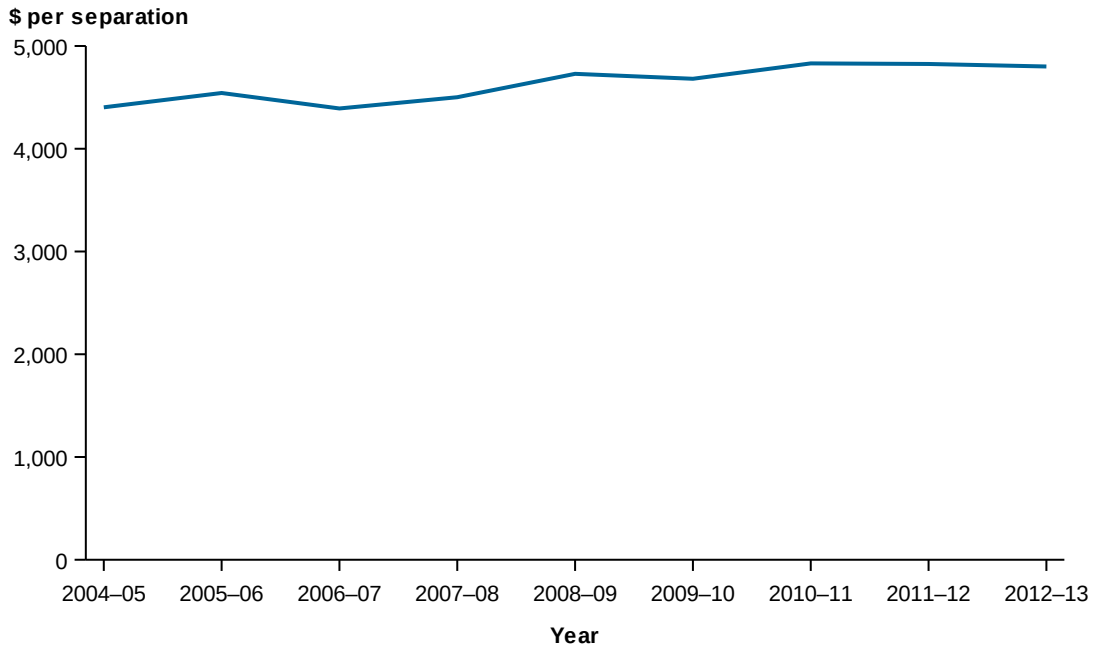


(a) Based on annual estimated resident population. Refer to the Technical notes for further details.

(b) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

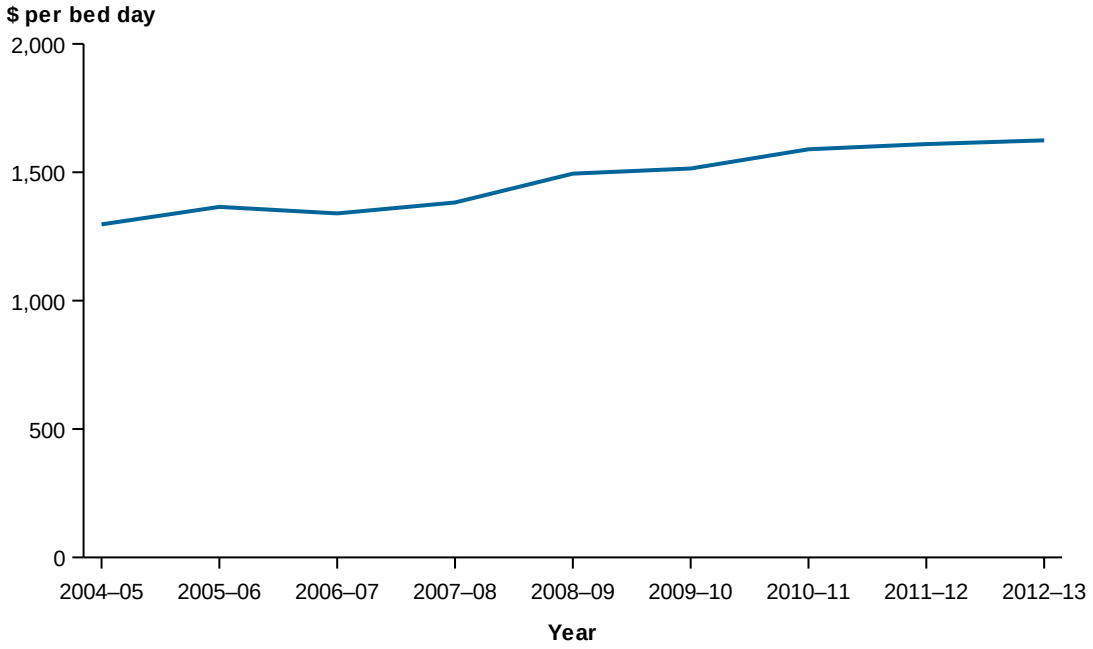
Figure 3.5: Hospital admitted patient expenditure per person[(a)(b)], 2004–05 to 2012–13



(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 3.6: Hospital admitted patient expenditure per separation[(a)], 2004–05 to 2012–13



(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

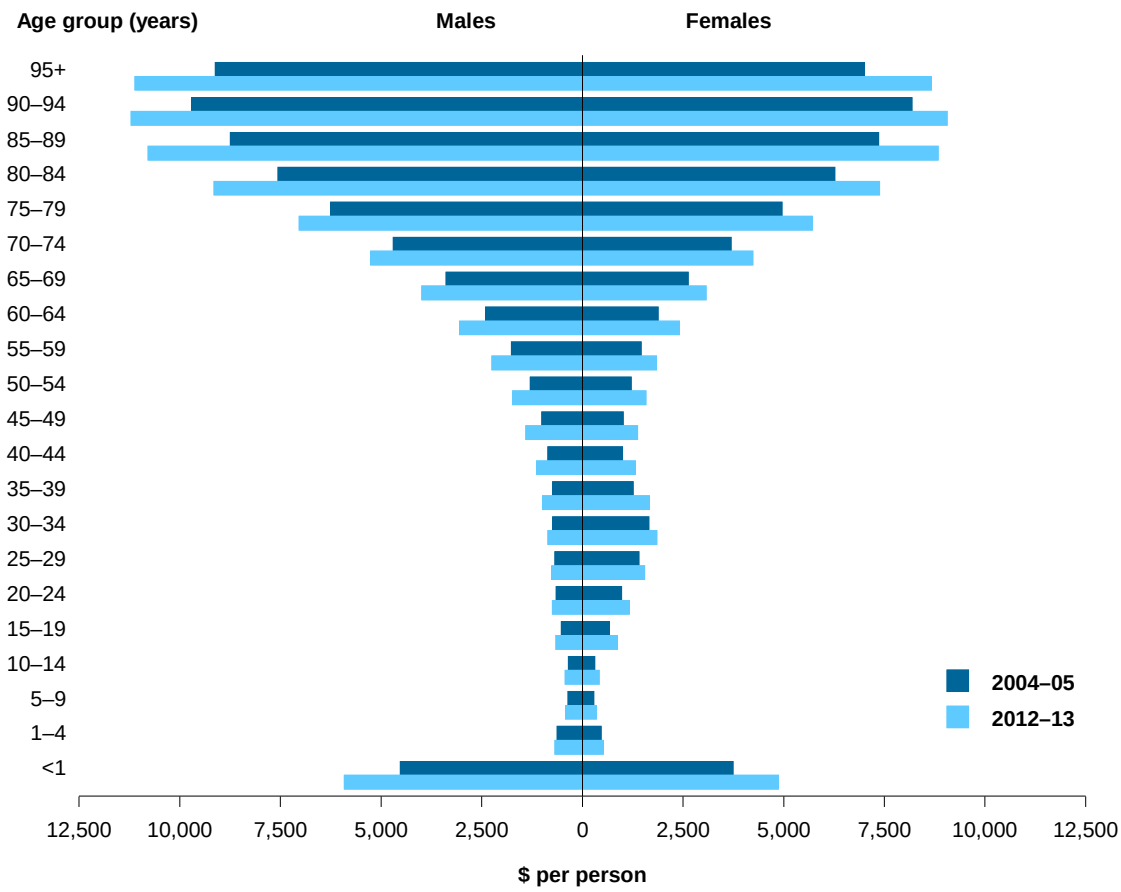
Figure 3.7: Hospital admitted patient expenditure per bed day[(a)], 2004–05 to 2012–13

4 Demographics

Expenditure by age

In all years between 2004–05 and 2012–13, significant admitted patient expenditure was associated with people aged 45 and over. Per person expenditure increased progressively with age for both males and females from the 45–49 age group up to the age of around 80 (Figure 4.1).

There was also notable per person expenditure on infants and females in their reproductive phase. This was seen in relatively high per person expenditure for those aged under 1, and females aged between 20 and 39.



(a) Constant price health expenditure, expressed in terms of 2012–13 prices. See Glossary for further details.

(b) Based on annual estimated resident population. Refer to the Appendices for further details.

Source: Disease expenditure database.

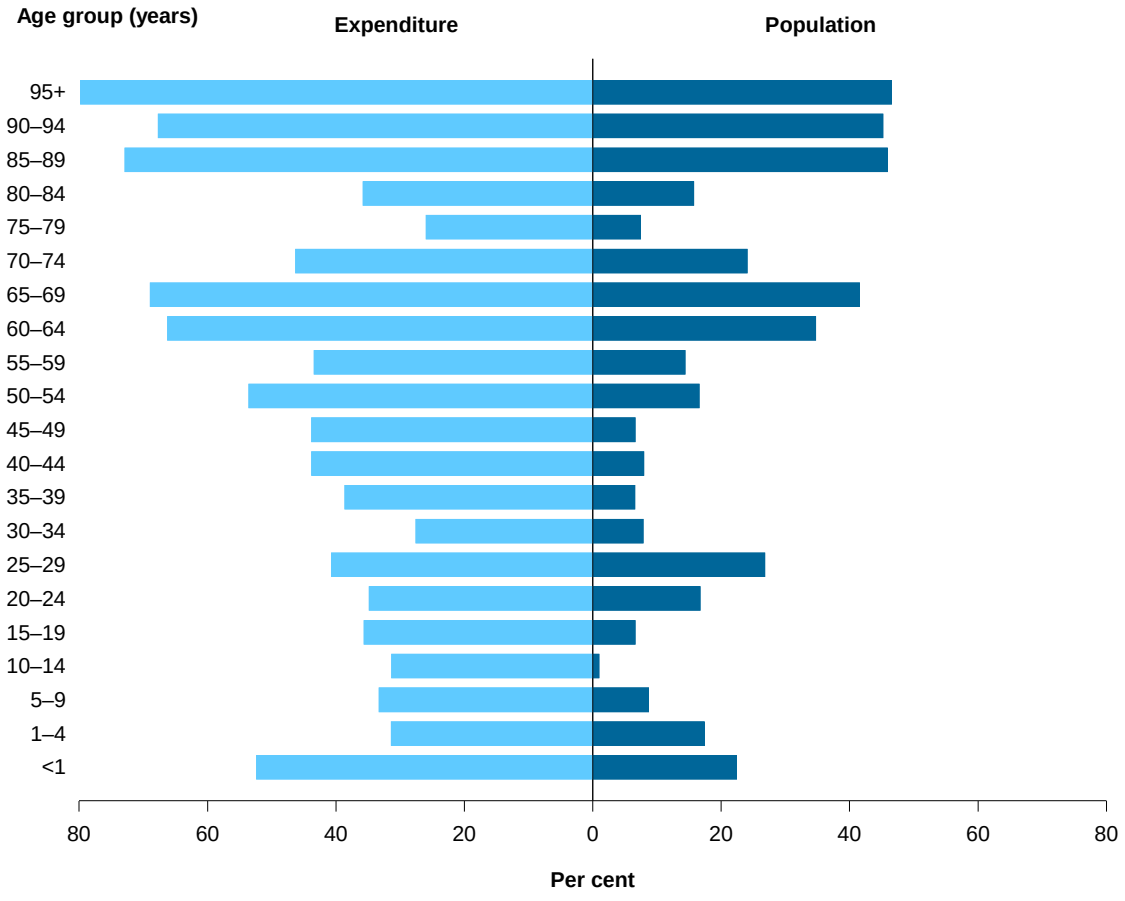
Figure 4.1: Average hospital admitted patient expenditure[(a)] per person[(b)], by age and sex, 2004–05 and 2012–13

All age groups experienced growth in spending over this period, with an average growth of 22.4% per person in the population. The older age groups (60 and over) accounted for much of the growth in total expenditure. Growth in per person spending was greatest in the 35–54 age range, peaking at 39.7% for males in the 45–49 age group (Figure 4.3).

There was also relatively high growth in spending per person in the 10–19 age range, with relatively low population growth in these years.

This growth was in part related to growth in the number of people in the population in these age groups. The oldest age group (95 and over), for example, had the largest growth in spending (79.8%) as well as the largest population growth (45.0%). The top 5 age groups in terms of population growth were all 60 and over, which were the same groups that had substantial growth in expenditure (Figure 4.2).

These data suggest that the relative contribution of population growth and increased spending per person differed across the age groups. In particular, population growth appeared to have a greater role in driving the expenditure growth in the older age groups than in the younger age groups (Figure 4.2).



(a) Constant price health expenditure, expressed in terms of 2012–13 prices. See Glossary for further details.

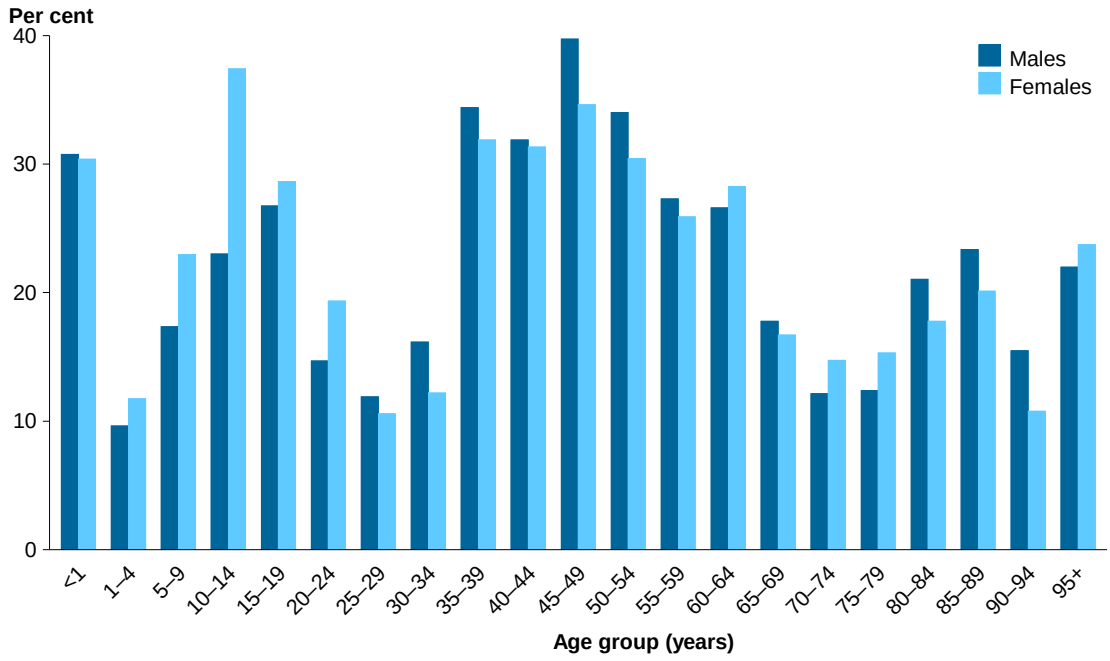
Source: Disease expenditure database.

Figure 4.2: Total hospital admitted patient expenditure growth(a) and population(b) growth, by age, 2004–05 to 2012–13

Expenditure by sex

Spending per person between 2004–05 and 2012–13 varied between males and females. Males aged 85 and over were 1.2 times higher in per person expenditure than females in the same age group (Figure 4.1).

Both males and females aged 35–54 experienced substantial growth in expenditure over the 9-year period. However, the age groups that experienced the highest growth over this period differed between males and females. For females, the 10–14 age group experienced the highest growth, whereas for males, it was the 45–49 age group (Figure 4.3).



(a) Constant price health expenditure, expressed in terms of 2012–13 prices. See Glossary for further details.

(b) Based on annual estimated resident population. Refer to the Appendices for further details.

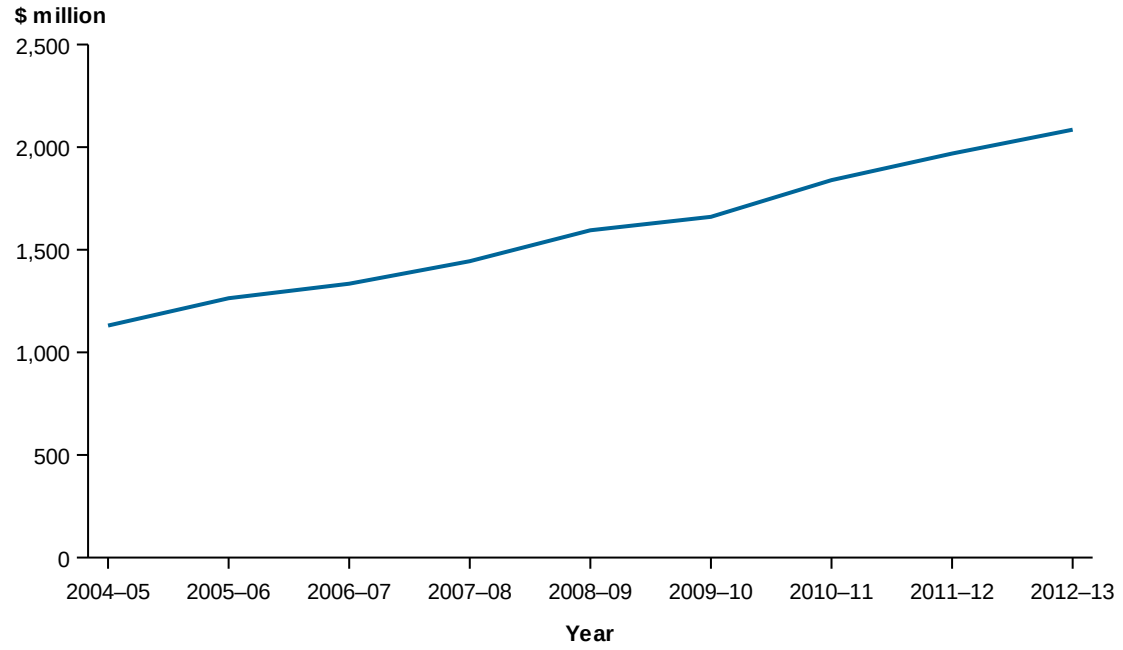
Source: Disease expenditure database.

Figure 4.3: Growth in average hospital admitted patient expenditure[(a)] per person[(b)], by age and sex, 2004–05 to 2012–13

Expenditure for Aboriginal and Torres Strait Islander people

For analysis of expenditure for Aboriginal and Torres Strait Islander people, an adjustment was made to account for the estimated under-identification of Aboriginal and Torres Strait Islander people in hospital records. A detailed description of the method and its associated limitations have been included in Appendix D.

In 2012–13, hospital admitted patient expenditure for Aboriginal and Torres Strait Islander people was estimated at $2.1 billion—$955 million higher (in real terms) than in 2004–05 (Figure 4.4). This represents growth of 84.4% over the 9-year period (compared with 45.5% growth in total spending).



(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

(b) Under-identification correction factors have been applied to Aboriginal and Torres Strait Islander expenditure. Refer to Appendix D for further information.

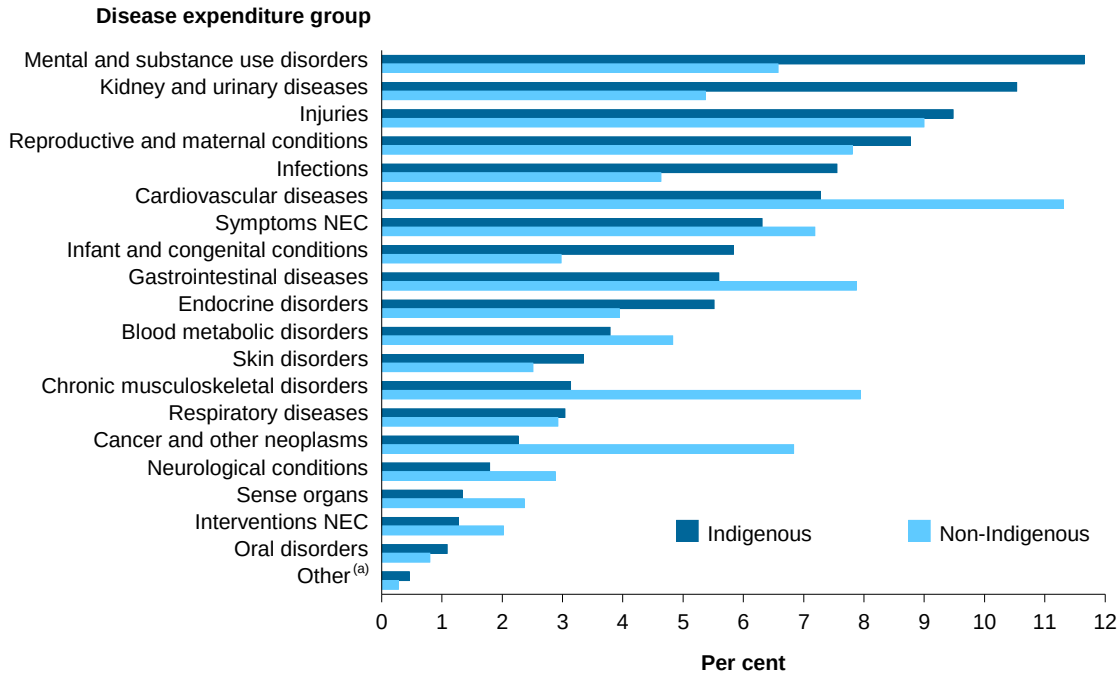
Source: Disease expenditure database.

Figure 4.4: Hospital admitted patient expenditure[(a)], Aboriginal and Torres Strait Islander people[(b)], 2004–05 to 2012–13

The disease expenditure groups that accounted for the highest proportion of admitted patient expenditure for Aboriginal and Torres Strait Islander people in 2012–13 were *Mental and substance use disorders* (11.7%), *Kidney and urinary diseases* (10.5%) and *Injuries* (9.5%) (Figure 4.5). A similar proportion of non-Indigenous expenditure was attributed to *Injuries* (9.0%); however, for the other 2 disease expenditure groups, the proportion of expenditure for Aboriginal and Torres Strait Islander people was almost double that of the non-Indigenous population (Figure 4.5).

Infections, *Endocrine disorders* and *Infant and congenital conditions* also accounted for relatively high proportions of Aboriginal and Torres Strait Islander expenditure compared with non-Indigenous expenditure.

While *Cardiovascular diseases* accounted for 11.3% of total admitted patient expenditure for the non-Indigenous population, this disease expenditure group accounted for 7.3% of Aboriginal and Torres Strait Islander expenditure. The proportions of expenditure attributable to *Chronic musculoskeletal disorders* and *Cancer and other neoplasms* were also significantly lower for Aboriginal and Torres Strait Islander people.



(a) Includes Examination and observation NEC; Physical, behavioural and social problems NEC; and Unrecognised code.

Source: Disease expenditure database.

Figure 4.5: Proportion of total expenditure by disease expenditure groups and Indigenous status, 2012–13

Expenditure by geographical location

This section presents information on hospital admitted patient expenditure by remoteness area of usual residence. Remoteness area categories divide Australia based on distances from population centres. The patient's area of usual residence is used to derive the remoteness area of usual residence and may differ from the remoteness area of the hospital where they were admitted.

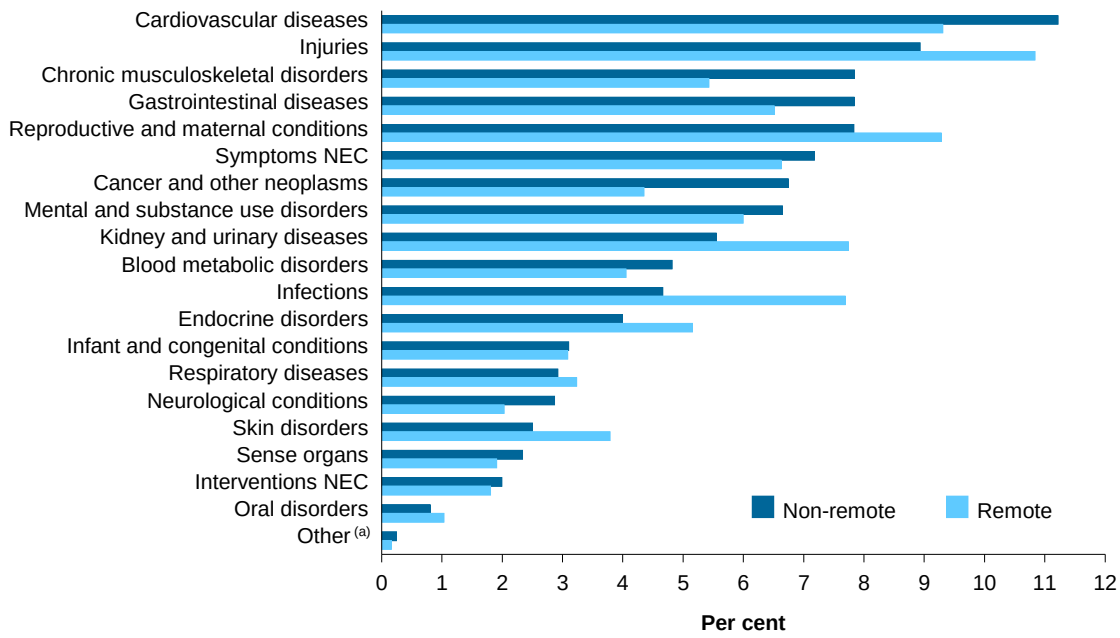
In 2012–13, the majority (96.6%) of hospital admitted patient expenditure was for people who lived in non-remote areas. This includes an estimated $29.2 billion for people living in *Major cities*, $9.0 billion for people living in *Inner regional* areas and $4.9 billion for those living in *Outer regional* areas. An estimated $1.5 billion was spent on people living in *Remote* and *Very remote*, including $662 million for those in *Very remote* areas.

The diseases accounting for the highest proportion of expenditure varied by remoteness area. For people living in *Major cities* and *Inner and outer regional* areas, *Cardiovascular diseases* accounted for the highest proportion of expenditure (11.2%) while for those living in *Remote* and *Very remote*, the highest proportion of expenditure was attributed to *Injuries* (10.8%) (Figure 4.6).

The proportions of expenditure attributable to *Cancer and other neoplasms*, *Chronic musculoskeletal disorders* and *Neurological conditions* were significantly higher for people living in non-remote areas compared with those living in remote areas. In contrast, *Infections*, *Skin disorders* and *Kidney and urinary diseases* each accounted for a higher proportion of expenditure for people living in remote areas compared with those living in non-remote areas.

In 2012–13, the proportions of hospital admitted patient expenditure attributable to *Chronic musculoskeletal disorders* and *Cancer and other neoplasms* were highest for people living in *Inner regional* areas and lowest for those living in *Very remote* areas, while the opposite was true for *Kidney and urinary diseases* (Figure 4.7).

Infections accounted for 8.9% of expenditure for people living in *Very remote* areas and 6.8% of expenditure for those living in *Remote* areas. This is higher than the proportion of expenditure for people living in *Outer regional* areas (5.1%), and *Major cities* and *Inner regional* areas (both 4.6%).

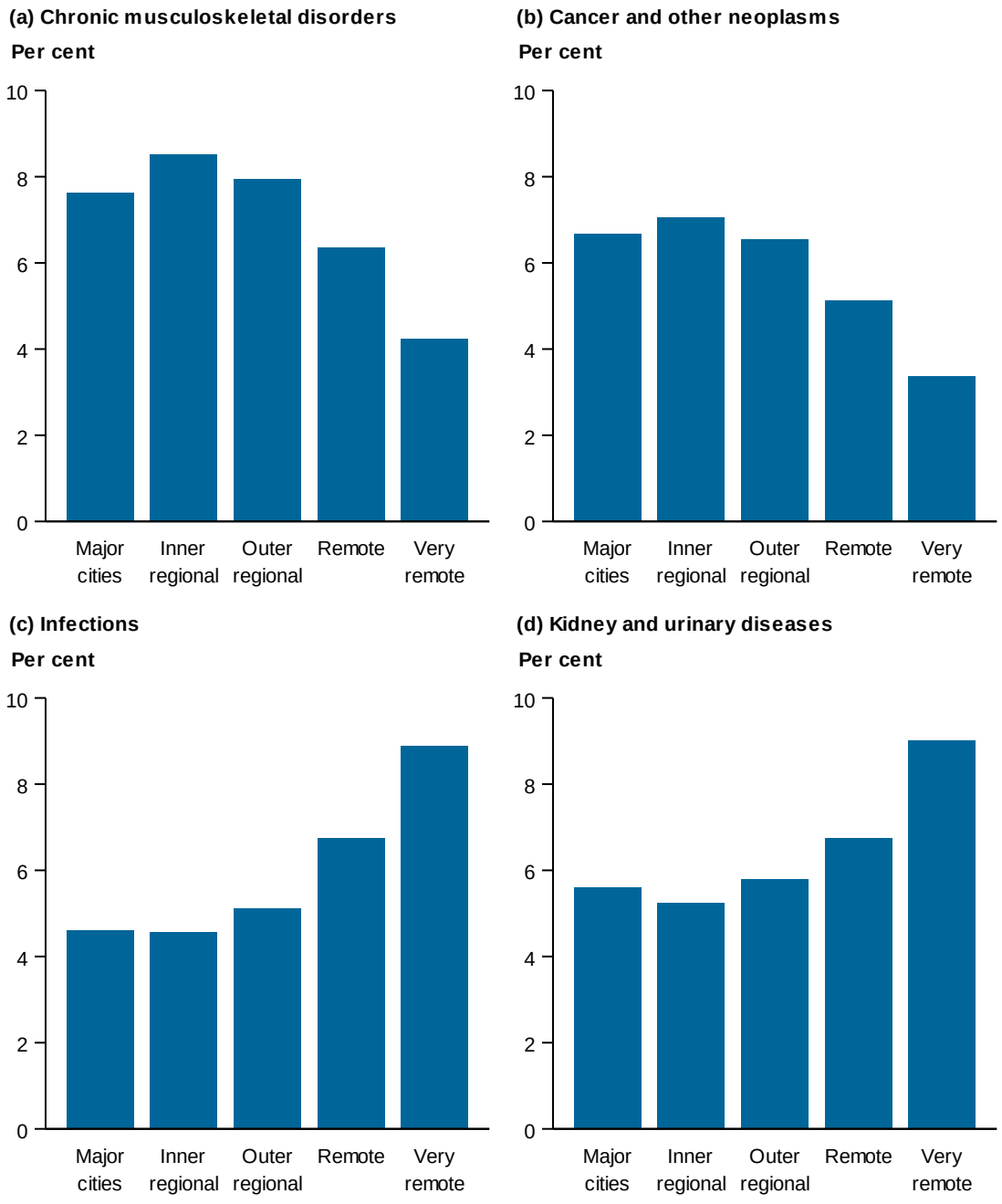


(a) Includes Examination and observation NEC; Physical, behavioural and social problems NEC; and Unrecognised code.

(b) Remoteness area of usual residence: Non-remote includes *Major cities, Inner regional* and *Outer regional*; Remote includes *Remote* and *Very remote*.

Source: Disease expenditure database.

Figure 4.6: Proportion of total expenditure by disease expenditure groups and remoteness(b), 2012–13



Source: Disease expenditure database.

Figure 4.7: Proportion of total expenditure by remoteness and selected disease expenditure groups, 2012–13

Expenditure on children aged under 1

In 2012–13, total hospital admitted patient expenditure for children aged under 1 was $1.7 billion—$570 million higher (in real terms) than in 2004–05 (Figure 4.8). This represents growth of 52.4% over the 9-year period, which was higher than expenditure growth for all people over the same period (45.5%).

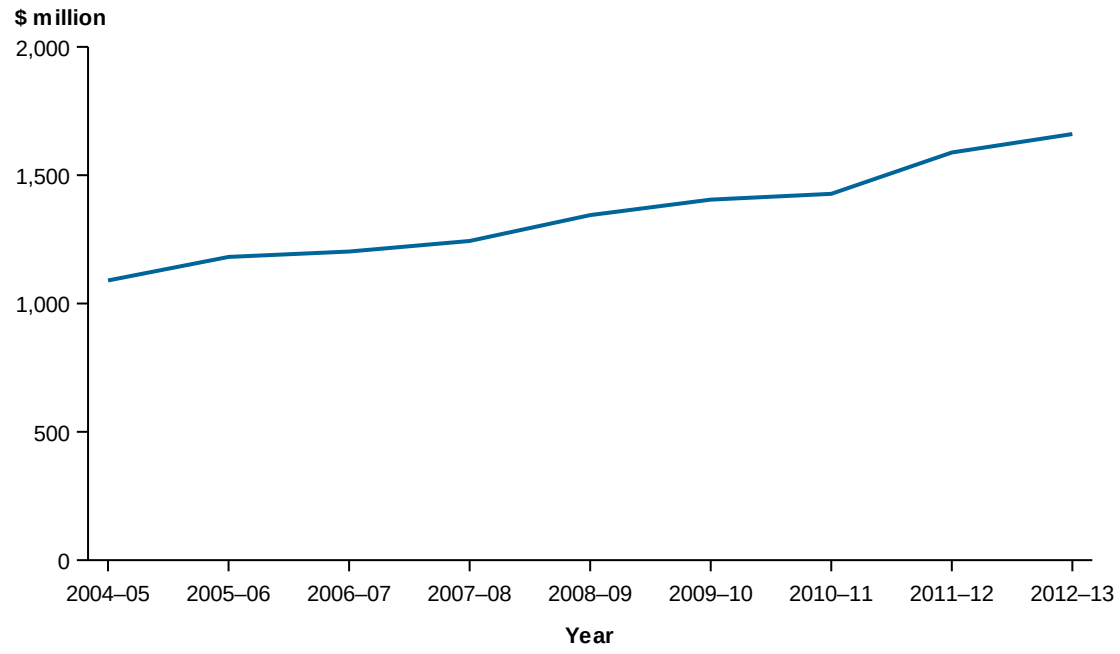
In contrast, per person expenditure growth for children aged under 1 (24.5%) was lower than per person growth for all people (27.3%) (Table 4.1). This suggests that population growth, relative to expenditure growth, was faster for this age group compared with other age groups.

Factors influencing the relatively high expenditure and large expenditure growth for this age group include the cost per separation and cost per bed day, as well as the number of separations and the number of bed days.

In 2012–13, per separation expenditure for children aged under 1 was estimated to be $9,489—double that of per separation expenditure for all people ($4,801). Between 2004–05 and 2012–13, per separation expenditure for children aged under 1 increased by $1,356 (in real terms), representing growth of 16.7%. This is almost double the per separation growth for all people over the same period (9.0%) (Table 4.1).

While growth in the number of separations for children aged under 1 was similar to that for all people (30.6% compared with 33.5%, respectively), the relatively high cost per separation for children aged under 1 resulted in a considerably large increase in total spending for this age group (Table 4.1).

Similarly, the cost per bed day was higher for children aged under 1 than for all people and the number of bed days increased at a greater rate between 2004–05 and 2012–13.



(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 4.8: Total hospital admitted patient expenditure[(a)], children aged under 1, 2004–05 to 2012–13

In 2012–13, an estimated $1.2 billion was spent on *Infant and congenital conditions* in children aged under 1—70.1% of total spending on children in this age group. *Infections* accounted for 10.2% of total spending, while *Gastrointestinal diseases* and *Injuries* each accounted for between 2% and 3% of total spending on children aged under 1 (Figure 4.9).

Between 2004–05 and 2012–13, the proportion of spending attributed to *Infant and congenital conditions* increased by 2.9 percentage points—the largest change in proportion

of total spending over the period. This disease expenditure group also had the largest growth in dollar terms, with spending increasing by $431 million.

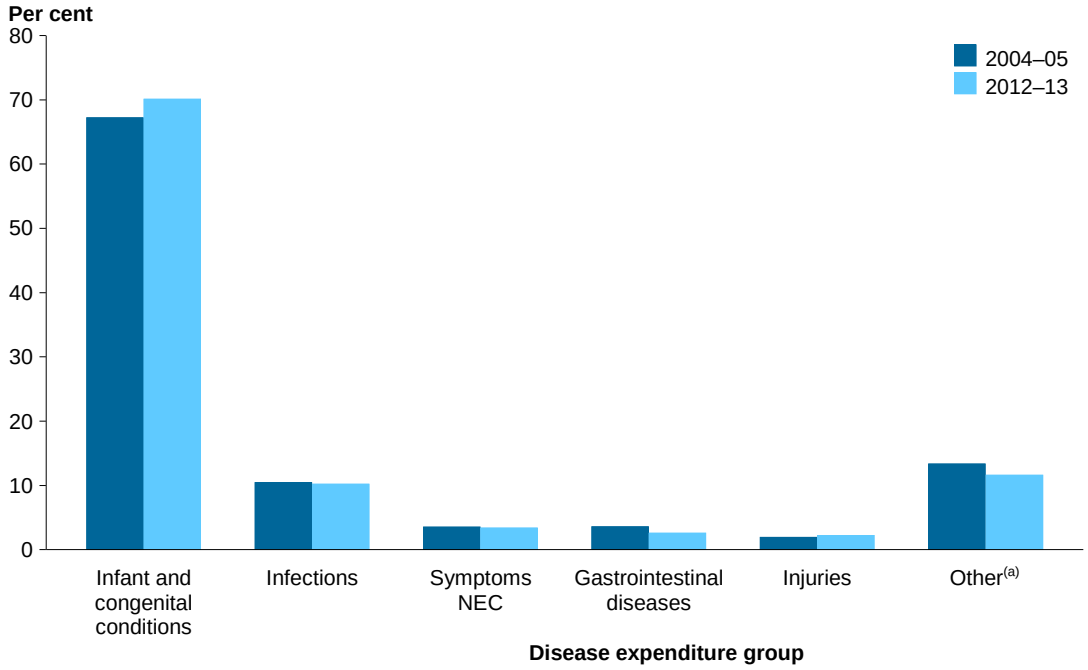
The largest growth in relative terms was for *Skin disorders*, which doubled in spending between 2004–05 and 2012–13. However, this disease expenditure group only accounted for a small proportion of total spending (1.3% in 2004–05, up to 1.8% in 2012–13).

Table 4.1: Admitted patient care, children aged under 1 and total population, 2004–05 and 2012–13[(a)]

	2004–05	2012–13	2004–05 to 2012–13 Change	2004–05 to 2012–13 Growth (%)
Under 1 year				
Total expenditure ($ million)	1,090.0	1,660.5	570.5	52.3
Expenditure per person ($)	4,314.7	5,372.0	1,057.3	24.5
Expenditure per separation ($)	8,133.6	9,489.1	1,355.5	16.7
Expenditure per bed day ($)	1,513.2	1,879.1	365.9	24.2
Population (n)	252,616	309,096	56,480	22.4
Separations (n)	134,007	174,985	40,978	30.6
Bed days (n)	720,314	883,652	163,338	22.7
All persons				
Total expenditure ($ million)	30,905.0	44,977.8	14,071.8	45.5
Expenditure per person ($)	1,541.7	1,962.3	420.6	27.3
Expenditure per separation ($)	4,403.2	4,800.6	397.4	9.0
Expenditure per bed day ($)	1,297.0	1,624.2	327.2	25.2
Population (n)	20,046,003	22,920,798	2,874,795	14.3
Separations (n)	7,018,850	9,369,257	2,350,407	33.5
Bed days (n)	23,828,612	27,691,532	3,862,920	16.2

(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.



(a) Includes disease groups that account for less than 2% of total expenditure.

(b) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 4.9: Proportion of total hospital admitted patient expenditure(b) by selected disease expenditure groups, children aged under 1, 2004–05 and 2012–13

5 Disease expenditure groups

To understand the growth in hospital admitted patient expenditure, it is useful to understand more about the diseases and conditions associated with the expenditure. The following analysis is based on disease expenditure groups. These groups are based on the AIHW's ABDS categorisation of diseases (AIHW 2015a), but incorporate some interventions and symptoms that are reported in some circumstances instead of diseases as the reasons for provision of health care, either as additions to the ABDS categories or as additional categories.

Mapping ICD-10-AM to disease expenditure groups

All ICD-10-AM codes were mapped to the relevant ABDS group (AIHW 2015a) (with 2 differences; namely, *Mental illnesses and behavioural disorders* became *Mental and substance use disorders*, and *Sense organ disorders* became *Sense organs*) and 4 new groups—*Examination and observation NEC* (not elsewhere classified), *Physical, behavioural and social problems NEC*, *Interventions NEC* and *Symptoms NEC*—were included to complete the disease expenditure group categorisation. For example, *Z01.0 Encounter for examination of eyes and vision* was mapped to *Sense organs* and *Z45.1 Adjustment and management of drug delivery device* was mapped to *Examination or observation NEC*. Details on the mapping of ICD-10-AM codes are available in Appendix E.

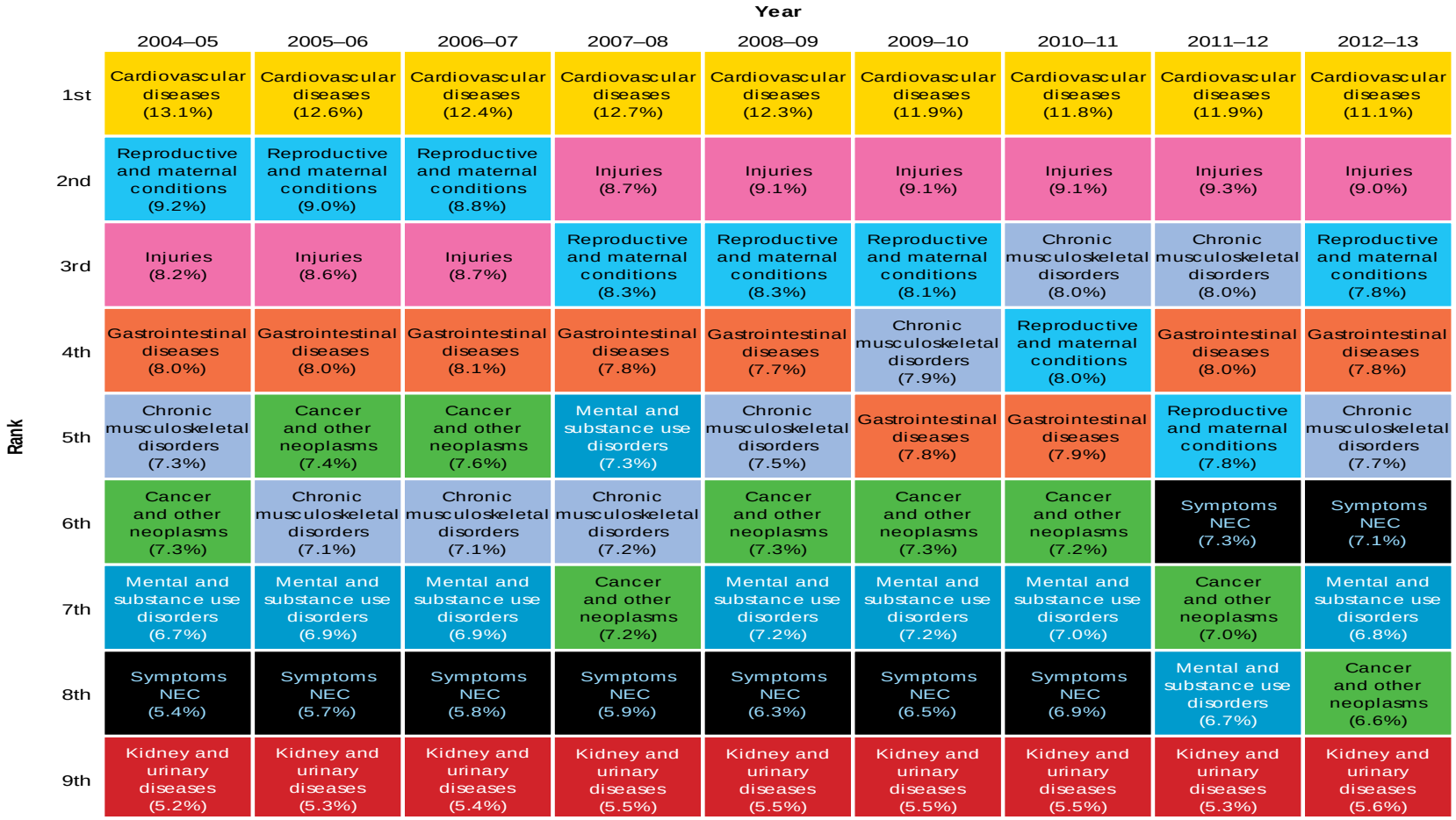
Expenditure by disease expenditure groups

In 2012–13, admitted patient expenditure for *Cardiovascular diseases* was estimated at $5.0 billion (11.1% of total expenditure), the highest of all the major disease expenditure groups. The next highest was *Injuries* at $4.1 billion (9.0% of total spending), followed by *Reproductive and maternal conditions*, *Gastrointestinal diseases* and *Chronic musculoskeletal disorders*, which each comprised about $3.5 billion in spending. Together, these 5 major disease expenditure groups accounted for 43.5% of total hospital admitted patient expenditure.

The overall distribution of expenditure by disease expenditure groups did not change substantially over the 2004–05 to 2012–13 period, with *Cardiovascular diseases* attracting the most expenditure in each year, and the same 5 disease expenditure groups noted above also accounting for a similar proportion (45.9%) of the total in 2004–05 (Figure 5.1a). There were, however, some notable changes over the period, particularly in the high expenditure groups.

The proportion of expenditure related to *Cardiovascular diseases* fell by 1.9 percentage points, from about 13.1% of total spending in 2004–05 to 11.1% in 2012–13. This was the largest overall change in the percentage of spending.

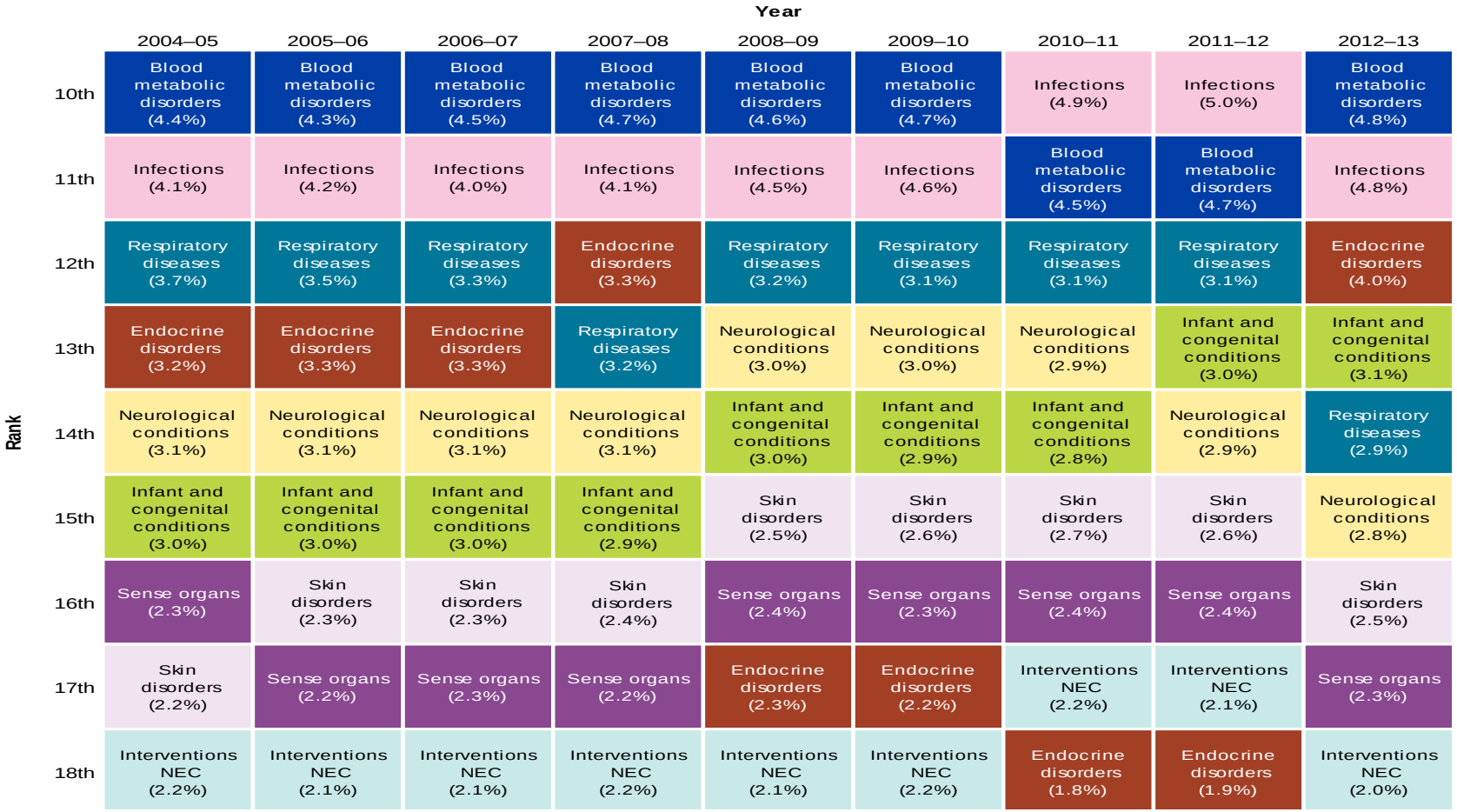
The next largest decrease was for the *Reproductive and maternal conditions* group, which fell by 1.4 percentage points from 9.2% to 7.8% of total spending. This suggests that growth in cardiovascular and reproductive and maternal spending was slower than for the other groups.



(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 5.1a: Proportions of total hospital admitted patient expenditure[(a)] by disease expenditure groups, 2004–05 to 2012–13



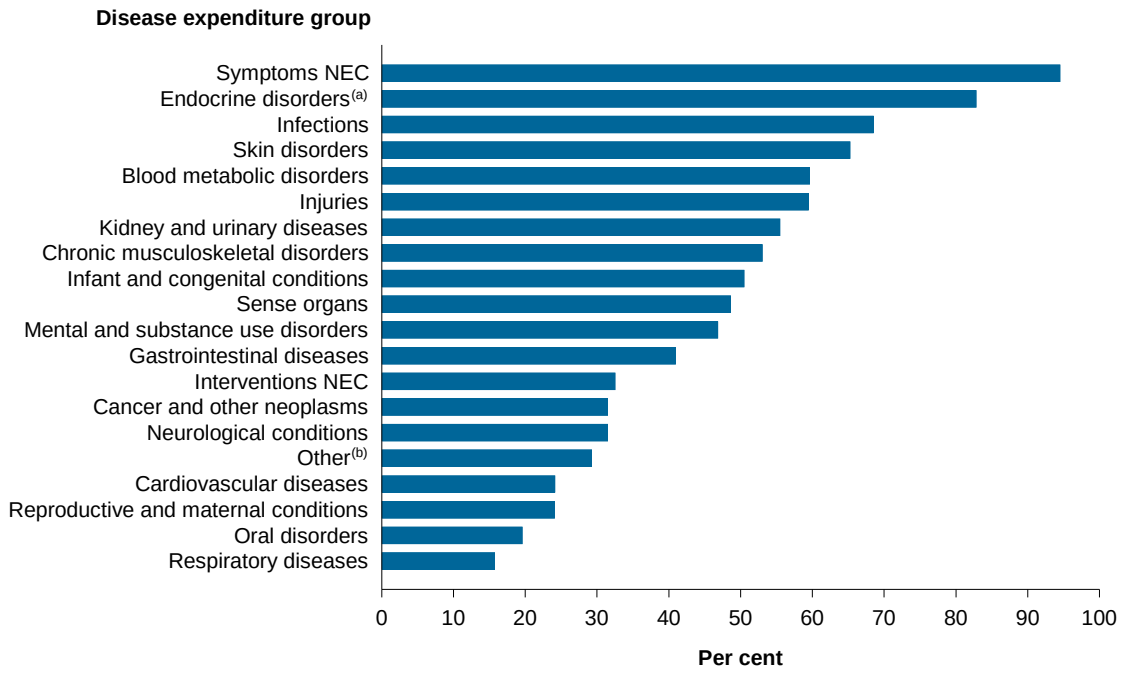
(a) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 5.1b: Proportions of total hospital admitted patient expenditure[(a)] by disease expenditure groups, 2004–05 to 2012–13

In contrast, the next largest overall change behind *Cardiovascular diseases* was for the *Symptoms NEC* group, which grew by 1.7 percentage points over the period from 5.4% to 7.1% of total spending ($3.2 billion). This was more than double the percentage point growth experienced by any other group, equating to growth in spending of 94.5% for the *Symptoms NEC* group (Figure 5.2). More than half (58%) of the growth in the *Symptoms NEC* group, however, was related to just 8 out of more than 380 diagnosis codes, with 3 codes (*E87.6 Hypokalaemia*, *E86.0 Dehydration* and *N17.9 Acute kidney failure, unspecified*) accounting for almost one-third (32%) (Table 5.1).

There was also substantial growth in expenditure in the *Endocrine disorders* group, which includes diabetes, from 2008–09 to 2012–13. However, changes to the Australian Coding Standard for *Diabetes mellitus and intermediate hyperglycaemia* (formerly *Diabetes mellitus and impaired glucose regulation*) on 1 July 2012 have affected the comparability, over time, of data reported for diabetes (AIHW 2016a).



(a) There was a large growth in expenditure on the Endocrine disorders group, which includes diabetes, from 2008–09 to 2012–13. Changes to the Australian Coding Standard for Diabetes mellitus and intermediate hyperglycaemia (formerly Diabetes mellitus and impaired glucose regulation) on 1 July 2012 have affected the comparability, over time, of data reported for diabetes.

(b) Includes Examination and observation NEC; Physical, behavioural and social problems NEC.

(c) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 5.2: Growth in hospital admitted patient expenditure(c) by disease expenditure groups, 2004–05 to 2012–13

Table 5.1: Diagnosis codes responsible for most of the growth in the Symptoms NEC group, 2004–05 to 2012–13

ICD-10-AM code	Description	Growth in expenditure ($ million)
E87.6	Hypokalaemia	184.2
E86.0	Dehydration	162.0
N17.9	Acute kidney failure, unspecified	153.1
E87.1	Hypo-osmolality and hyponatraemia	92.6
R07.4	Chest pain, unspecified	87.2
R32.0	Unspecified urinary incontinence	86.3
E87.7	Fluid overload	70.5
E87.5	Hyperkalaemia	66.7

Note: Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Males

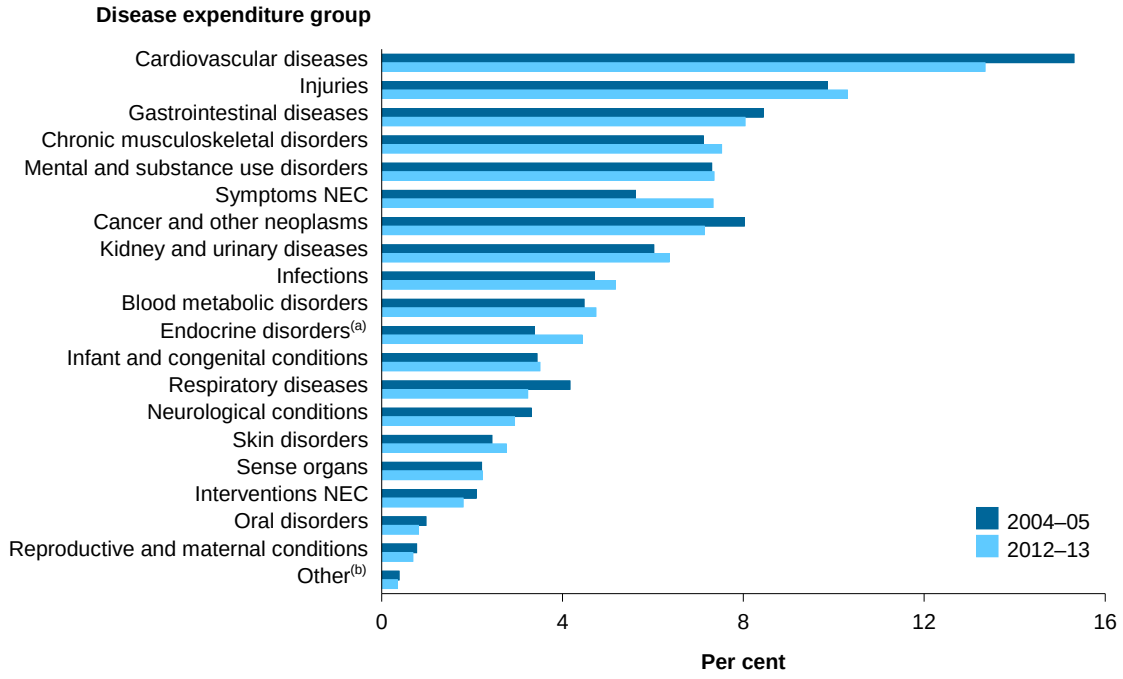
In 2012–13, the disease expenditure groups that accounted for the highest proportion of male expenditure were *Cardiovascular diseases* (13.3%) and *Injuries* (10.3%). Combined with *Gastrointestinal diseases* (8.0%), *Chronic musculoskeletal disorders* (7.5%), *Mental and substance use disorders* (7.4%) and *Cancer and other neoplasms* (7.1%), these accounted over half (53.7%) of total male expenditure (Figure 5.3).

Between 2004–05 and 2012–13, overall growth in male expenditure was 48.5%. This was 3.0 percentage points higher than expenditure growth for all people. Growth occurred for all disease expenditure groups; however, the rate of growth varied considerably (Figure 5.4).

While *Cardiovascular diseases* remained the highest expenditure group for males over the whole period, spending growth for this group was fourth lowest at 29.4%. This is reflected in the decrease in the proportion of total spending by 2.0 percentage points, from 15.3% in 2004–05 to 13.3% in 2012–13—the largest change over the 9-year period.

There were also relatively large decreases in the proportion of spending attributed to *Cancer and other neoplasms* and *Respiratory diseases* (both decreased by 0.9 percentage points), associated with low growth for these disease expenditure groups (32.2% and 15.1%, respectively).

The disease expenditure group that experienced the largest overall growth for males was *Injuries*, with expenditure increasing by $799 million between 2004–05 and 2012–13. The disease expenditure groups that experienced the largest relative growth were *Skin disorders* (67.8%) and *Infections* (63.0%).



(a) There was a large growth in expenditure on the Endocrine disorders group, which includes diabetes, from 2008–09 to 2012–13. Changes to the Australian Coding Standard for Diabetes mellitus and intermediate hyperglycaemia (formerly Diabetes mellitus and impaired glucose regulation) on 1 July 2012 have affected the comparability, over time, of data reported for diabetes.

(b) Includes Examination and observation NEC; Physical, behavioural and social problems NEC.

(c) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

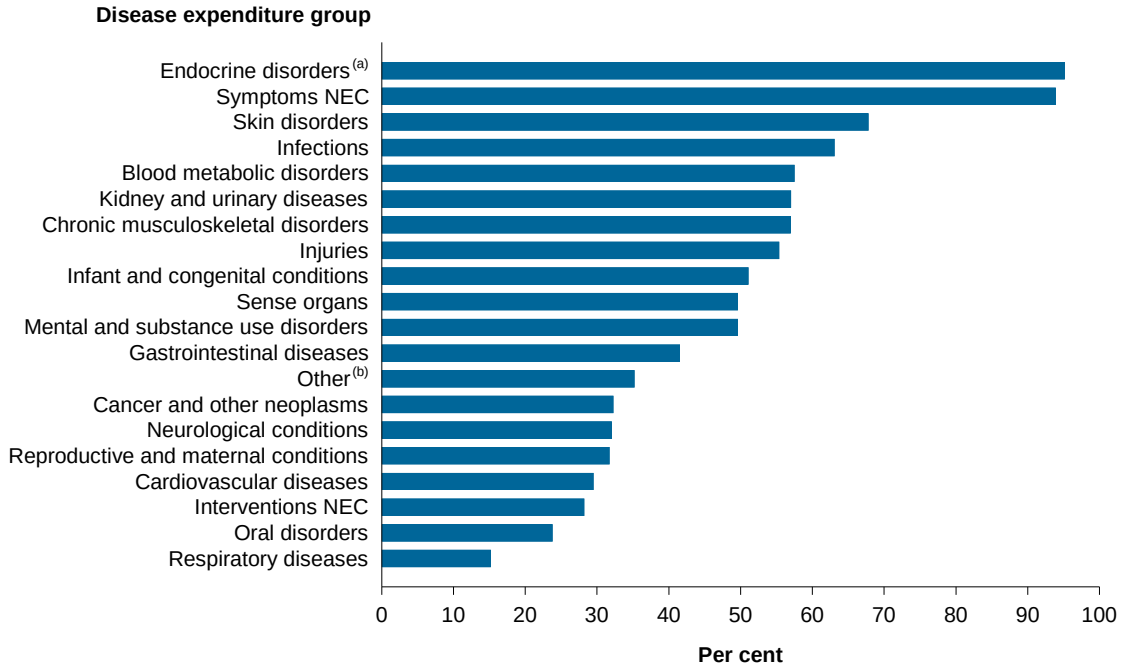
Figure 5.3: Proportions of total male expenditure(c) by disease expenditure groups, 2004–05 and 2012–13

The diseases that accounted for the highest proportion of hospital admitted patient expenditure varied throughout the life course (Figure 5.5). *Cardiovascular diseases* attracted more spending for older males than for younger males (as high as one-fifth (19.8%) of total spending on males aged 75–84). The proportion of spending on *Kidney and urinary diseases* also increased with age, up to the age of around 85.

Spending on *Injuries* was highest for younger males, peaking at 27.4% of total expenditure for males aged 15–24 and dropping to 6.5%of spending on those aged 75–84, then rising again for those 85 and over (8.3%).

For males aged between 25 and 44, *Mental and substance use disorders* accounted for the highest proportion of expenditure, peaking at 24.6% of total spending for males aged 25–34. *Infant and congenital conditions*, *Infections* and *Injuries* accounted for the high proportions of expenditure in the younger age groups (up to age 24).

Cancer and other neoplasms accounted for less than 5.0% of expenditure for males aged under 45, increasing to a high of 10.5% of spending on males aged 65–74.



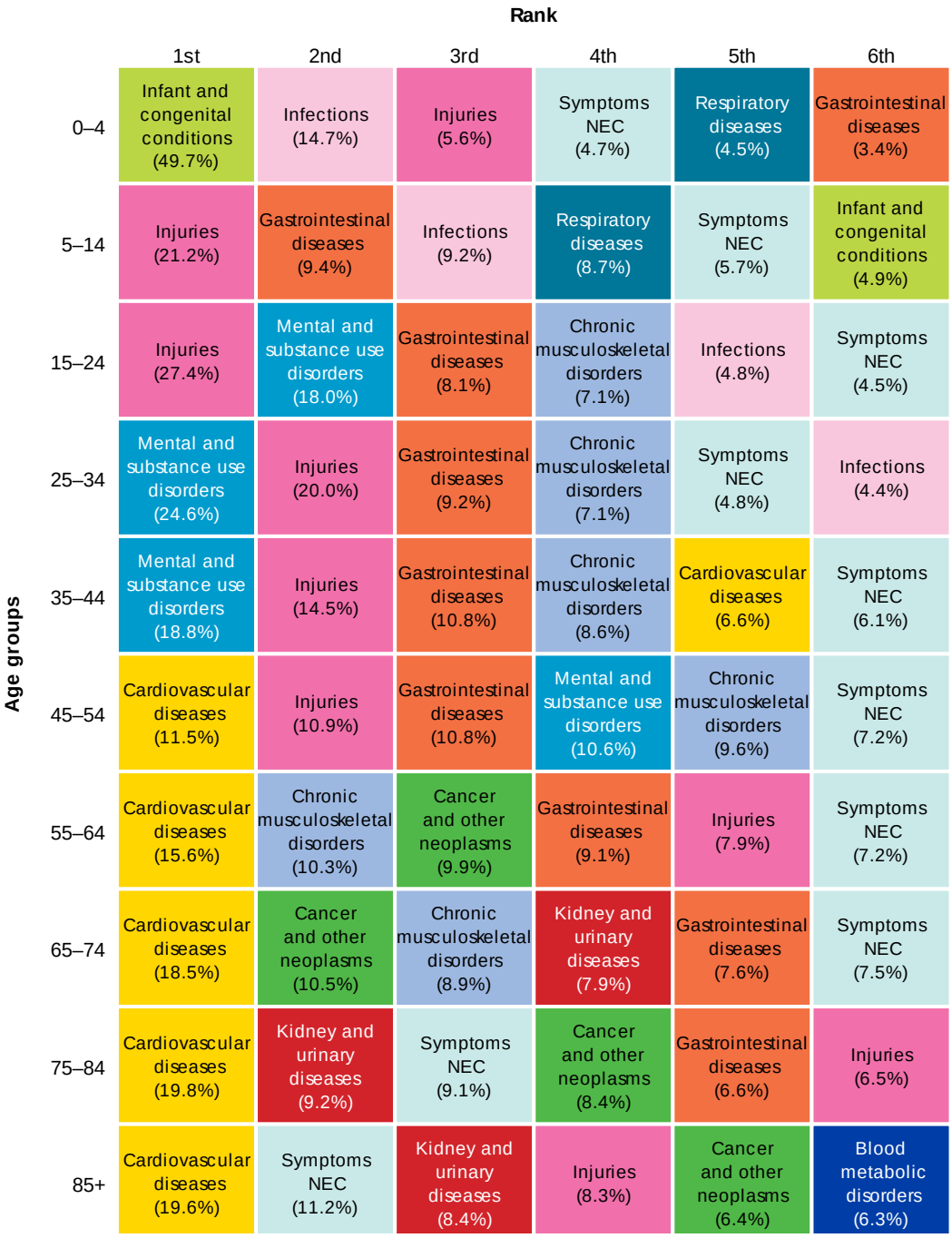
(a) There was a large growth in expenditure on the Endocrine disorders group, which includes diabetes, from 2008–09 to 2012–13. Changes to the Australian Coding Standard for Diabetes mellitus and intermediate hyperglycaemia (formerly Diabetes mellitus and impaired glucose regulation) on 1 July 2012 have affected the comparability, over time, of data reported for diabetes.

(b) Includes Examination and observation NEC; Physical, behavioural and social problems NEC.

(c) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 5.4: Growth in male expenditure(c) by disease expenditure groups, 2004–05 to 2012–13



Source: Disease expenditure database.

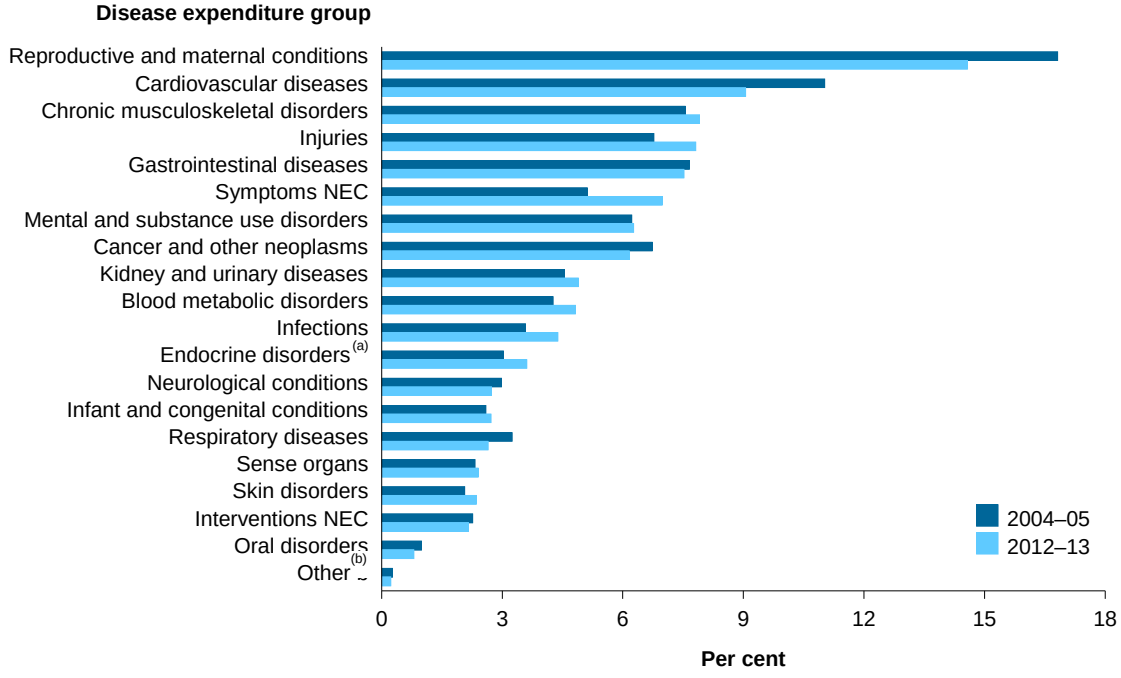
Figure 5.5: Proportions of male expenditure by age and selected disease expenditure groups, 2012–13

Females

In 2012–13, *Reproductive and maternal conditions* accounted for 14.6% of female expenditure—the highest of all disease expenditure groups, and 5.5 percentage points above the second highest group, *Cardiovascular diseases* (9.1%). Together with *Chronic musculoskeletal disorders* (7.9%), *Injuries* (7.8%) and *Gastrointestinal diseases* (7.5%), these accounted for almost half (46.9%) of total spending for females (Figure 5.6).

Between 2004–05 and 2012–13, overall growth in spending for females was 42.8%—2.7 percentage points lower than expenditure growth for all people. As was the case for males, growth occurred for all disease expenditure groups, with varying rates of growth (Figure 5.7).

While *Reproductive and maternal conditions* accounted for the highest proportion of female expenditure each year between 2004–05 and 2012–13, the proportion of expenditure attributed to this disease expenditure group decreased by 2.2 percentage points—from 16.8% of total spending in 2004–05 to 14.6% in 2012–13, reflecting relatively low growth during this period (23.7%).



(a) There was a large growth in expenditure on the Endocrine disorders group, which includes diabetes, from 2008–09 to 2012–13. Changes to the Australian Coding Standard for Diabetes mellitus and intermediate hyperglycaemia (formerly Diabetes mellitus and impaired glucose regulation) on 1 July 2012 have affected the comparability, over time, of data reported for diabetes.

(b) Includes Examination and observation NEC; Physical, behavioural and social problems NEC.

(c) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 5.6: Proportions of total female expenditure(c) by disease expenditure groups, 2004–05 and 2012–13

Growth in spending on *Cardiovascular diseases* was also relatively low at 17.4% over the 9-year period, with the proportion of female expenditure attributed to *Cardiovascular diseases* decreasing from 11.0% in 2004–05 to 9.1% in 2012–13.

In contrast, there was relatively large growth in spending on *Injuries* (64.8%). This is reflected in the 1.0 percentage point increase in the proportion of female expenditure attributed to *Injuries* between 2004–05 and 2012–13, from 6.8% to 7.8%.

Similar to male expenditure, there was variation in the disease expenditure groups accounting for the highest proportion of female expenditure across the life course (Figure 5.8).

For females between 15 and 44 years of age, the proportion of total spending attributed to *Reproductive and maternal conditions* was significantly more than any other disease expenditure group. More than half (57.3%) of all spending on females aged 25–34 was for

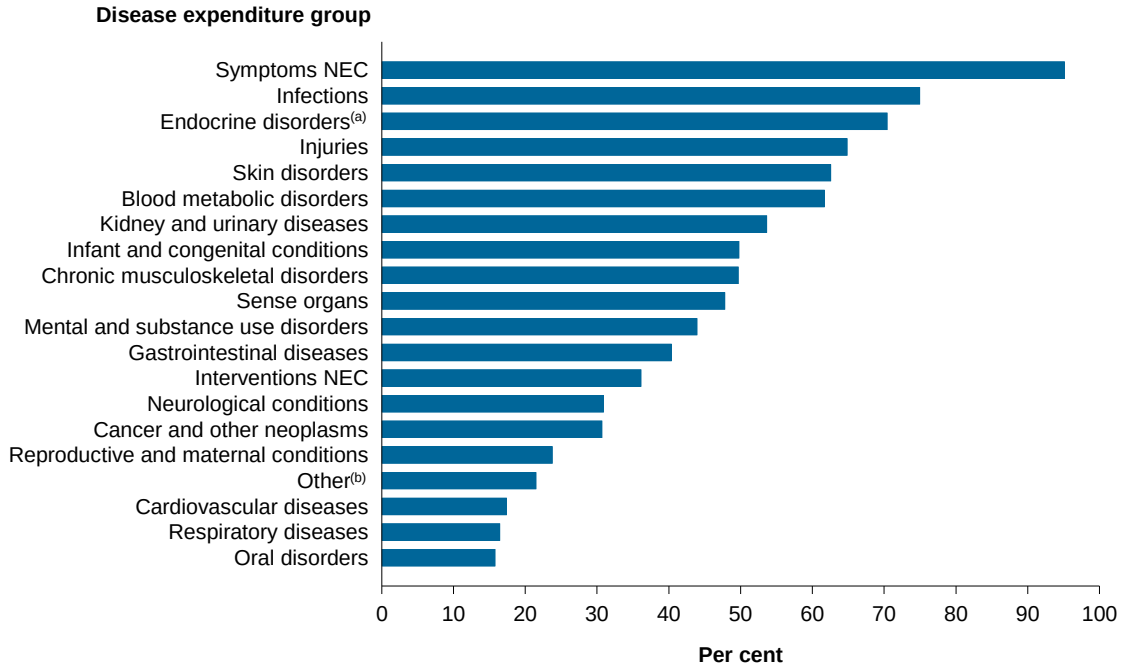
Reproductive and maternal conditions, with *Mental and substance use disorders* attracting the second highest proportion of spending for females in this age group (8.4%).

Spending on *Cardiovascular diseases* increased with age, and this disease expenditure group accounted for the highest proportion of expenditure for females aged 85 and over (17.9%).

The proportion of expenditure attributed to *Injuries* was highest for females aged 5–14 (15.1% of total expenditure for this age group) and third highest for those aged 85 and over (11.5%).

Mental and substance use disorders accounted for a relatively high proportion of spending for females aged between 15 and 54, peaking at 13.7% of expenditure for females aged 15–24. For females aged between 55 and 74, *Chronic musculoskeletal disorders* and *Cancer and other neoplasms* both accounted for a significant proportion of total expenditure.

Infant and congenital conditions, *Infections* and *Injuries* accounted for the highest proportion of expenditure in younger females (up to age 14).



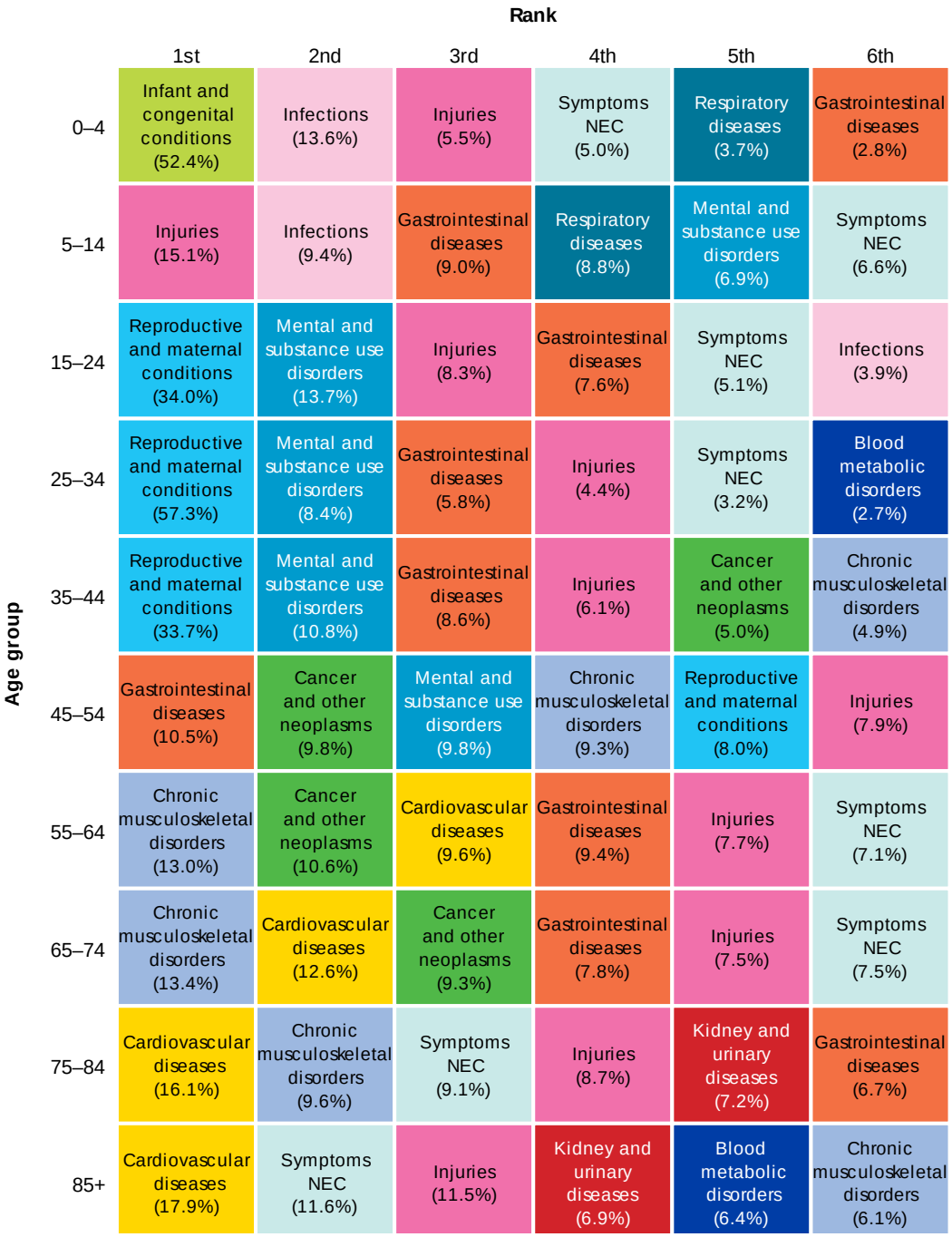
(a) There was a large growth in expenditure on the Endocrine disorders group, which includes diabetes, from 2008–09 to 2012–13. Changes to the Australian Coding Standard for Diabetes mellitus and intermediate hyperglycaemia (formerly Diabetes mellitus and impaired glucose regulation) on 1 July 2012 have affected the comparability, over time, of data reported for diabetes.

(b) Includes Examination and observation NEC; Physical, behavioural and social problems NEC.

(c) Constant price health expenditure for 2004–05 to 2012–13 is expressed in terms of 2012–13 prices. See Glossary for further details.

Source: Disease expenditure database.

Figure 5.7: Growth in female expenditure(c) by disease expenditure groups, 2004–05 to 2012–13



Source: Disease expenditure database.

Figure 5.8: Proportions of female expenditure by age and selected disease expenditure groups, 2012–13

6 Future directions

The methodology and results presented in this report form the start of an improved methodology for estimating health system expenditure by population demographics and disease expenditure groups.

A key aim will be the ability to align expenditure estimates with the AIHW's upcoming 2015 ABDS. Once completed, this work could be used to compare ABDS information with disease expenditure estimates to evaluate the corresponding health system expenditure on the burden due to different disease and risk factors. This could also provide inputs into cost-effectiveness analyses, where the change in disability-adjusted life years (DALY) is compared with the corresponding change in expenditure.

This necessitates the methodology to be expanded to incorporate non-admitted patient expenditure. The expenditure estimates in the NHMD will also be extended to cover more recent related expenditure data.

A number of the limitations that are highlighted in appendices A and B will also be addressed in future work. In conjunction with these improvements, further investigations will be made into the latest available data sources and their usefulness in improving the methodology.

Appendix A: Data Quality Statement

Data Quality Statement (disease expenditure database 2012–13)

Summary of key data quality issues

- The disease expenditure database contains estimates of expenditure by each diagnosis reported for admitted patient hospital services.
- Estimates are derived from combining information from the National Hospital Morbidity Database (NHMD), the National Public Hospital Establishments Database (NPHED), the National Hospital Cost Data Collection (NHCDC) and the health expenditure database.
- The database contains essentially all admitted patient activity and equates to around 30% of total recurrent health expenditure.

Description

The disease expenditure database contains estimates of expenditure by each diagnosis reported for admitted patient hospital services. Admitted patient hospital costs refer to the cost of services for admitted patients in both public and private acute hospitals and psychiatric hospitals, excluding expenditure on medical services provided to private admitted patients in hospitals.

Estimates are derived from combining information from the NHMD; the NPHED; the NHCDC and the health expenditure database.

Institutional environment

The Australian Institute of Health and Welfare (AIHW) is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act 1987* to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent corporate Commonwealth entity established in 1987, governed by the AIHW Board, and accountable to the Australian Parliament through the Health portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the main functions of the AIHW is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national data sets based on data from each jurisdiction, to analyse these data sets and disseminate information and statistics.

The *Australian Institute of Health and Welfare Act 1987*, in conjunction with compliance to the *Privacy Act 1988* (Cwlth), ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information, see the AIHW website <www.aihw.gov.au>.

The AIHW's expenditure reporting forms Australia's National Health Accounts, which are distinct from, but related to, the National Accounts produced by the Australian Bureau of Statistics (ABS).

The AIHW compiles its Health expenditure database from a wide variety of government and non-government sources. Since 2008–09, the main source of state and territory government expenditure data has been the Government Health Expenditure National Minimum Data Set (GHE NMDS), which comprises data provided by the states and territories to the AIHW. Information about Australian Government expenditure is sourced from the Department of Health, Treasury and other sources.

Other expenditure data are sourced from the Independent Hospital Pricing Authority—an independent government agency established by the Australian Government as part of the *National Health Reform Act 2011*.

Timeliness

The reference period for this data set is 2004–05 to 2012–13. The disease expenditure database can only be updated once the NHMD, NPHED, NHCDC and health expenditure database have all been updated for the relevant financial year, which is currently a minimum of 15 months after the end of the financial year.

The AIHW first published 2012–13 data from the disease expenditure database in *Australia's Health 2016* (AIHW 2016b) in September 2016.

Accessibility

Summary information from the database is in:

- Australian health expenditure–demographics and diseases: hospital admitted patient expenditure 2004–05 to 2012–13.
- Australia's Health 2016.

Users can request data not available online or in reports via the AIHW Expenditure and Workforce Unit on (02) 6244 1119 or via email to <expenditure@aihw.gov.au>. Requests that take longer than half an hour to compile are charged for on a cost-recovery basis.

Interpretability

Supporting information on the quality and use of the disease expenditure database are published in Health system expenditure on disease and injury in Australia, 2004–05 (technical notes), available on the AIHW website and in the appendices in this report.

Most important to note is that the disease expenditure database estimates are:

- an estimate based on around 30% of total recurrent health expenditure
- only 1 measure of the size of the disease burden on the community (that is, the 'size of the problem')
- not the same as loss of health due to disease

- not to be regarded as how much would be saved if a specific disease or all diseases were prevented
- not an estimate of the total economic impact of diseases in the Australian community. This is because the estimates do not include non-admitted patients and costs that are not accrued by the health system, such as travel costs of patients, costs associated with the social and economic burden on carers and family, and owing to lost quality and quantity of life.

Relevance

Scope and coverage

Admitted patient disease expenditure estimates provide a broad picture of the use of admitted patient hospital resources classified by disease expenditure group, as well as a reference source for planners and researchers interested in costs and use patterns for particular disease expenditure groups.

The disease expenditure database contains an estimate based on around 30% of total recurrent health expenditure.

Statistical standards

Readers need to bear in mind that cost-of-illness data only provide estimates of the impact of a disease on health-care expenditures. The estimates of the cost of treating and/or preventing a disease cannot be used to indicate the loss of health due to that disease.

Care should be taken not to interpret expenditure associated with disease treatment as simply an estimate of the savings that would result from prevention of disease. Conversion of the opportunity cost—or the benefits forgone—of resources being devoted to disease treatment into expenditure savings involves a number of additional considerations (see, for example, AIHW: Mathers et al. 1998b).

Accuracy

Potential sources of error

The disease expenditure database uses a bottom-up approach to divide known expenditures by demographics and disease.

The NHCDC cost data are only available at the state and territory level rather than for individual hospitals. In using these data, it was assumed that the relative costliness of each Australian Refined Diagnosis Related Group (AR-DRG) was the same for all public hospitals within a particular jurisdiction (nationally, in the case of private hospitals). This can understate the variation in expenditure between hospitals and might impact the characteristics within the data.

Refer to the Data Quality Statements for the NHMD, NPHED and the health expenditure database for further information on the potential sources of error within these databases.

Data validation

Refer to the Data Quality Statements for the NHMD, NPHED and the health expenditure database for further information on the accuracy of the data within these databases.

Coherence

To ensure consistency between the disease expenditure database and associated burden of disease (ABDS) projects, the disease expenditure groups used in the 2012–13 admitted patient expenditure estimates were based on the 17 ABDS groups that were published in *Australian Burden of Disease Study: fatal burden of disease 2010* (AIHW 2015a). All ICD-10-AM codes were mapped to the relevant ABDS group and 4 new groups—*Examination and observation NEC* (not elsewhere classified), *Physical, behavioural and social problems NEC*, *Interventions NEC* and *Symptoms NEC* were included to complete the disease expenditure group categorisation (AIHW 2015a).

The methodology used to estimate expenditures for admitted patient hospital services is consistent between 2004–05 and 2012–13. Hence, time series comparisons for admitted patient hospital services are possible. Due to the changes in methodology these estimates are not comparable with estimates of disease expenditure using previous methods.

Appendix B: Limitations of the current method

There are always going to be limitations in any estimation methodology that is developed, and the method outlined in this report is no different. Here follows an account of the key limitations in both the model used and the inputs that were available. This is structured around general limitations for each step followed by limitations relating to particular substeps in the process.

Admission practice variation

Using the National Hospital Morbidity Database (NHMD) as the basis for the calculation of expenditure brings with it the implicit assumption that each jurisdiction has the same admission practices. Variations in admission practices and policies lead to variation among providers in the number of admissions for some conditions. Variation can also occur over time and between the public and private sectors.

Limitations of Step 1: Estimating the cost of each separation

The National Public Hospital Establishments Database (NPHED) provides information about public hospital expenditure which is used to scale estimates for public hospital separations. However, a small minority of public hospitals reported no expenditure, and some were not included in the NPHED for certain years (potentially because they did not report public expenditure or were not considered a public hospital at certain times), so no scaling factor was available. To address this, the expenditure estimates of separations for these hospitals were scaled up or down by the average adjustment made for other hospitals within the same hospital peer group. A hospital peer group consists of groupings of hospitals that are broadly similar in terms of characteristics (AIHW 2016a). This was considered the best available method without having additional information about those hospitals' expenditure.

In some instances a hospital is part of a hospital network, with expenditure recorded at the network level in the NPHED (aggregated for all hospitals in the network) rather than for individual hospitals. In these cases, a scaling factor was calculated and applied to separations at the hospital network level. While some granularity is lost, this still ensures that hospital admitted patient expenditure estimates scale to total expenditure.

1.1: Estimating the cost of acute separations

The National Hospital Cost Data Collection (NHCDC) cost data are only available at the state and territory level. In using these data, it was assumed that the relative costliness of each Australian Refined Diagnosis Related Group (AR-DRG) was the same for all public hospitals within a particular jurisdiction (nationally, in the case of private hospitals). This can understate the variation in expenditure between hospitals and might impact the characteristics within the data. This is somewhat addressed by scaling the separation-based expenditure to match the expenditure for the particular hospital for public hospitals; however, this assumes that the variation in expenditure between hospitals is experienced consistently across all AR-DRGs. That is, a hospital that has higher expenditure per weighted separation on average is equally higher in expenditure across all separations, rather than this increased

expenditure being particularly focused on certain service areas. For example, 1 hospital may have relatively high expenditure associated with *Cardiovascular diseases* but average or below average expenditure for all other types of diseases. There was no other information available at the time of analysis so these are best estimates based on the limitations in available AR-DRGs.

Because the hospital morbidity costing model (HMCM) models a cost for each separation, the results may not reflect the actual cost for the separation. To test the robustness of the HMCM for acute separations, 2 years of complete NHCDC data for public acute care hospitals were supplied by the Independent Hospital Pricing Authority (IHPA) (for 2011–12 and 2012–13). The NHCDC provides a direct measure of the actual cost ascribed to each separation by the reporting hospital.

The mean costs, by AR-DRG, for acute public hospital separations from the HMCM were compared with those in the NHCDC and the correlation coefficient was calculated. The results showed a very strong correlation between both sets of means (Table B.1). That is, there was a strong relationship between the mean cost for each AR-DRG as calculated by the HMCM and the mean cost calculated using the NHCDC data. This suggests that the average expenditure per separation within each AR-DRG was similar to that recorded in the NHCDC for both years. This was to be expected as the cost weights used in the HMCM were derived from the NHCDC.

Table B.1: Correlation of mean cost by AR-DRG, between HMCM and NHCDC data, for years 2011–12 and 2012–13

Year	Correlation coefficient
2011–12	0.998
2012–13	0.997

Source: Disease expenditure database, National Hospital Cost Data Collection (NHCDC) cost data.

It should also be noted that recent improvements to hospital cost data, particularly through the work of the IHPA, may provide significant opportunity for improvement. For example, improvements to the scope and quality of the NHCDC data may provide an opportunity to replace the HMCM estimation with NHCDC data in some cases.

1.2: Estimating the cost of subacute and non-acute separations

The Australian National Sub-Acute and Non-Acute Patient Classification (AN-SNAP) studies are many years old and there is some potential that they may not reflect current cost relativities; however, they are a source of information that could be used for the reference period, which included years before the establishment of national activity-based funding arrangements for subacute and non-acute care. Recent work by the IHPA on the costs of subacute and non-acute hospital care would be able to be incorporated into future costing approaches for subacute and non-acute separations.

Limitations of Step 2: Scaling costs to total hospital expenditure

In general, the Health and Allied Services Advisory Council (HASAC) information is now many years old and there is a need to verify whether this method still provides an accurate estimate of the admitted patient fraction (IFRAC). For the purposes of this report, there were insufficient resources to look into this but it will be considered in future work. Additionally,

IHPA work investigating non-admitted patient expenditure will provide input to future disease expenditure analysis.

Limitations of Step 3: Assigning expenditure to diagnoses

3.1: Mapping to ICD-10-AM Eighth Edition

As different editions of the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) are developed, individual diagnosis codes may be removed and/or replaced with other codes and new ones are added. This means that, at the level of individual diagnoses, data will not necessarily be comparable between years.

Coding practices also change over time in accordance with Australian Coding Standards, which undergo ongoing revision to reflect changes in clinical practice, clinical classification amendments and various user requirements of admitted patient data collections. This can mean that some codes are used more or less even though they are not changed between versions. There can also be variation between jurisdictions in how the standards are adopted.

Analysis at an aggregated level, such as at the level of ICD-10-AM chapters, is less likely to be affected by this than more detailed analysis, such as attempts to track expenditure on individual diagnoses over time.

3.2: Distributing separation costs to relevant diagnoses

The list of excluded diagnoses helps limit the potential for diagnosis codes to be allocated expenditure when they played little or no role in driving the cost. For any given separation, the cost-relevant diagnosis codes are likely to have played a greater or lesser part than others in determining the overall cost. In this context, the even distribution method undoubtedly overstates the contribution of some diagnoses in some cases and the reverse in others. This is, however, a better starting point than allocating all expenditure to the principal diagnosis as in previous AIHW methods, as this assumes all additional diagnoses did not contribute to the cost associated with a separation.

Potentially, the Diagnosis Complexity Level (DCL) scores might have provided a means to more accurately distribute the expenditure; however, it was judged that the DCL scores were not a viable way of distributing the expenditure between the cost-relevant diagnoses in this particular case. This was for the following reasons:

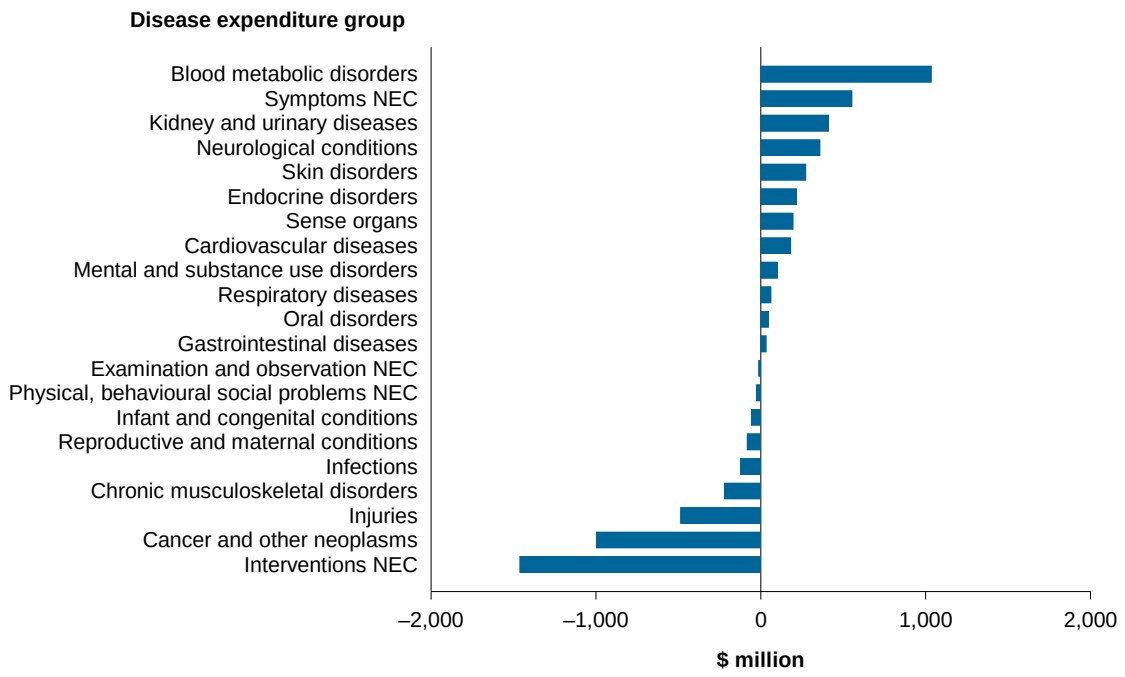
- At the time of developing the database, the AIHW did not have access to the AR-DRG version 8 Grouper software that would have been required to allocate DCL scores to all diagnoses. Obtaining this software and applying it to the older data would have required resources beyond those available for this project.
- The DCL scores weren't explicitly designed to provide an indication of the relative contribution of particular diagnoses to the overall cost of a separation. They were designed to indicate the likelihood that a separation within a particular adjacent AR-DRG had relatively high resource consumption compared with other separations within the same group. As such, they provide an estimate of the likely contribution of particular diagnoses to driving the cost of the separation beyond the base cost for the AR-DRG.

The DCL scores essentially provide an indication of the relative contribution of diagnoses to this marginal cost, rather than either the base or overall cost of the separation.

- Use of the DCL scores in this context would be useful if there was sufficient confidence in the ability of the DCL scores to reliably predict the relative contribution of each diagnosis to the cost of a given separation in a given year. The Episode Clinical Complexity Score (ECCS) model, which is an aggregation of the DCL scores that are applied to all diagnoses, was developed based on data from 2009–10 to 2011–12. According to the ACCD, this model 'is specifically adapted to the casemix and cost profiles of those three years' and there is considerable variation when comparing DCLs across data sets (ACCD 2014). As also noted by the ACCD, there is substantial variation in the cost of separations within adjacent AR-DRGs as well as within individual AR-DRGs. This limits the extent to which the AR-DRG for an individual separation predicts its actual cost and, therefore, also the reliability of the DCL scores in predicting the relative contribution of individual diagnoses in a given separation. The review essentially showed that this predictive ability has been improved for the 2009–10 to 2011–12 years but that substantial cost variation remained. There can, therefore, be limited confidence in the reliability of the DCL scores in terms of predicting the relative contribution of particular diagnoses to the cost of a given separation in a given year, particularly for years earlier than 2009–10.

Appendix C: Comparison of the current and previous methods

The previous estimates of expenditure by disease were derived by allocating all the expenditure for a separation to the principal diagnosis. In the new method, the expenditure was allocated equally across all cost-relevant diagnoses. The effect of this new methodology on the estimates are shown in Figure C.1 and Table C.1.



Note: Difference is calculated by subtracting the expenditure allocated using the principal diagnosis only (previous method) from that derived using all diagnoses (current method).

Source: Disease expenditure database.

Figure C.1: Difference in hospital admitted patient expenditure, by disease expenditure groups, all diagnoses versus principal diagnosis methods, 2008–09

Table C.1: Comparison of expenditure allocated to each disease expenditure group, for separations where the principal diagnosis maps to *Interventions NEC,* 2008–09

Disease expenditure group	Expenditure allocated to principal diagnosis only ($)[a]	Expenditure allocated to all relevant diagnoses ($)[b]
Infections	—	58,556,676
Infant and congenital conditions	—	7,813,214
Cancer and other neoplasms	—	50,822,787
Cardiovascular diseases	—	217,506,395
Respiratory diseases	—	26,261,867
Gastrointestinal diseases	—	62,612,792
Neurological conditions	—	93,355,256
Mental and substance use disorders	—	129,455,869
Endocrine disorders	—	52,329,730
Kidney and urinary diseases	—	73,848,615
Reproductive and maternal conditions	—	7,737,339
Chronic musculoskeletal disorders	—	164,684,728
Sense organs	—	31,235,580
Skin disorders	—	59,253,277
Oral disorders	—	5,694,446
Blood metabolic disorders	—	71,755,019
Injuries	—	229,517,779
Examination and observation NEC	—	—
Interventions NEC	2,174,536,333	715,283,436
Physical, behavioural social problems NEC	—	—
Symptoms NEC	—	116,811,530
Total	2,174,536,333	2,174,536,335

(a) Total expenditure for each separation is allocated to the principal diagnosis.

(b) Total expenditure for each separation is allocated equally between cost-relevant diagnoses recorded for the separation.

Source: Disease expenditure database.

Appendix D: Adjusting for Aboriginal and Torres Strait Islander under-identification

Hospital records provide an indication of whether an admitted patient is Aboriginal and/or Torres Strait Islander or non-Indigenous. There is, however, a degree of under-identification of Aboriginal and Torres Strait Islander people in hospital records (AIHW 2013d).

The level of under-identification is assessed through data quality studies. These studies compare the results of face-to-face interviews with the information recorded in the patient's administrative records. The results represent the best information currently available on Indigenous under-identification in Australian hospitals.

These studies provide an estimate of the level of under-identification, expressed in terms of under-identification correction factors. Each of these studies provides these factors for various patient groups for certain time periods. The 2005 report published a national correction factor as well as state and territory specific factors (AIHW 2005b). The 2010 report had correction factors for national, state and territory and national remoteness areas (AIHW 2010b). The 2013 report had correction factors for national, state and territory, national remoteness areas and remoteness within jurisdictions (AIHW 2013b).

When conducting analysis of hospital data involving Indigenous status, the data can be adjusted at the aggregate level based on these under-identification correction factors. This is done by multiplying the number of separations for Indigenous persons by the appropriate correction factor and scaling down the number of separations for non-Indigenous persons accordingly.

There are not, however, specific correction factors for diseases or condition groups to allow this approach to be used when analysing expenditure by disease or condition. To overcome this limitation, adjustments have been made at the separation level rather than at the aggregated level. That is, the expenditure estimates for separations for Aboriginal and Torres Strait Islander persons have been inflated according to the selected correction factor for the state or territory and time period in which the separation occurred. This analysis was only used when reporting expenditure estimates for Aboriginal and Torres Strait Islander people.

Consistent with the recommendation in the 2013 report that 'the correction factors provided in this report should be used to adjust total hospital data from the 2010–11 reference year onwards' (AIHW 2013b), these correction factors were used for 2010–11, 2011–12 and 2012–13.

The 2010 report was based on data from 2007 and 2008, so the correction factors published in that report were applied to data for 2007–08 to 2009–10 inclusive (AIHW 2010b).

The 2005 report used survey data from 1996–97 to 2003–04 (AIHW 2005b). Correction factors published in that report were used to adjust data for 2004–05 to 2006–07 inclusive. For those years, no adjustment was made to data for South Australia, Northern Territory and Tasmania because the correction factor for South Australia and the Northern Territory was 1.0 and no correction factor was provided for Tasmania.

The lowest administrative level that was available across all these reports was the state and territory level. To enhance comparability across the whole time series, state and territory specific correction factors were used for all years for public hospitals (Table D.1).

Table D.1: Estimated correction factors for Aboriginal and Torres Strait Islander people, by state and territory

	Correction factors		
State	**2005 report**	**2010 report**	**2013 report**
New South Wales	1.30	1.13	1.20
Victoria	1.25	1.20	1.23
Queensland	1.20	1.13	1.08
Western Australia	1.06	1.03	1.01
South Australia	1.00	1.15	1.09
Tasmania	No under-identification factor	2.00[(a)]	1.37
Australian Capital Territory	1.30	1.70	1.69
Northern Territory	1.00	1.02	1.00
Total	**1.16**	**1.12**[(b)]	**1.09**

(a) The raw results, adjusted estimates and the estimated correction factor for Tasmania were not considered to be reliable.

(b) Excludes Tasmania and the Australian Capital Territory.

Sources: AIHW 2005b, 2010b, 2013d.

As the Australian Institute of Health and Welfare (AIHW) studies on Aboriginal and Torres Strait Islander identification in hospital data did not include private hospitals, an adjustment of 54% was used for private hospitals, which was derived from the analysis of linked hospital morbidity data from New South Wales (AIHW: Deeble et al. 1998).

Limitations

The under-identification of Aboriginal and Torres Strait Islander people in public hospitals varies substantially between and within jurisdictions, as well as remoteness categories. For this reason, it is best to use correction factors calculated at the lowest level possible. For the sake of consistency in method over time, however, it was decided to use a single level of factors across the data set and the state and territory level was the lowest level available in all years.

Ideally, any adjustments for under-identification would be done by specifically identifying separations where the person was Aboriginal and/or Torres Strait Islander but did not identify as such and reclassifying the separation. In that way, the cost information for both Indigenous and non-Indigenous people would remain unadjusted for under-identification. While the under-identification studies suggest that some of these separations were in fact for Aboriginal and Torres Strait Islander people, these studies do not, however, identify exactly which ones, and the AIHW is not aware of any method for doing so. There remains a question, therefore, as to the appropriateness of applying the adjustment factors to expenditure data in this way.

For the above reasons, the under-identification-adjusted expenditure estimates are only to be used for analysis where Indigenous status is of interest and where there are a large number of cases in the data being studied. Micro-level studies using the adjusted data should be avoided and all analyses where Indigenous status is not relevant should use the unadjusted data.

Appendix E: Mapping of ICD-10-AM codes

The mapping of the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) codes to the disease expenditure groups used in this report are detailed in Table E.1.

Table E.1: Mapping of ICD-10-AM codes to disease expenditure groups

Disease expenditure group	ICD-10-AM 3 character codes
Infections	A00–A44, A48–A98, B00–B07, B08*, B09–B17, B19–B85, B87–B99, D59*, G00–G07, H65–H66, H68, H70, J00–J22, J85–J86, N29*, N33*, N74*, O98*, R02, R57*, R65, R75, R76*, Z03*, Z06, Z11*, Z20*, Z21–Z28, Z29*, Z83*, Z86*
Infant and congenital conditions	G80, P00–P96, Q00–Q60, Q62–Q99, R68*, R95, Z03*, Z13*, Z82*, Z87*
Cancer and other neoplasms	C00–C96, D00–D24, D26–D48, Z03*, Z08, Z12, Z40*, Z44*, Z51*, Z54*, Z80, Z85, Z86*
Cardiovascular diseases	G45, I00–I09, I10–I11, I13, I15*, I20–I83, I86–I99, R00–R01, R03, R09*, R57*, Z03*, Z13*, Z45*, Z50*, Z82*, Z86*, Z94*
Respiratory diseases	D86*, J30–J33, J34*, J35–J84, J90–J99, R05–R06, R09*, Z03*, Z13*, Z82*, Z83*, Z87*, Z94*, Z96*
Gastrointestinal diseases	B18, I85, K20–K93, R15, R18, Z11*, Z13*, Z20*, Z43*, Z46*, Z83*, Z87*, Z93*, Z94*, Z98*
Neurological conditions	F00–F03, G08–G44, G46–G73, G81–G99, R29*, R40*, R56, Z03*, Z13*
Mental and substance use disorders	F04–F99, R40*, R41–R46, R54, R63*, R78*, Z00*, Z03*, Z04*, Z09*, Z13*, Z50*, Z54*, Z55*, Z56, Z71*, Z81, Z82*, Z86*, Z91*
Endocrine disorders	E03–E07, E09*, E10*, E11*, E13*, E14*, E15–E27, E28*, E29–E35, E89, O24*, Z13*, Z83*, Z86*, Z96*
Kidney and urinary diseases	E10*, E11*, E13*, E14*, I12, I15*, N00–N28, N29*, N30–N32, N33*, N34–N42, Q61, R30–R39, Z13*, Z43*, Z46*, Z49, Z84*, Z87*, Z93*, Z94*, Z96*, Z99*
Reproductive and maternal conditions	D25, E28*, N43–N73, N74*, N75–N99, O00–O23, O24*, O25–O94, O98*, O99, Z01*, Z30–Z39, Z64*, Z87*, Z92*, Z97*
Chronic musculoskeletal disorders	M00–M99, R29*, Z13*, Z46*, Z47*, Z82*, Z87*, Z94*, Z96*, Z97*, Z98*
Sense organs	H00*, H01–H49, H50–H59, H60*, H61–H62, H67, H69, H71–H95, Z01*, Z13*, Z45*, Z46*, Z50*, Z82*, Z83*, Z86*, Z94*, Z96*, Z97*
Skin disorders	A46, B08*, B86, H00*, H60*, J34*, L00–L75, L80–L99, R20–R21, R23*, Z84*, Z87*, Z94*
Oral disorders	K00–K14, Z01*, Z46*, Z96*, Z97*
Blood metabolic disorders	D50–D58, D59*, D60–D84, D86*, D89, E00–E02, E09*, E40–E88, R70–R74, Z13*, Z87*, Z92*
Injuries	S00–S99, T00–T98, Z03*, Z04*, Z09*, Z54*, Z91*
Examination and observation NEC	Z00*, Z01*, Z02, Z03*, Z04*, Z09*, Z10, Z13*
Interventions NEC	Z29*, Z40*, Z41–Z42, Z43*, Z44*, Z45*, Z46*, Z47*, Z48, Z50*, Z51*, Z52–Z53, Z54*, Z55*, Z70, Z71*, Z74*, Z75*, Z76*
Physical, behavioural social problems NEC	Z57–Z63, Z64*, Z65, Z72–Z73, Z74*, Z75*, Z76*, Z82*, Z83*, Z84*, Z86*, Z87*, Z88–Z90, Z91*, Z92*, Z93*, Z94*, Z97*, Z98*, Z99*
Symptoms NEC	R04, R07, R10–R14, R16–R17, R19, R22, R23*, R25–R27, R29*, R47–R49, R50–R53, R55, R58–R62, R63*, R64, R68*, R69, R76*, R77, R78*, R79–R94, R96–R99

Notes

1. * Indicates code is split across more than 1 cause group.
2. Detailed tables are available on request.

Appendix F: Overview of expenditure by disease classified using ICD-10-AM

In addition to disease expenditure groups, expenditure estimates by International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) can be derived from the disease expenditure database. Using the ICD-10-AM, the highest expenditure in 2012–13 was $4.8 billion for *Diseases of the circulatory system*, followed by $4.1 billion for *Endocrine, nutritional and metabolic diseases* and $4.0 billion for *Injury, poisoning and certain other consequences of external causes* (Table F.1). *Diseases of the circulatory system* ($2.8 billion) ranked first for males, with *Injury, poisoning and certain other consequences of external causes* ($2.2 billion) the second most expensive and *Endocrine, nutritional and metabolic diseases* ($2.1 million) ranked third. *Pregnancy, childbirth and the puerperium* ranked first for females ($2.6 billion), with *Diseases of the circulatory system* ($2.0 billion) second and *Endocrine, nutritional and metabolic diseases* ($2.0 billion) third.

Table F.1: Total hospital admitted patient expenditure by disease classified using ICD-10-AM Eighth Edition, 2012–13 ($ million)

ICD-10-AM chapter	Male	Female	Total
Certain infectious and parasitic diseases (A00–B99)	472.05	453.15	925.20
Neoplasms (C00–D49)	1,441.34	1,370.31	2,811.64
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50–D89)	477.26	503.49	980.75
Endocrine, nutritional and metabolic diseases (E00–E89)	2,073.95	2,027.23	4,101.18
Mental and behavioural disorders (F00–F99)	1,692.10	1,571.61	3,263.72
Diseases of the nervous system (G00–G99)	704.96	643.23	1,348.20
Diseases of the eye and adnexa (H00–H59)	398.32	469.08	867.40
Diseases of the ear and mastoid process (H60–H95)	132.30	123.45	255.74
Diseases of the circulatory system (I00–I99)	2,807.60	2,040.46	4,848.05
Diseases of the respiratory system (J00–J99)	1,301.48	1,113.05	2,414.54
Diseases of the digestive system (K00–K93)	1,893.76	1,921.05	3,814.80
Diseases of the skin and subcutaneous tissue (L00–L99)	589.72	534.87	1,124.59
Diseases of the musculoskeletal system and connective tissue (M00–M99)	1,635.80	1,829.55	3,465.36
Diseases of the genitourinary system (N00–N99)	1,071.85	1,493.61	2,565.47
Pregnancy, childbirth and the puerperium (O00–O99)	. .	2,554.50	2,554.50
Certain conditions originating in the perinatal period (P00–P96)	497.92	402.11	900.03
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	197.13	166.25	363.37
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00–R99)	723.53	793.99	1,517.52
Injury, poisoning and certain other consequences of external causes (S00–T98)	2,236.01	1,802.72	4,038.73
Factors influencing health status and contact with health services (Z00–Z99)	1,401.60	1,357.33	2,758.94
Total	**21,788.86**	**23,188.91**	**44,977.78**

Source: Disease expenditure database.

Appendix G: Hospital admitted patient expenditure tables

Further data analysed for the production of this publication are available for download from the AIHW website at <www.aihw.gov.au/reports-statistics/health-welfare-overview/health-welfare-expenditure/data>.

Glossary

Aboriginal or Torres Strait Islander: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Indigenous**.

acute: Coming on sharply and often brief, intense and severe.

admission: An admission to hospital. The term **hospitalisation** is used to describe an episode of hospital care that starts with the formal admission process and ends with the formal **separation** process. The number of separations has been taken as the number of admissions; hence, admission rate is the same as separation rate.

admitted patient: A patient who undergoes a hospital's formal admission process to receive treatment and/or care. This treatment and/or care is provided over a period of time and can occur in hospital and/or in the person's home (for hospital in the home patients).

average length of stay: The average of the length of stay for admitted patient episodes. Calculated by dividing total patients days in a given period by the total number of hospital **separations** in that period.

burden of disease and injury: Term referring to the quantified impact of a disease or injury on an individual or population, using the **disability-adjusted life year (DALY)** measure.

cardiovascular diseases: Any disease of the **circulatory system**, namely the heart (cardio) or blood vessels (vascular). Includes heart attack, angina, stroke and peripheral vascular disease. Also known as circulatory disease.

care type: The care type defines the overall nature of a clinical service provided to an admitted patient during an episode of care (admitted care), or the type of service provided by the hospital for boarders or posthumous organ procurement (other care). Admitted patient care consists of the following categories:

- acute care
- rehabilitation care
- palliative care
- geriatric evaluation and management
- psychogeriatric care
- maintenance care
- newborn care
- other admitted care—that is, where the principal clinical intent does not meet the criteria for any of the above.

Other care services include:

- posthumous organ procurement
- hospital boarder.

constant prices: Dollar amounts for different years that are adjusted to reflect the prices in a chosen reference year. This provides a way of comparing spending over time on an equal dollar-for-dollar basis without the distorting effects of inflation. The comparison will reflect only the changes in the amount of goods and services purchased—that is, changes in the 'buying power'—not the changes in prices of these goods and services caused by inflation. Compare with **current cost**.

cost weight: The costliness of an Australian Refined Diagnosis Related Group (AR-DRG) relative to all other AR-DRGs such that the average cost weight for all separations is 1.00. A separation for an AR-DRG with a cost weight of 5.0, therefore, on average costs 10 times as much as a separation with a cost weight of 0.5. There are separate cost weights for AR-DRGs in the public and private sectors, reflecting the differences in the range of costs in the different sectors.

current cost: The term 'current cost' refers to expenditures reported for a particular year, unadjusted for inflation. Changes in current cost expenditures reflect changes in both price and volume.

demographics: Statistical data relating to population characteristics, such as age, sex, economic status, education level and employment status, among others.

disability-adjusted life year (DALY): A year of healthy life lost, either through premature death or equivalently through living with disability due to illness or injury. It is the basic unit used in **burden of disease and injury** estimates.

disease: A physical or mental disturbance involving symptoms (such as pain or feeling unwell), dysfunction or tissue damage, especially if these symptoms and signs form a recognisable clinical pattern.

hospital services: Services provided to a patient who is receiving admitted patient services or non-admitted patient services in a hospital, but excludes non-admitted dental services, community health services, patient transport services, public health activities and health research undertaken within the hospital. Can include services provided off-site, such as hospital in the home, dialysis or other services.

hospitalisation: Synonymous with **admission** and **separation**; that is, an episode of hospital care that starts with the formal admission process and ends with the formal separation process. An episode of care can be completed by the patients being discharged, transferred to another hospital or care facility, or dying, or by a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute to rehabilitation).

Indigenous: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Aboriginal or Torres Strait Islander**.

Indigenous status: Whether a person identifies as being of **Aboriginal and/or Torres Strait Islander** origin.

inpatient: See **admitted patient**.

International Classification of Diseases (ICD): The World Health Organization's internationally accepted statistical classification of death and disease. The 10th revision (ICD-10) is currently in use. The Australian modification of the ICD-10 (ICD-10-AM) is used for diagnoses and procedures recorded for patients admitted to hospitals.

non-admitted patient: A patient who receives care from a recognised non-admitted patient service/clinic of a hospital, including emergency departments and outpatient clinics.

non-Indigenous: People who have declared they are not of Aboriginal or Torres Strait Islander descent.

Organisation for Economic Co-operation and Development (OECD): An organisation of 35 countries, including Australia—mostly developed and some emerging (such as Mexico, Chile and Turkey). The organisation's aim is to promote policies that will improve the economic and social wellbeing of people around the world.

principal diagnosis: The diagnosis listed in hospital records to describe the problem that was chiefly responsible for **hospitalisation**.

private hospital: A health-care provider facility, other than a public hospital, that has been established under state or territory legislation as a hospital or freestanding day procedure unit and authorised to facilitate the provision of hospital services to patients. A private hospital is not defined by whether it is privately owned but by whether it is not a public hospital (as defined below). Private hospital expenditure includes expenditures incurred by a private hospital in providing contracted and/or ad hoc treatments for public patients.

public hospital: A health-care provider facility that has been established under state or territory legislation as a hospital or as a freestanding day procedure unit. Public hospitals are operated by, or on behalf of, the government of the state or territory in which they are established and are authorised under that state/territory's legislation to provide or facilitate the provision of hospital services to patients. Public hospitals include some denominational hospitals that are privately owned. Australian Defence Force hospitals are not included in the scope of public hospitals.

separation: The formal process where a hospital records the completion of an episode of treatment and/or care for an admitted patient. In this report, described by the term **hospitalisation**.

total health expenditure (spending): The sum of health expenditure for all conditions (that is, allocated recurrent health expenditure). This excludes expenditure that cannot be allocated to a specific disease (for example, ambulance services) and capital expenditure (non-recurrent).

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The following Australian Institute of Health and Welfare (AIHW) publications relating to hospital admitted patient expenditure might be of interest:

- AIHW 2016. Australia's health 2016. Australia's health series no. 15. Cat. no. AUS 199. Canberra: AIHW.
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