Australian Government
Australian Institute of Health and Welfare

Cardiovascular disease, diabetes and chronic kidney disease

Australian facts

Prevalence and incidence

risk factors
chronic kidney disease
cardiovascular disease
diabetes
stroke

Cardiovascular disease, diabetes and chronic kidney disease

Australian facts

Prevalence and incidence

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This publication is part of the Australian Institute of Health and Welfare's Cardiovascular, diabetes and chronic kidney disease series. A complete list of the Institute's publications is available from the Institute's website <www.aihw.gov.au>.

ISSN 2204-1397
ISBN 978-1-74249-662-7

Suggested citation

Australian Institute of Health and Welfare 2014. Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: Prevalence and incidence. Cardiovascular, diabetes and chronic kidney disease series no. 2. Cat. no. CDK 2. Canberra: AIHW.

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Published by the Australian Institute of Health and Welfare

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Contents

Preface

Cardiovascular disease, diabetes and chronic kidney disease—Australian facts, produced by the National Centre for Monitoring Vascular Diseases at the Australian Institute of Health and Welfare (AIHW), is a series of reports examining cardiovascular disease (CVD) (including conditions such as heart disease, stroke and heart failure), diabetes and chronic kidney disease (CKD), and their interrelationships. Each is a serious disease that contributes substantially to poor health affecting millions of Australians, often leading to further health complications, disability, loss of quality of life and premature death.

Some of the diseases covered in these reports, such as heart attack and stroke, can be immediately life-threatening events, whereas conditions such as diabetes and CKD persist over a long time. But they all require intensive management and impose a substantial burden on the Australian community and the health-care system. However, these diseases are largely preventable. Modifying and controlling risk factors for these diseases not only reduces the risk of onset of disease but also has a favourable impact on disease progression and the development of complications, leading to large health gains in the population.

There are complex causal relationships between CVD, diabetes and CKD. These, in combination with shared risk factors, often results in these diseases occurring together in an individual—known as *comorbidity*. The effects of comorbidity may lead to both more severe illness and poorer prognosis.

In the context of Australia's ageing population, the increasing risk of developing these diseases with age, the high prevalence of CVD, diabetes and CKD, and the rise in these diseases and their comorbidities will escalate the burden of CVD, diabetes and CKD on individuals, families and the health-care system in the future.

The purpose of this series of 5 reports, of which this report is the second, is to provide a compendium of the most recent information to monitor CVD, diabetes and CKD and their associations. Reports in the series will include:

- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: mortality*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: prevalence and incidence*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: morbidity*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: risk factors*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: Indigenous Australians*.

These reports present up-to-date statistics as well as trends, and examine age and sex characteristics. Variations across population groups, by geographical location, socioeconomic disadvantage and for Aboriginal and Torres Strait Islander people are also included where possible, reflecting that these diseases and associated risk factors are not uniformly distributed across Australia and affect some more than others.

This is the first time that all 3 diseases and their comorbidities have been brought together in one 'Australian facts' publication series. This approach will highlight the interrelated nature of CVD, diabetes and CKD and their determinants, as well as emphasise the burden of these 3 diseases individually and combined. Knowing more about the relationship between these diseases and common issues of concern can lead to shared prevention, management and treatment strategies, leading to improved health outcomes.

This report builds on the previous publications *Cardiovascular disease: Australian facts 2011* and *Diabetes: Australian facts 2008*.

The *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts* series is intended as a resource for policymakers and decision-makers, health professionals, researchers and academics, and the wider community.

Acknowledgments

The authors of this report are Claire Lee-Koo, Eric Henry and Sushma Mathur of the Australian Institute of Health and Welfare (AIHW). Susana Senes, Lisa McGlynn, David Whitelaw, Pamela Kinnear, George Bodilsen, Mark Cooper-Stanbury, Louise York, Xingyan Wen, Graz Hamilton, Louise Catanzariti and Jennifer Kerrigan from the AIHW provided valuable guidance and advice. The authors also acknowledge the helpful guidance and assistance provided by previous AIHW staff member Simon O'Mahony.

The report was prepared under the guidance of the **National Vascular Disease Monitoring Advisory Group**, whose members are Erin Lalor (Chair), Alan Cass, Derek Chew, Maria Craig, Wendy Davis, Rob Grenfell, Wendy Hoy, Tim Mathew, David Parker, Jonathan Shaw, Andrew Tonkin and Bernie Towler.

Valuable input was also received from the Cardiovascular Disease, Diabetes, and Chronic Kidney Disease expert advisory groups, whose members are listed below:

Cardiovascular Disease Expert Advisory Group: Andrew Tonkin (Chair), Tom Briffa, Derek Chew, Annette Dobson, Rob Grenfell, Belinda Lister, John Lynch and Mandy Thrift.

Diabetes Expert Advisory Group: Jonathan Shaw (Chair), Janelle Babare, Stephen Colagiuri, Maria Craig, Wendy Davis, Mark Harris, Greg Johnson, Glynis Ross and Sophia Zoungas.

Chronic Kidney Disease Expert Advisory Group: Tim Mathew (Chair), Alan Cass, Steven Chadban, Jeremy Chapman, Joan Cunningham, Bettina Douglas, Wendy Hoy, Stephen McDonald and David Parker.

The Department of Health funded this report. The authors acknowledge the valuable comments from individual staff members at the Department of Health.

Abbreviations

ABS	Australian Bureau of Statistics
ACR	albumin creatinine ratio
AHS	Australian Health Survey
AIHW	Australian Institute of Health and Welfare
ANZDATA	Australian and New Zealand Dialysis and Transplant Registry
APEG	Australasian Paediatric Endocrine Group
ASGC	Australian Standard Geographical Classification
ASGS	Australian Statistical Geography Standard
CHD	coronary heart disease
CKD	chronic kidney disease
CVD	cardiovascular disease
eGFR	estimated glomerular filtration rate
ESKD	end-stage kidney disease
FPG	fasting plasma glucose
HbA1c	glycated haemoglobin
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th Revision
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification
KRT	kidney replacement therapy
METeOR	AIHW Metadata Online Registry
NDR	National (insulin-treated) Diabetes Register
NDSS	National Diabetes Services Scheme
NHMD	National Hospital Morbidity Database
NMD	National Mortality Database
OECD	Organisation for Economic Co-operation and Development
SDAC	Survey of Disability, Ageing and Carers
SEIFA	Socio-Economic Index for Areas
SES	socioeconomic status

Symbols

—	nil or rounded to zero
mL	millilitre
min	minute
m^2	square metre
mg	milligram
mmol	millimole
mm Hg	millimetre of mercury
<	less than
≥	greater than or equal to
n.p.	not published because of small numbers, confidentiality or other concerns about the quality of the data

Summary

Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: prevalence and incidence is the second in a series of national reports by the National Centre for Monitoring Vascular Diseases at the Australian Institute of Health and Welfare. It describes the prevalence and incidence in the Australian population of 3 chronic diseases, acting alone or together: cardiovascular disease (CVD) (including conditions such as heart disease and stroke), diabetes and chronic kidney disease (CKD).

How many people have CVD, diabetes or CKD?

In 2011–12:

- 22% of Australians (3.7 million) aged 18 and over reported that they had 1 or more cardiovascular diseases, including hypertensive disease, heart disease, stroke or heart failure
- an estimated 5% of Australians (917,000) aged 18 and over had diabetes (based on self-reported and measured data). Of these, 1 in 5, or 1% of the adult population, showed biomedical signs of diabetes but did not self-report that they had the condition
- around 10% of Australians (1.7 million) aged 18 and over had measured biomedical signs of CKD. Of these, 97% showed early signs of CKD (stages 1–3).

How many new cases of CVD, diabetes and CKD are there each year?

In 2011:

- an estimated 69,900 people aged 25 and over had an acute coronary event, with almost two-thirds (63%) of the events occurring in men
- of the over 53,500 people who began using insulin to treat their diabetes, 68% had type 2 diabetes, 12% had gestational diabetes, 4% had type 1 diabetes and 1% had other forms of diabetes requiring insulin (diabetes type was unknown for another 15%).

In 2010:

- there were over 4,800 new cases of end-stage kidney disease (ESKD) in Australia, including people who do not receive kidney replacement therapy (KRT). For each case of ESKD receiving KRT, there was about 1 new case of ESKD that did not.

What are the associations between CVD, diabetes and CKD?

In 2011–12:

- over 1 in 4 (29%) Australian adults had CVD, diabetes or CKD (based on self-reported and measured data); 7% (1.2 million) had at least 2 of these conditions and 1% (182,000) had all 3 conditions
- over two-thirds of people with diabetes (68%) had CVD and/or CKD, compared with 51% of people with CKD who had CVD and/or diabetes, and 30% of people with CVD who had diabetes and/or CKD
- the presence of comorbidity increased with age; predominantly, where one of the conditions was CVD. For example, for those aged 65 and over who had CVD and CKD, the rate was 7 times that for those aged 45–64 (15% compared with 2%).

1 Introduction

This report on prevalence and incidence is the second in the series *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts* authored by the National Centre for Monitoring Vascular Diseases at the Australian Institute of Health and Welfare (AIHW). It provides a comprehensive summary of the latest available data on the prevalence and incidence (see Box 1.1) in the Australian population of 3 chronic vascular diseases, acting alone or together: cardiovascular disease (CVD) (including conditions such as heart disease and stroke), diabetes and chronic kidney disease (CKD).

These diseases often have similar underlying causes and features and share common risk factors as well as prevention, management and treatment strategies. Australia has had success in treating and preventing CVD, diabetes and CKD. But the burden of these diseases, in terms of prevalence, continues to grow due to unfavourable risk factor trends combined with an ageing population. Although smoking rates have continued to fall, increases in overweight and obesity, physical inactivity and in insufficient fruit and vegetable consumption suggest that the burden of CVD, diabetes and CKD will escalate in the future (for further details on these risk factors, see AIHW, forthcoming 2015a).

Furthermore, improvements in the diagnosis, treatment, management and survival of CVD, diabetes and CKD have resulted in greater longevity among Australians and a consequent increase in the prevalence of these conditions, particularly among older Australians. These 3 chronic diseases have a substantial impact on the health of Australians, affecting almost 1 in 4 adult Australians, or an estimated 3.7 million Australians, including 1.2 million who have at least 2 of these conditions.

Monitoring the prevalence and incidence of these diseases and their comorbidities enables their burden on population health to be assessed and the effectiveness of preventative health initiatives to be estimated.

This report has 4 chapters: one for each disease group—CVD (including coronary heart disease [CHD], stroke and heart failure), diabetes (including type 1, type 2 and gestational diabetes) and CKD (including end-stage kidney disease [ESKD]), with the final chapter examining the comorbidity of the 3 diseases. Each chapter includes an analysis of prevalence and/or incidence by sex and age and, where available, trend information. Where possible, information is presented by remoteness and socioeconomic group, reflecting that people from socioeconomically disadvantaged areas and remote areas of Australia often have higher rates of these conditions. International comparisons are also presented where possible. The appendixes provide supporting data, and information on methods and data sources.

What's missing from the picture?

In the absence of national disease registries, it is difficult to present a complete picture of the incidence and prevalence of CVD, diabetes and CKD. Knowing more about the risk factor profile of these patients and their health determinants, their diagnosis and access to primary and speciality health care, their time to treatment, and their treatment and care pathways would be valuable information for the ongoing monitoring and surveillance of these chronic diseases. The information presented in this report has been drawn from national survey data, uses proxy measures to estimate disease incidence in the absence of linked/registry data, and uses condition-specific registers, which have their limitations in terms of scope and disaggregations. Despite these limitations, these data sources are currently the best available data for reporting on the prevalence and incidence of CVD, diabetes and CKD in Australia.

The burden of CVD, diabetes and CKD is high among Aboriginal and Torres Strait Islander Australians (AIHW 2013). While it is acknowledged that it is critical to describe here the burden of these conditions for Indigenous Australians, detailed national biomedical estimates of CKD and diabetes were not available for Indigenous Australians when this report was prepared. The AIHW will be releasing a subsequent report in 2015, that examines the impact and burden of CVD, diabetes and CKD among Aboriginal and Torres Strait Islander people, pending data availability (see AIHW, forthcoming 2015b).

Box 1.1: Incidence and prevalence

Incidence refers to the number of new cases (of an illness, disease or event) occurring during a given period. Unlike many infectious diseases such as influenza, most cardiovascular diseases, diabetes and CKD are chronic diseases. This means that they are long-lasting diseases, with persistent effects that may never be cured completely, and requiring long term management. Hence, for CVD, diabetes or CKD, people will generally only receive a diagnosis once, and the year of their diagnosis will represent their 'incident year'.

Prevalence is the number or proportion of cases or instances of a disease or illness present in a population at a given time. This includes new cases occurring during the period of time, existing cases, cases first diagnosed before the start of the period, and people with the condition who have died during the period. The prevalence of a disease is related to both the incidence of the disease and how long people live after developing it (survival).

2 Cardiovascular disease

Cardiovascular disease

The term cardiovascular disease (CVD) is used to describe many different conditions affecting the heart and blood vessels. The most common and serious types of CVD in Australia are coronary heart disease (CHD), stroke and heart failure. These conditions are described separately later in this chapter. The main underlying cause of CVD is a process known as *atherosclerosis*. This is a condition where abnormal deposits of fat, cholesterol and other substances build up in the inner lining of the arteries to form *plaque*, which causes the artery walls to lose their elasticity. Atherosclerosis is most serious when it leads to reduced or blocked blood supply to the heart (causing angina or heart attack) or to the brain (causing stroke). The process leading to atherosclerosis is slow and complex, often starting in childhood and progressing with age.

A number of factors are known to increase the risk of developing CVD. These include overweight and obesity, tobacco smoking, high blood pressure, high blood cholesterol, insufficient physical activity, poor nutrition and diabetes (for further details, see AIHW, forthcoming 2015a).

Box 2.1: CVD data sources

The Australian Bureau of Statistics (ABS) 2011–12 Australian Health Survey (AHS) combines the existing National Health Survey with two new components: a National Nutrition and Physical Activity Survey and a National Health Measures Survey (NHMS). The AHS collected self-reported data on whether a respondent had 1 or more long-term health conditions; that is, conditions that had lasted, or were expected to last, 6 months or more. These data are used in this report to estimate the prevalence of CVD, CHD and heart failure (see Appendix B). It should be noted that the AHS may underestimate the number of people with these conditions for the reasons given below:

- People living in institutional care facilities, such as hospitals and aged care facilities, were not included in the survey. This excludes a sector of the population where high levels of CVD are expected to occur.
- Some respondents may not have known or been able to accurately report their health status, while others may have over-reported their condition.

Using data from the AHS to examine differences in disease prevalence by remoteness does not present a complete picture because the AHS excludes those living in *Very remote* areas. Further aggregation of *Outer regional* with *Remote* areas may mask important differences in remote areas, given the population in *Outer regional* areas is much larger than in *Remote* areas.

Prevalence data presented in this chapter were limited to Australians aged 18 and over to allow for comparability with diabetes and CKD prevalence estimates (see Appendix B).

No trend data are presented for CVD disease prevalence estimates as the AHS used a different approach to define CVD than that used for previous health surveys.

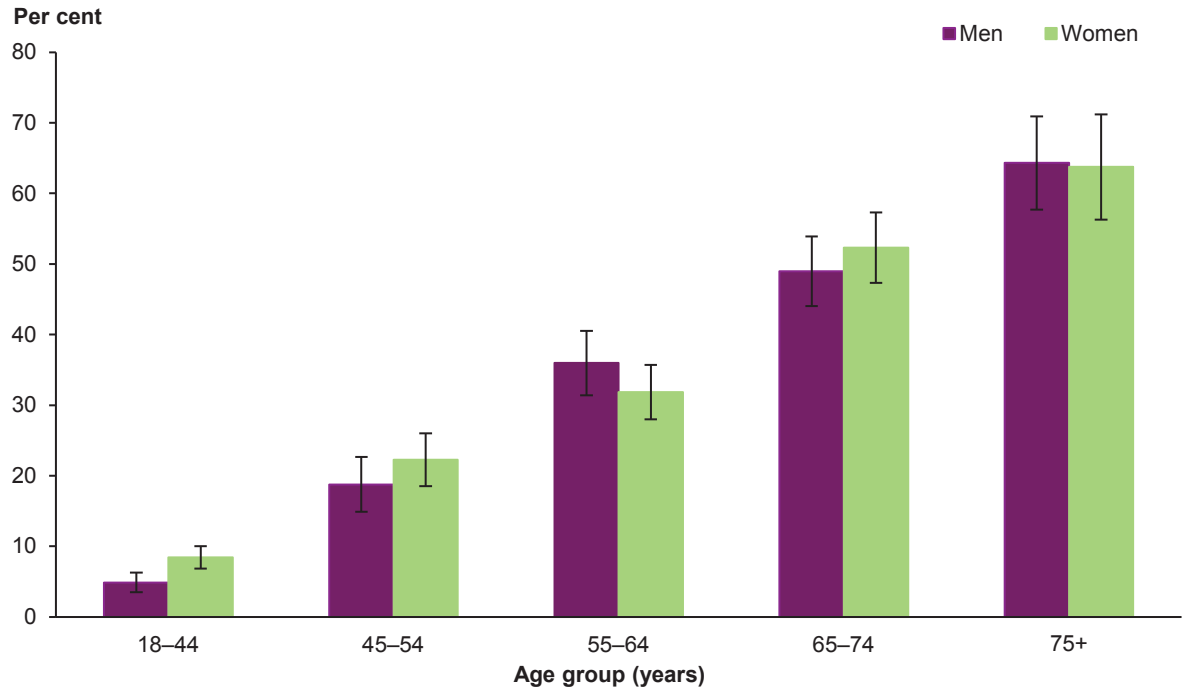
Prevalence

In 2011–12, an estimated 3.7 million Australians (22%) aged 18 and over had 1 or more cardiovascular diseases, based on self-reported data. This includes conditions such as hypertensive disease, CHD and cerebrovascular diseases. According to the AHS, CVD is ranked fourth in the prevalence of long-term health conditions after diseases of the eye and adnexa (structures associated with the eye), the musculoskeletal system and connective tissue, and the respiratory system.

Sex and age

The prevalence of CVD was similar for men and women (an age-standardised rate of 20% and 22%, respectively).

CVD occurred more commonly in older age groups—half (51%) of those aged 65–74 and almost two-thirds (64%) of those aged 75 and over had CVD (Figure 2.1 and Table C1). This compares with 7% among those aged 18–44 and 21% among those aged 45–54.



Note: CVD prevalence is based on the self-reported data of people who participated in the National Health Measures Survey.

Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C1.

Figure 2.1: Prevalence of self-reported CVD among persons aged 18 and over, by age and sex, 2011–12

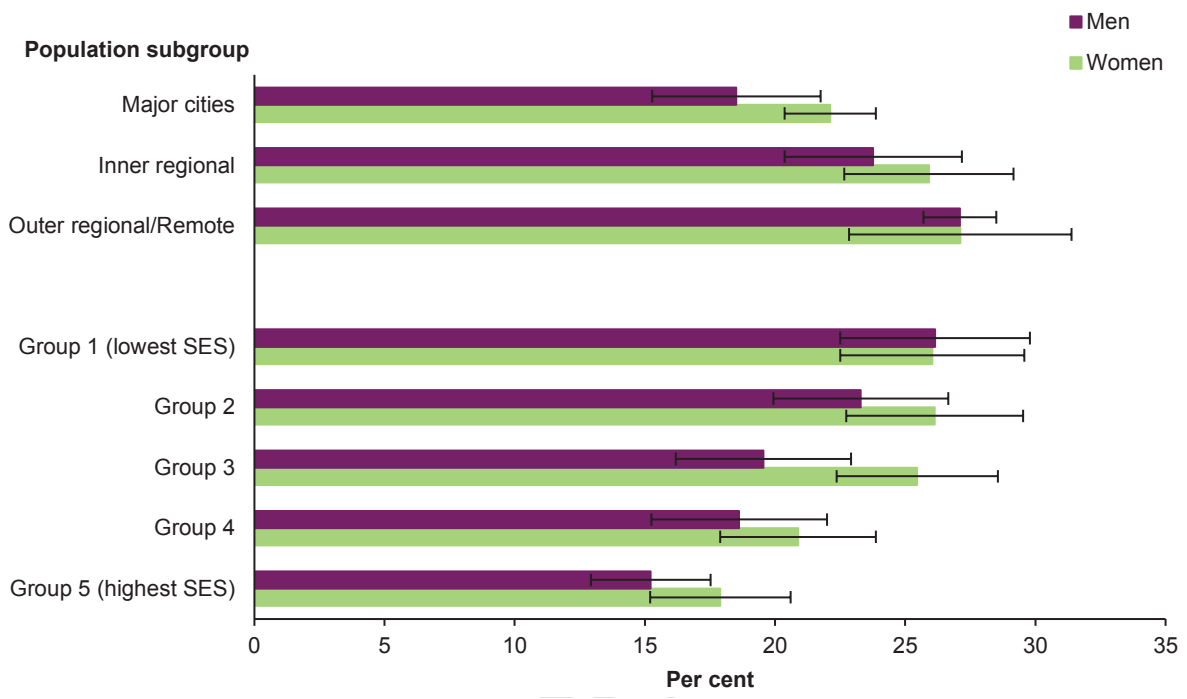
Inequalities

Remoteness

In 2011–12, *Major cities* had a lower prevalence of CVD (20%) than *Inner regional* areas (25%), and *Outer regional* and *Remote* areas combined (27%) (Figure 2.2 and Table C1).

Socioeconomic group

In 2011–12, the prevalence of CVD among Australian adults was higher for people in the lowest socioeconomic status (SES) group (26%) than in the highest SES group (17%) (Figure 2.2 and Table C1).



Notes

1. CVD prevalence is based on the self-reported data of people who participated in the National Health Measures Survey.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C1.

Figure 2.2: Prevalence of self-reported CVD among persons aged 18 and over, by selected population characteristics, 2011–12

Coronary heart disease

CHD, or ischaemic heart disease as it is often referred to, is the most common form of CVD. There are two major clinical forms of CHD—heart attack (often known as acute myocardial infarction or AMI) and angina. A heart attack is a life-threatening event that occurs when a blood vessel supplying the heart itself is suddenly blocked completely, threatening to damage the heart muscle and its functions. Angina is a chronic condition in which non-sustained episodes of chest pain can occur periodically when the heart has a temporary deficiency in its blood supply. Angina is generally not life-threatening on its own, although unstable angina is the most dangerous and less predictable form and is medically treated in a similar manner to heart attack. The major risk factors for CVD also increase the risk of developing CHD.

CHD is very common, affecting over half a million Australians. It is the leading cause of death in Australia, accounting for over 20,000 deaths in 2011 (for further details, see AIHW 2014a).

Box 2.2: Coronary heart disease data sources

Prevalence

The ABS 2011–12 AHS provides self-reported data on long-term health conditions that can be used to estimate the national prevalence of CHD (see Box 2.1 for further information and for limitations with the scope of the survey).

As for CVD, no trend data are presented for CHD as the AHS used a different approach to define CHD than that used for previous surveys.

Incidence

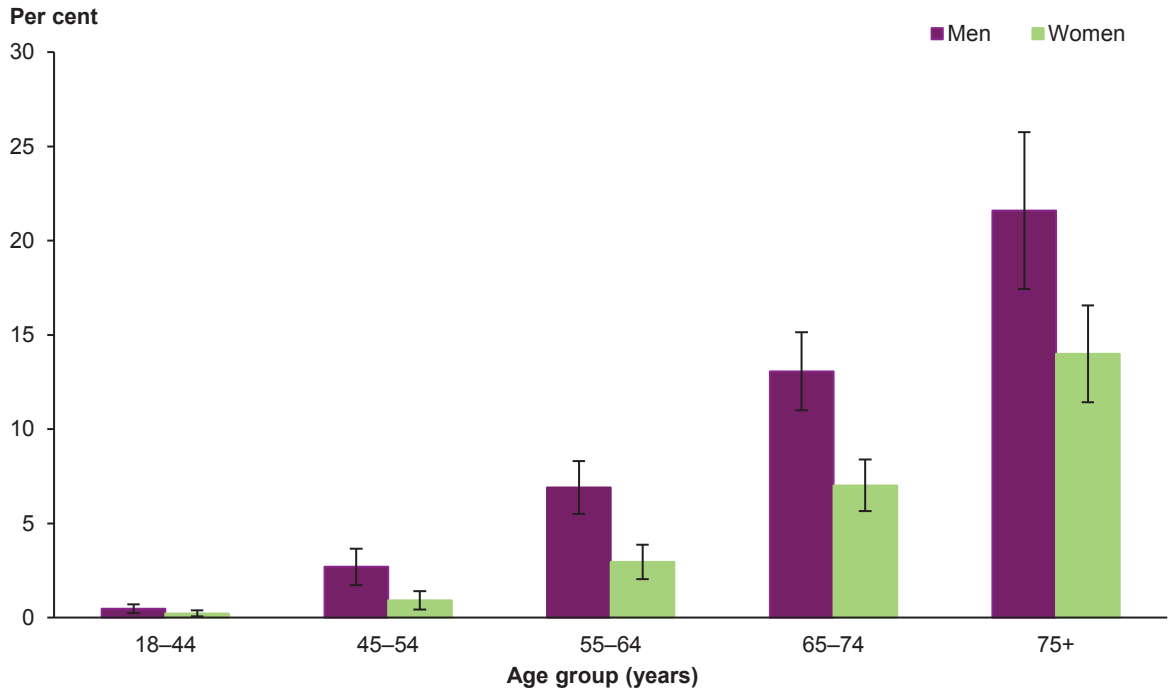
There are no reliable national data for measuring the incidence (or new cases) of CHD. Consequently, a proxy measure has been developed by the AIHW that combines hospital and mortality data to estimate the incidence of acute coronary events (includes heart attacks and unstable angina, also known as 'acute coronary syndrome'). To estimate the incidence of acute coronary events, unlinked episode-based hospital data from the AIHW National Hospital Morbidity Database (NHMD) and deaths data from the AIHW National Mortality Database (NMD) are used. The rate of acute coronary events is not reported for people aged under 25 as the number of events in this age group is very small (see Appendix B for details on the algorithm used to estimate acute coronary events).

Prevalence

In 2011–12, an estimated 590,000 Australians aged 18 and over (3% of the adult population) had CHD, based on self-reported data. Of those with CHD, 277,000 had experienced angina and 406,000 other forms of CHD (note that a person may report more than 1 disease).

Sex and age

After adjusting for age, a higher percentage of men (4%) than women (2%) were estimated to have CHD. CHD occurred more commonly in older age groups, increasing rapidly with age from 2% in those aged 45–54 to almost 1 in 6 (17%) among those aged 75 and over (Figure 2.3 and Table C2).



Note: CHD is based on self-reported results only.

Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C2.

Figure 2.3: Prevalence of self-reported CHD among persons aged 18 and over, by sex and age, 2011–12

Inequalities

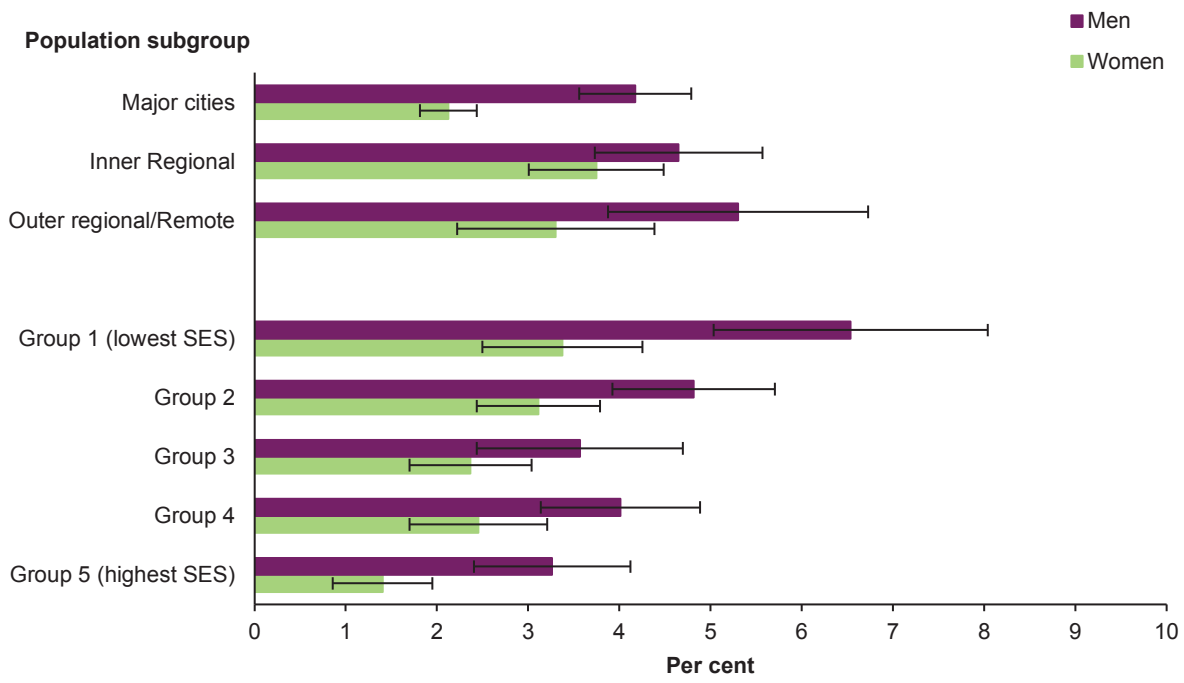
Remoteness

People aged 18 and over living in *Inner regional* areas (4%) were more likely to have CHD than those in *Major cities* (3%), with this difference driven by the higher rate of CHD for women in *Inner regional* areas. There was no statistically significant difference between *Outer regional* and *Remote* areas combined (4%) and other areas of Australia (Figure 2.4 and Table C2).

Socioeconomic group

In 2011–12, the prevalence of CHD was twice as high among adults in the lowest SES group (5%) than in the highest SES group (2%) (Figure 2.4 and Table C2).

Men had higher CHD prevalence rates across most SES groups, although the gap between the highest and lowest SES groups was slightly more for women than men—CHD prevalence rates among women in the lowest SES group were 2.4 times the rate in the highest group, while the rates for men were 2 times as high.



Notes

1. CHD is based on self-reported results only.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C2.

Figure 2.4: Prevalence of self-reported CHD among persons aged 18 and over, by selected population characteristics, 2011–12

Incidence of acute coronary events

There are no reliable national or jurisdictional registry data on the number of new cases (incidence) of CHD each year. However, a proxy measure developed by the AIHW using unlinked hospital and deaths data can be used to estimate the number of new cases of acute coronary events (includes heart attack and unstable angina; see Appendix B for further details).

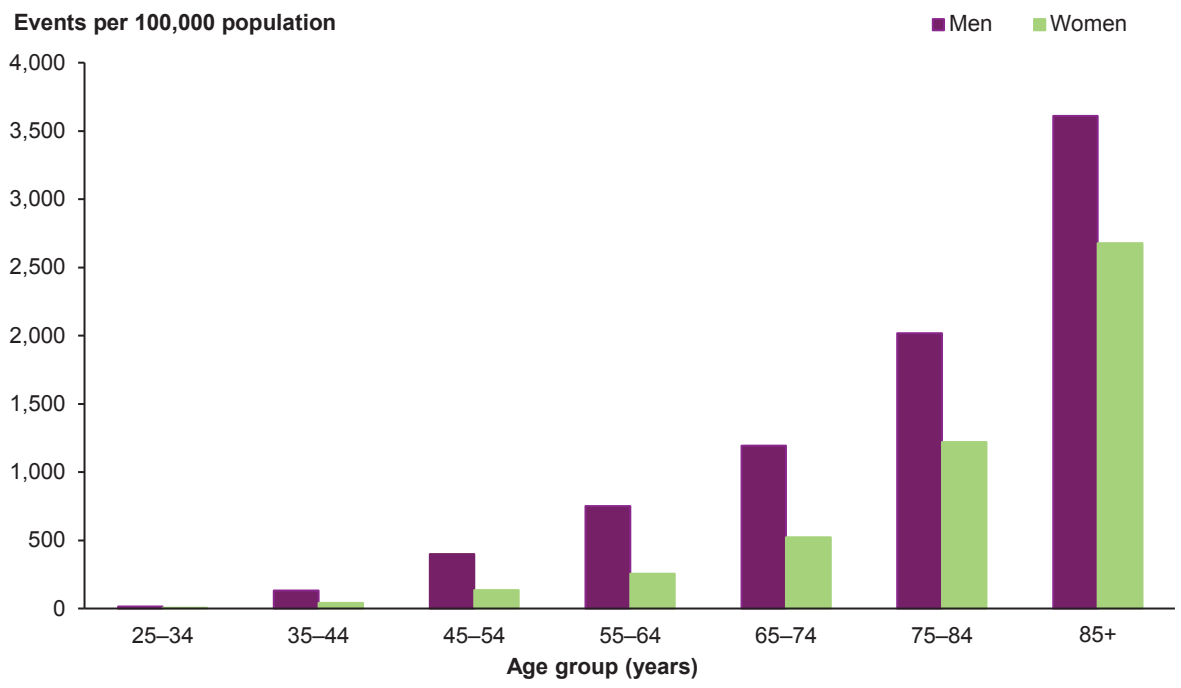
In 2012, an estimated 68,200 people aged 25 and over had an acute coronary event.

Sex and age

In 2012, an estimated two-thirds (63%) of acute coronary events among those aged 25 and over occurred in men. The rate of acute coronary events was twice as high in men as in women (age-standardised rate of 558 and 266 per 100,000 population, respectively) (Table C3).

The rate of acute coronary events increased rapidly with age, with the rate among the 85 and over age group (3,005 per 100,000 population) over 3 times that for the 65–74 age group (854 per 100,000 population) and 6 times the rate for the 55–64 age group (502 per 100,000 population).

Men had consistently higher rates of acute coronary events than women across all age groups. However, the relative difference in rates by sex decreased substantially in the older ages, from around twice as high in those aged less than 75 to around 35% in those aged 85 and over (Figure 2.5 and Table C3).



Note: Acute coronary events include heart attack (acute myocardial infarction) and unstable angina.

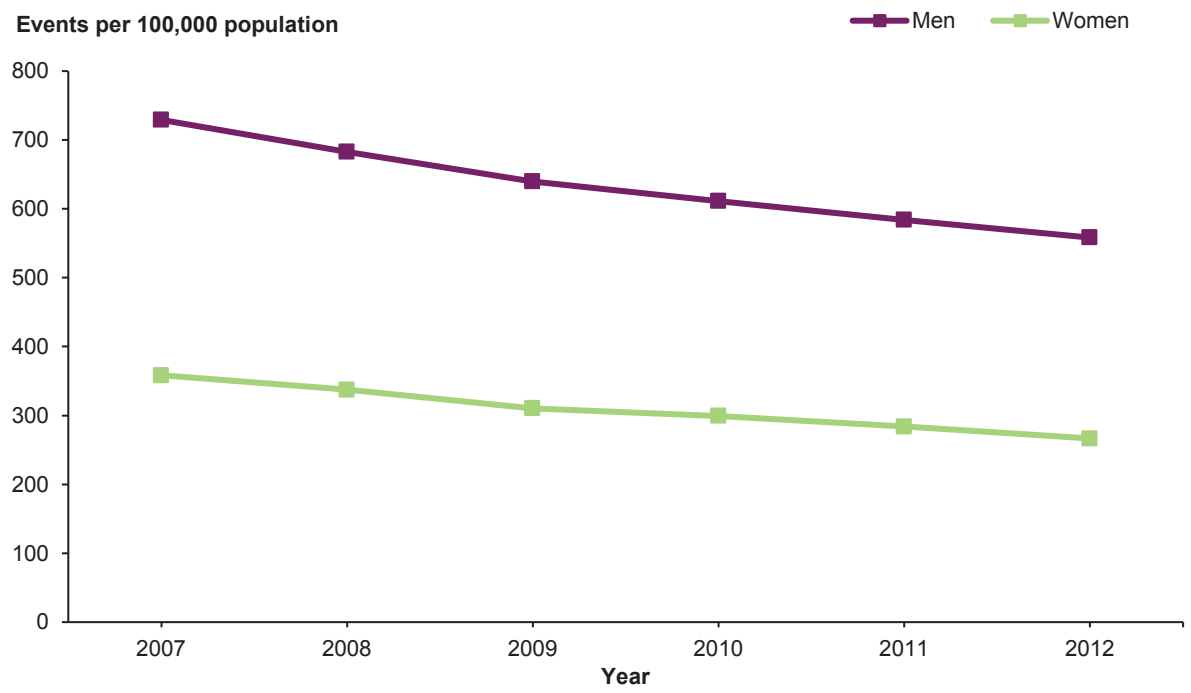
Sources: AIHW analysis of AIHW National Hospital Morbidity Database and AIHW National Mortality Database; Table C3.

Figure 2.5: Acute coronary events among persons aged 25 and over, by age and sex, 2012

Trends

The rate of acute coronary events fell by 24% between 2007 and 2012, from an age-standardised rate of 534 per 100,000 population in 2007 to 406 per 100,000 population in 2012 (Figure 2.6 and Table C3). The decline in the rates was similar for men (23%) and women (26%).

The decline in rates of acute coronary events can be attributed to a number of factors. Prominent among them are early improvements in medical and surgical treatment, and the increasing use of antithrombotic drugs as well as drugs to lower blood pressure and cholesterol. Further, reductions in risk factor levels—particularly for tobacco smoking, high blood cholesterol and high blood pressure—have also contributed to these declines (Taylor et al. 2006).



Notes

1. Rates have been age-standardised to the 2001 Australian population.
2. Acute coronary events include heart attack (acute myocardial infarction) and unstable angina.
3. In 2012, the method for calculating acute coronary events was revised to reflect changes in diagnostic techniques and clinical practice. Therefore, rates presented in this report are not comparable with previously published rates on acute coronary events in Australia.

Sources: AIHW analysis of AIHW National Hospital Morbidity Database and AIHW National Mortality Database; Table C3.

Figure 2.6: Trends in acute coronary events, among persons aged 25 and over, 2007–2012

Stroke

Stroke occurs when an artery supplying blood to the brain either suddenly becomes blocked (known as ischaemic stroke) or ruptures and begins to bleed (known as haemorrhagic stroke). Either may result in part of the brain dying, leading to sudden impairment that can affect a range of functions. Stroke often causes paralysis of parts of the body normally controlled by the area of the brain affected by the stroke, or speech problems and other symptoms, such as difficulties with swallowing, vision and thinking. Stroke is often fatal, claiming approximately 9,000 lives in 2011 (for further information on stroke mortality, see AIHW 2014a).

In many but not all cases, stroke is preventable because many of its risk factors are modifiable. These risk factors include high blood pressure, physical inactivity, abdominal overweight and obesity and tobacco smoking (for further details on these risk factors, see AIHW, forthcoming 2015a).

Box 2.4: Stroke data sources

Prevalence

The ABS Survey of Disability, Ageing and Carers (SDAC) provides more reliable estimates on the prevalence of stroke than the ABS 2011–12 AHS. This is because the SDAC includes more comprehensive questions on long-term conditions and associated activity limitations, and includes non-private dwellings, such as residential aged care facilities. This is particularly important when reporting on stroke because stroke is strongly associated with increasing age, and many survivors of stroke require the special care that these facilities provide. Data in this section of the report combine information from both private and non-private dwellings and are presented for all ages.

Reliable information on socioeconomic disadvantage cannot be obtained from the SDAC and so stroke data from the ABS 2011–12 AHS have been used to fill this gap. It should be noted that this survey did not collect information from those living in non-private dwellings (see Box 2.1 for more information).

Incidence

There are no reliable national data for measuring the incidence of stroke events. However, it is possible to estimate the incidence of stroke events in Australia based on a proxy method that uses data from the NHMD and the NMD (Thrift et al. 2012) (see Appendix B for further information).

Prevalence

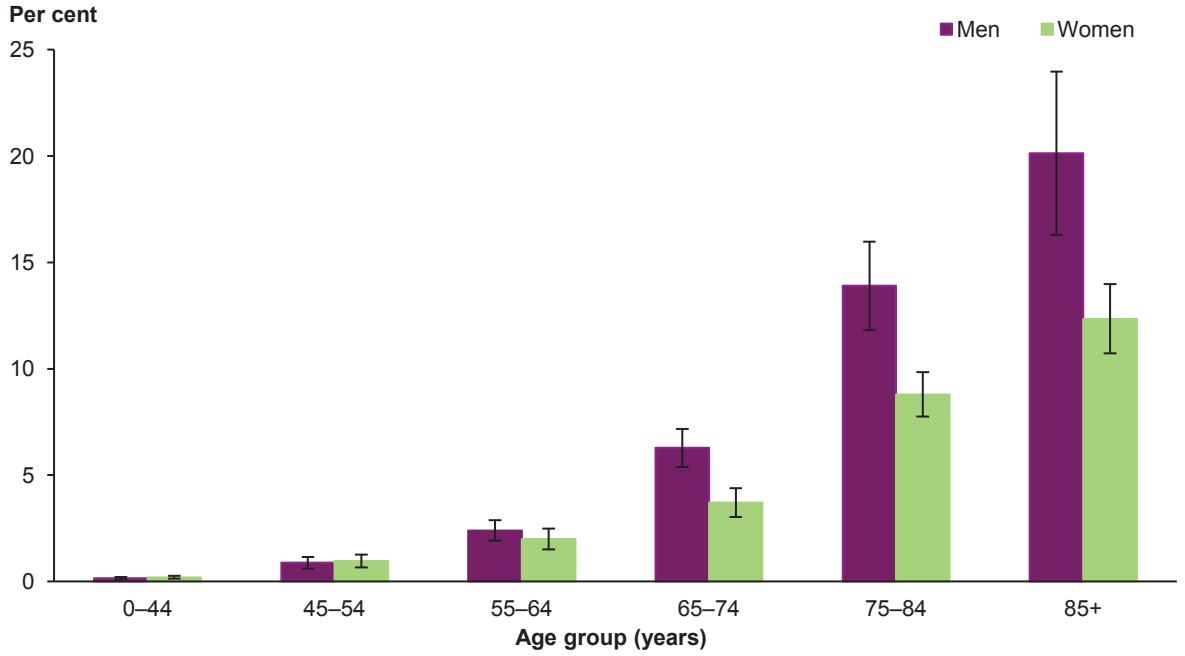
Based on the 2012 SDAC, an estimated 377,000 Australians had had a stroke at some time in their lives (2% of the Australian population), based on self-reported data.

Sex and age

After adjusting for age, the prevalence of stroke was higher in men (2%) than in women (1%). The male rate was 1.6–1.7 times as high as the female rate for those aged 65 and over.

The vast majority (71%) of people who had a stroke were aged 65 and over. The prevalence of stroke increased with age, with rates 3 times as high among those aged 85 and over (15%) as for those aged 65–74 (5%) (Figure 2.7 and Table C4).

The prevalence of stroke was higher among men than women in all age groups older than 54.



Sources: AIHW analysis of ABS 2012 Survey of Disability, Ageing and Carers, Basic CD-ROM; Table C4.

Figure 2.7: Prevalence of self-reported stroke, by age and sex, 2012

Trends

There was little change in the age-adjusted prevalence of stroke between the 1998 (1.6%), 2003 (1.7%), 2009 (1.6%) and 2012 (1.5%) SDAC surveys. Between 1998 and 2012, among people with stroke, the proportion who had a disability resulting from stroke declined from 45% to 39%.

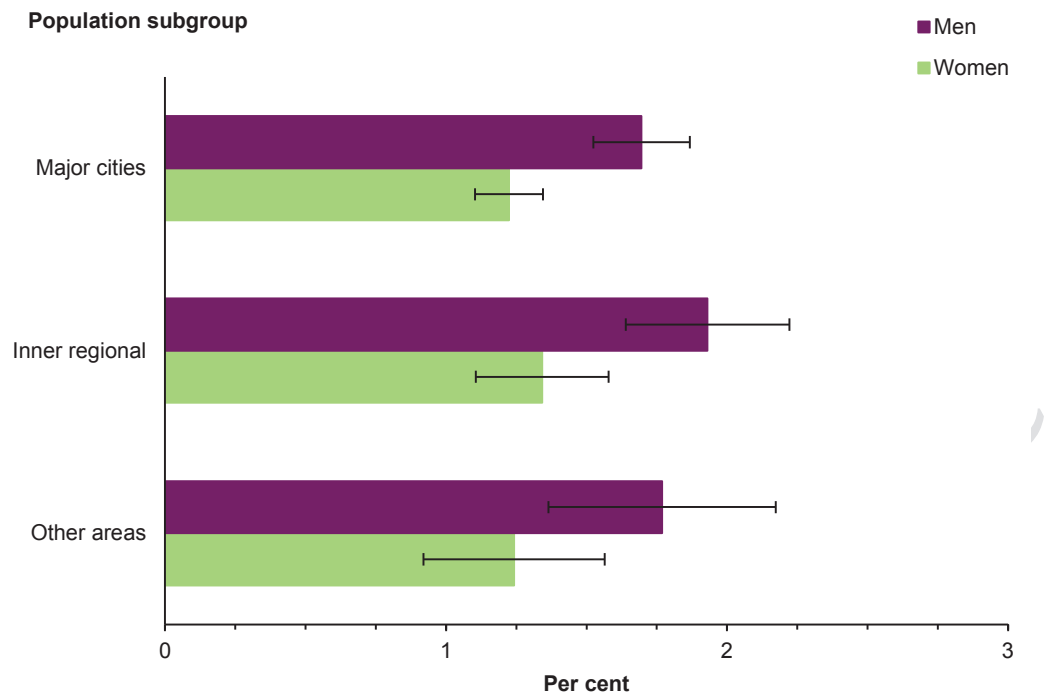
Inequalities

Remoteness

Based on the 2012 SDAC, the prevalence of stroke was similar across remoteness areas for both men and women (Figure 2.8 and Table C4).

Socioeconomic group

Based on the 2011–12 AHS, the prevalence of stroke among people aged 18 and over was twice as high for those in the lowest SES group (2%) than in the highest SES group (1%) (Figure 2.9 and Table C5). This gap was largely driven by the pattern for men, as for women the difference by SES was not statistically significant.

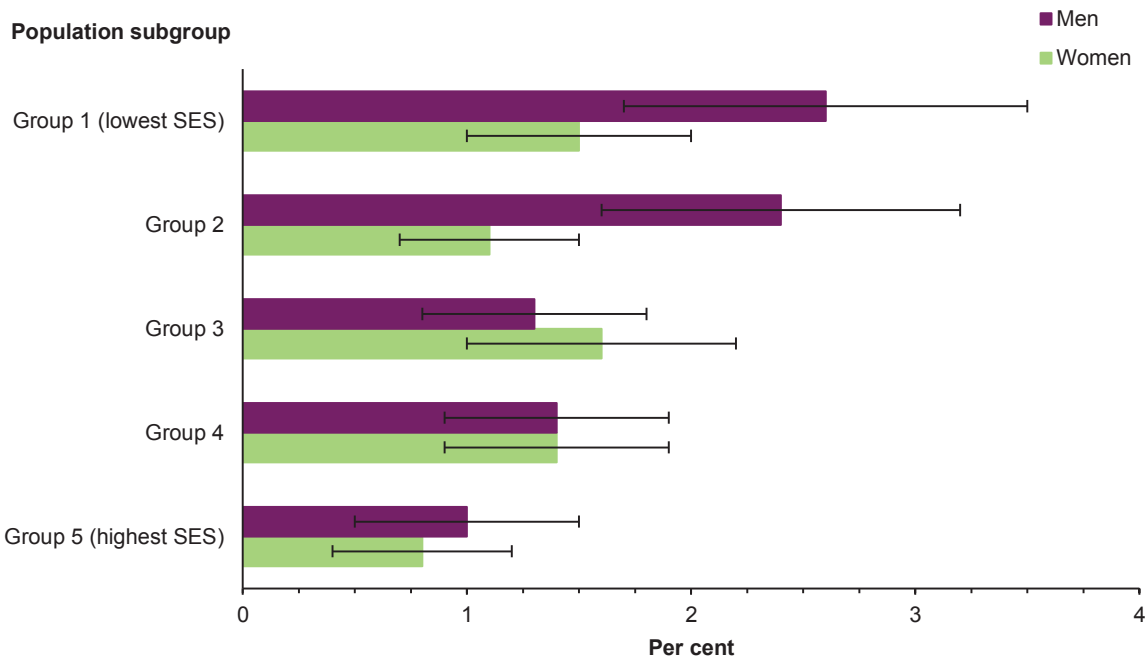


Notes

1. Rates are age-standardised to the 2001 Australian population.
2. Refer to Appendix B for definitions of classifications for remoteness.

Sources: AIHW analysis of ABS 2012 Survey of Disability, Ageing and Carers, Basic CD-ROM; Table C4.

Figure 2.8: Prevalence of self-reported stroke (all ages), by remoteness, 2012



Note: Refer to Appendix B for definitions of classifications for socioeconomic groups.

Sources: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (Core component)'; Table C5.

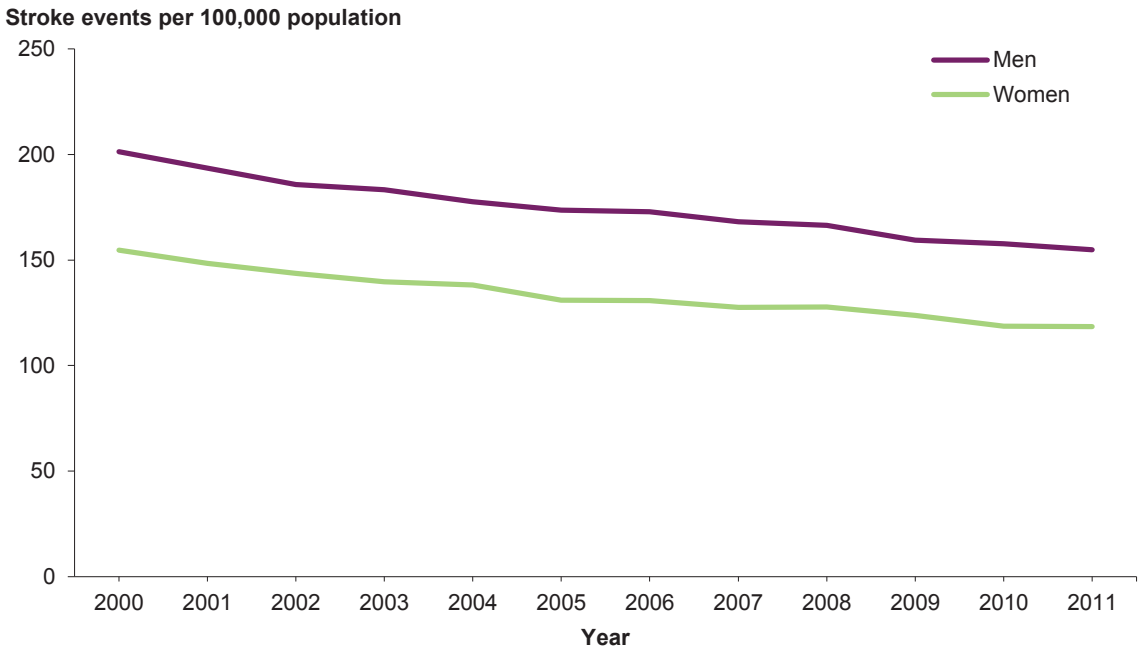
Figure 2.9: Prevalence of self-reported stroke among persons aged 18 and over, by socioeconomic group, 2011–12

Incidence of stroke events

In 2011, there were an estimated 34,500 stroke events in Australia, equating to 154 events per 100,000 population. The rate of stroke events fell by 23% between 2000 and 2011 (from an age-standardised rate of 176 to 136 per 100,000 population).

Sex and age

In 2011, the stroke event rate was higher in males than in females (an age-standardised rate of 155 events per 100,000 compared with 119, respectively). The male rate has consistently remained higher than the female rate over the period 2000 to 2011 (Figure 2.10).



Note: Age-standardised to the 2001 Australian population.
Sources: AIHW analysis of AIHW National Morbidity Database; and AIHW National Mortality Database.

Figure 2.10: Trends in stroke events (all ages), by sex, 2000 to 2011

Heart failure

Heart failure occurs when the heart begins to function less effectively in its role of pumping blood around the body. Although it can occur suddenly, it usually develops slowly over many years, as the heart becomes gradually weaker and works less effectively. Heart failure can result from a variety of diseases and conditions that impair or overload the heart, notably heart attack, high blood pressure, damaged heart valve, or primary heart muscle weakness (known as cardiomyopathy, where the entire heart muscle, or a large part of it, is weakened by various causes, including viral infections and severe alcohol abuse).

People with mild heart failure may have few symptoms, but in more severe cases it can result in chronic tiredness, reduced capacity for physical activity and shortness of breath. Heart failure is life-threatening and usually associated with poor survival. It often occurs as a comorbid condition of other chronic diseases, including CHD, diabetes and CKD. While treatment may improve quality of life, reduce hospital admissions and extend a person's life, heart failure usually cannot be cured (National Heart Foundation of Australia & Cardiac Society of Australia and New Zealand 2011; NHLBI 2014).

Heart failure and cardiomyopathy have a considerable impact on the health of Australians, accounting for around 4,300 deaths in 2011 (for further details, see AIHW 2014a).

Box 2.5: Heart failure data sources

Prevalence

There are no national registers or administrative data sets that record the prevalence or incidence of heart failure, although the prevalence of heart failure can be estimated using self-reported data from the ABS AHS. However, these estimates may under-report the true burden of heart failure because the early stages of heart failure are only mildly symptomatic; therefore, many people may be unaware that they have the condition. For this reason, the following prevalence estimates of heart failure should be interpreted with caution (see Box 2.1 for more information). Due to the small prevalence of heart failure, limited results are presented. It was not possible to present trends or prevalence by remoteness or socioeconomic group.

Incidence

There are no national data on the incidence of heart failure in Australia.

Prevalence

In 2011–12, an estimated 96,700 people aged 18 and over had heart failure, corresponding to less than 1% of all people aged 18 and over, based on self-reported data.

Heart failure predominantly affects older Australians; two-thirds of adults with heart failure were aged 65 and over (65,600 people).

3 Diabetes

Diabetes (all types)

Diabetes mellitus (in this report referred to as diabetes) is a chronic disease marked by high levels of glucose in the blood. It is caused either by the inability to produce insulin (a hormone produced by the pancreas to control blood glucose levels), by the body not being able to use insulin effectively, or both.

The main types of diabetes are:

- *type 1 diabetes*—an autoimmune disease that usually has onset in childhood or early adulthood but can be diagnosed at any age
- *type 2 diabetes*—largely preventable, usually associated with lifestyle factors and with later onset
- *gestational diabetes*—when higher than normal blood glucose is diagnosed during pregnancy.

Diabetes may increase the risk of complications, including heart disease, stroke, kidney disease, retinopathy (loss of vision), heart failure and limb amputation. For example, diabetes is now the leading cause of treated end-stage kidney disease (ESKD) in Australia, accounting for 1 in 3 new cases in 2011 (ANZDATA 2013).

A number of factors are known to increase the risk of developing diabetes including physical inactivity, poor diet, overweight and obesity, tobacco smoking, high blood pressure and high blood lipids (for further details, see AIHW, forthcoming 2015a).

Box 3.1: Diabetes (all types) data sources

Prevalence

The ABS 2011–12 AHS provides both self-reported and biomedical (measured) data that can be used to estimate the national prevalence of diabetes (see Box 3.2 for further information). In the AHS, people with diabetes included those with type 1, type 2 and type unknown, but gestational diabetes was not included (ABS 2014). See Box 2.1 for further details on the scope of the AHS.

Incidence

There is limited information on the national incidence of diabetes in Australia. However, information on the incidence of insulin-treated diabetes is available from the National (insulin-treated) Diabetes Register (NDR) from 1999 onwards (with reporting starting in 2000). The NDR is based on 2 primary data sources: the National Diabetes Services Scheme (NDSS) and the Australasian Paediatric Endocrine Group (APEG). The NDR aims to record all new cases of people who use insulin to treat their diabetes, including type 1, type 2, gestational and other forms of diabetes (see Appendix A for further information).

Prevalence

In 2011–12, an estimated 917,000 (5.4%) Australians aged 18 and over had diabetes, based on self-reported data and HbA1c results (see Box 3.2). Approximately 1% of the adult population did not self-report that they had diabetes, which may indicate that they were unaware they had the condition, compared with 4% who were aware of and self-reported their diabetes (see Appendix B). These results suggest that for every 4 adults with diagnosed diabetes, there is approximately 1 with undiagnosed diabetes.

Box 3.2: Methods to estimate diabetes (all types) prevalence

Self-reported data

Overall, diabetes prevalence estimates provided in previous AIHW reports have often relied on self-reported survey data. However, while many individuals are aware of, and accurately report, their diabetes, there are some who may not be aware that they have diabetes. This means that self-reported estimates may underestimate the prevalence of diabetes.

Biomedical data

The prevalence of chronic diseases, such as diabetes, is often most accurately estimated using measured—or biomedical—data, in the form of markers found during blood and urine testing. The oral glucose tolerance test is the current 'gold standard' test for diagnosing diabetes (Phillips 2012). However, this test is difficult to administer as it requires strict pre-test preparation, is time-consuming (at least 2 hours), often needs to be repeated, and has poor patient compliance (d'Emden et al. 2012).

The biomedical component of the ABS 2011–12 AHS contained 2 tests aimed at detecting biomedical signs of diabetes: a measure of fasting plasma glucose (FPG) and a measure of glycated haemoglobin (HbA1c).

- *FPG* tests measure the level of sugar in the person's blood at the time of testing. In the AHS, participants were required to fast for 8 hours before the test in order to get an accurate reading. FPG readings could not be used for 21% of participants in the AHS biomedical sample as they did not fast correctly.
- *HbA1c* measurement is a one-off test that estimates the average blood glucose levels over the previous 3 months. Participants are not required to fast for this test.

Biomedical estimates used in this report

The measured (biomedical) diabetes prevalence estimates in this report are based on AHS participants aged 18 and over who completed the biomedical component of the survey (approximately 9,500 people aged 18 and over). Self-reported data (presence of diabetes and medication use) were integrated with the measured results (measured HbA1c) to estimate the prevalence of diabetes. Biomedical estimates from the AHS can detect signs of diabetes, but not diabetes type.

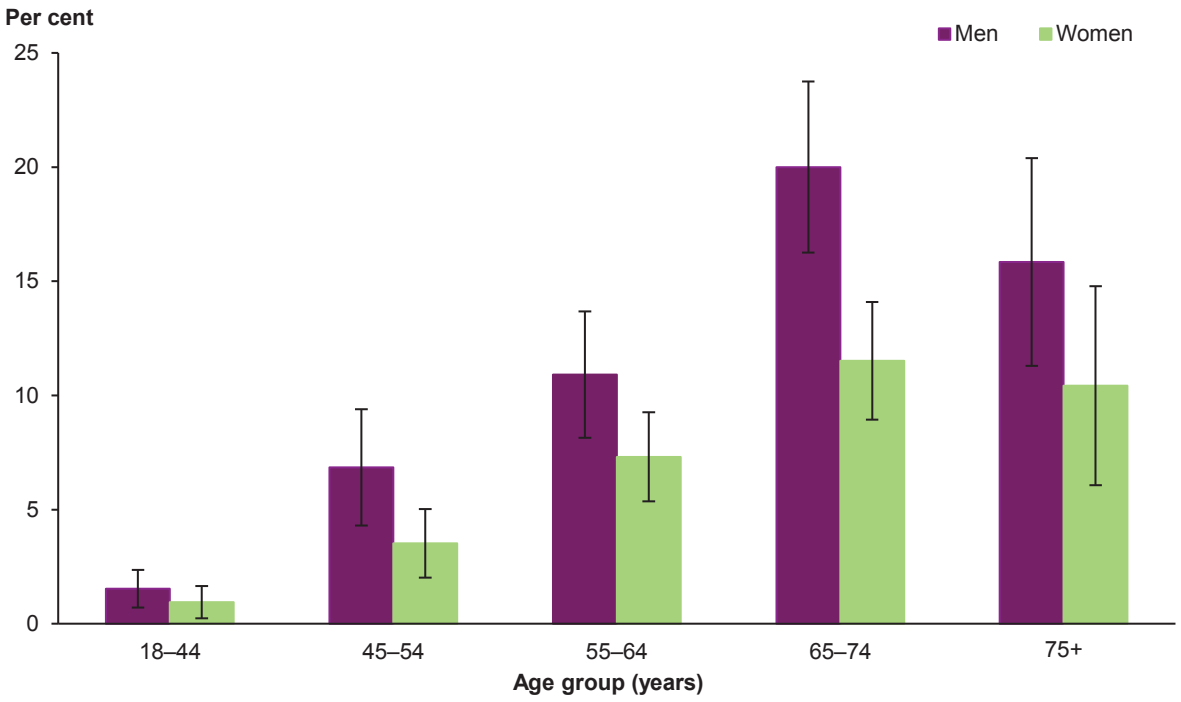
Measured diabetes prevalence estimates in this report use HbA1c results rather than FPG results (see Appendix B). HbA1c results were used in this report so as to be able to include the greatest number of respondents with biomedical markers for diabetes. This is particularly critical for the comorbidities and inequalities analysis. Further, the prevalence of diagnosed diabetes was similar for the populations who completed the FPG testing and those who completed the HbA1c testing—5.1% and 5.4%, respectively. It should be noted, however, that HbA1c may not be as suitable a measure of diabetes for people who have haemoglobinopathies or anaemia (Adeoye et al. 2014).

Sources: ABS 2013b; 2014.

Sex and age

The prevalence of diabetes was higher in men than in women—an age-standardised rate of 6% for men and 4% for women aged 18 and over had diabetes (based on HbA1c and self-reported data).

The prevalence of diabetes increased rapidly with age up to age 75. Rates for those aged 65–74 (16%) were 3 times those for 45–54-year-olds (5%) and almost double those for 55–64-year-olds (9%) (Figure 3.1 and Table C6).



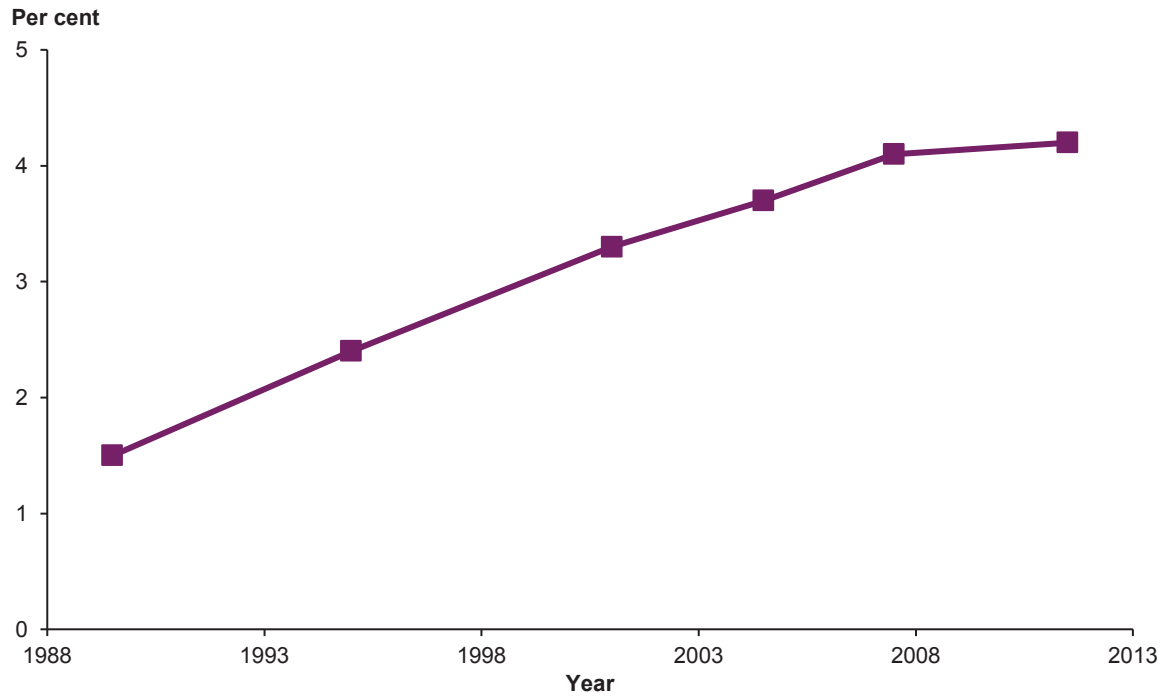
Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C6.

Figure 3.1: Prevalence of diabetes, based on HbA1c and self-reported data among persons aged 18 and over, by age and sex, 2011–12

Trends

The prevalence of self-reported diabetes more than doubled between 1989–90 and 2011–12, increasing from an age-standardised rate of 1.5% in 1989–90 to 4.2% in 2011–12 (Figure 3.2). However, the rate has remained stable in recent years, between 2007–08 and 2011–12 (4.1% to 4.2%). Note that there are currently no national trend data based on measured diabetes estimates.

Several factors may have contributed to the rise in diabetes prevalence between 1989–90 and 2011–12. These include an increase in incidence of type 2 diabetes, increased public awareness of diabetes, better detection of the disease, improved survival leading to people living longer with diabetes, and an ageing population.



Note: Rates have been age-standardised to the 2001 Australian population.

Sources: AIHW analysis of ABS National Health Survey 1989–90, 1995, 2001, 2004–05; National Health Survey 2007–08 (reissue) and ABS Australian Health Survey, 2011–12 (National Health Survey component).

Figure 3.2: Trends in the prevalence of self-reported diabetes, 1989–90 to 2011–12

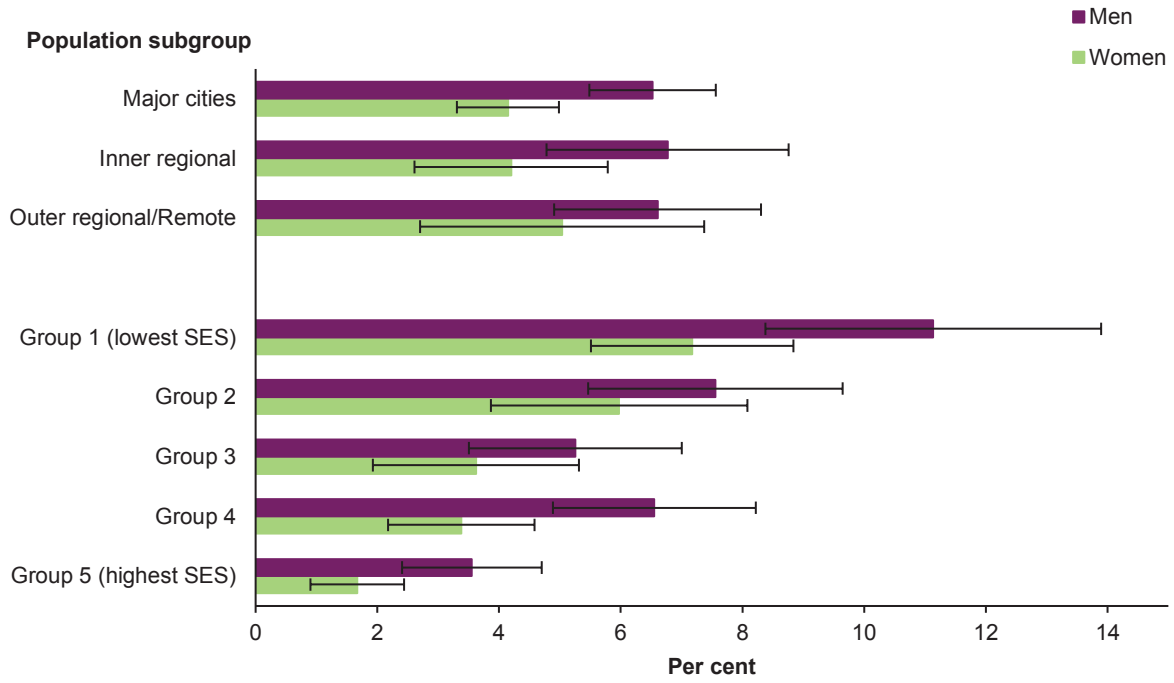
Inequalities

Remoteness

In 2011–12, prevalence rates for diabetes (based on HbA1c and self-reported data) among those aged 18 and over ranged from 5.3% in *Major cities* to 5.5% in *Inner regional* areas, to 6.1% in *Outer regional* and *Remote* areas combined (Figure 3.3 and Table C6). However, there were no statistically significant differences in diabetes prevalence rates for these 3 categories. The aggregation of *Remote* areas with *Outer regional* and the exclusion of *Very remote* areas in the AHS mean that the influence of remoteness on diabetes prevalence could not be fully assessed. The complex issue of remoteness and diabetes for Indigenous Australians will be further explored in AIHW's upcoming publication *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: Indigenous Australians* (AIHW, forthcoming 2015b).

Socioeconomic group

In 2011–12, Australian adults in the lowest SES group (9%) were more than 3 times as likely to have diabetes (based on HbA1c and self-reported data) as those in the highest SES group (3%) (Figure 3.3 and Table C6).



Note: Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

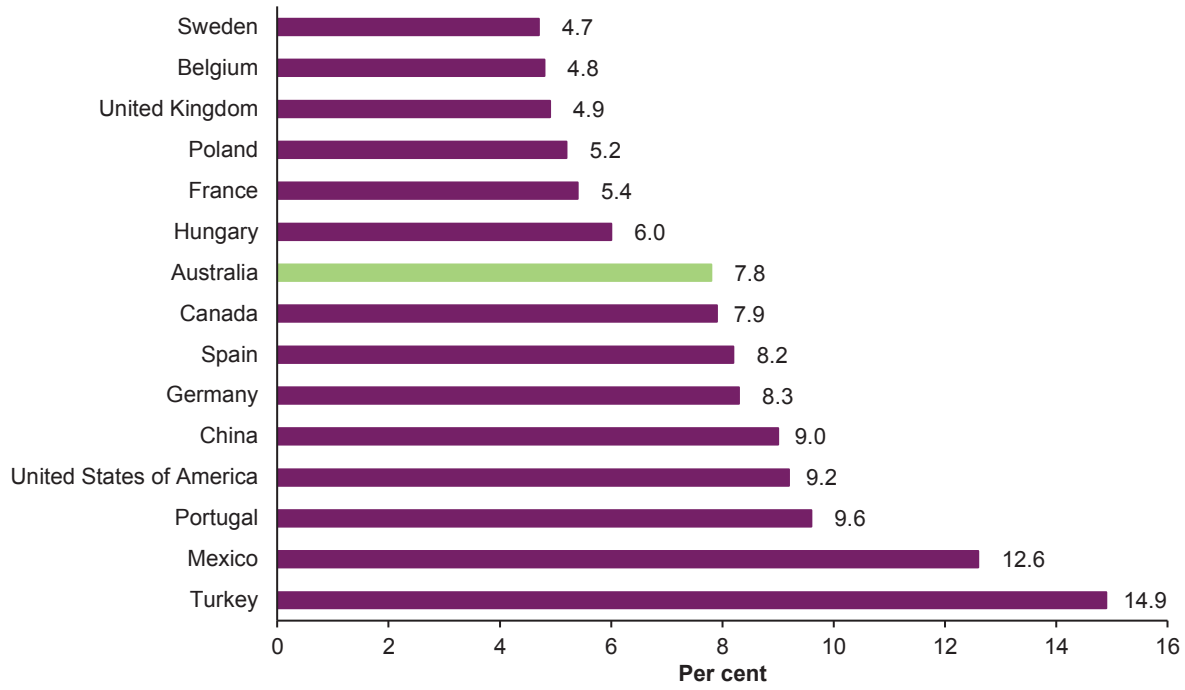
Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C6.

Figure 3.3: Prevalence of diabetes, based on HbA1c and self-reported data among persons aged 18 and over, by selected population characteristics, 2011–12

International comparison

Based on data from the International Diabetes Federation, Australia's diabetes prevalence rate of 7.8% (among persons aged 20–79), ranked in the middle of the 15 countries compared (Figure 3.4). Australia had a similar prevalence rate to Canada (8%), while the United Kingdom, Sweden and Belgium had the lowest prevalence rates (5%), and Turkey and Mexico the highest prevalence rates (15% and 13%, respectively).

The diabetes prevalence rates for each country were obtained by using the most methodologically appropriate study or studies for each country.



Note: Data are standardised to the World Health Organization (WHO) standard population, 2001.
Source: Guariguata et al. 2014.

Figure 3.4: International comparisons in diabetes prevalence among those aged 20–79, selected countries, 2013

Incidence

Based on data from the NDR (which captures only people who use insulin to treat their diabetes), there were around 53,500 people in Australia who began using insulin to treat their diabetes in 2011—68% had type 2 diabetes, 12% had gestational diabetes, 4% had type 1 diabetes and 1% had other forms of diabetes requiring insulin (diabetes type was unknown for another 15%) (AIHW 2014b).

Type 1 diabetes

Type 1 diabetes is an autoimmune disease that develops when the immune system destroys the insulin-producing cells of the pancreas. The absence of insulin means glucose cannot be transported into the cells, where it would usually be used for energy, and consequently blood glucose levels rise. Unless treated with insulin, people with type 1 diabetes accumulate dangerous chemicals in their blood, causing a condition known as ketoacidosis. This condition is life-threatening if not treated. The exact cause of type 1 diabetes is unknown, although it is believed to be an interaction of genetic predisposition and environmental factors. Although type 1 diabetes can occur at any age, it mainly develops during childhood and adolescence (Craig et al. 2011). Currently, once a person is diagnosed with type 1 diabetes, they will require insulin treatment every day throughout their life.

Box 3.3: Type 1 diabetes data sources

Prevalence

There are various estimates available for the prevalence of type 1 diabetes in Australia, from both survey data and administrative data. The NDSS provides estimates on the prevalence of type 1 diabetes. However, the accuracy of the recorded diabetes type on the NDSS (AIHW 2014c) may not accurately reflect the true prevalence of type 1 diabetes. In this report, self-reported data from the ABS 2011–12 AHS have been used to estimate the national prevalence of type 1 diabetes (biomedical estimates in the AHS cannot detect diabetes type; see Box 3.2 for further details).

Incidence

Since 2000, the NDR has captured most people with type 1 diabetes in Australia because, almost without exception, they require insulin for survival. However, only a proportion of people with type 2, gestational and other types of diabetes require insulin as treatment; those who do not require insulin are excluded from the NDR (see Appendix A for further information).

Prevalence

Based on self-reported data from the ABS 2011–12 AHS, an estimated 119,000 people aged 2 and over had type 1 diabetes, equating to less than 1% of the Australian population aged 2 and over. This corresponds to an estimated 12% of all people (around 999,000) who reported having some form of diabetes. Note that there is currently no national survey data available on diabetes type based on measured data (see Box 3.1).

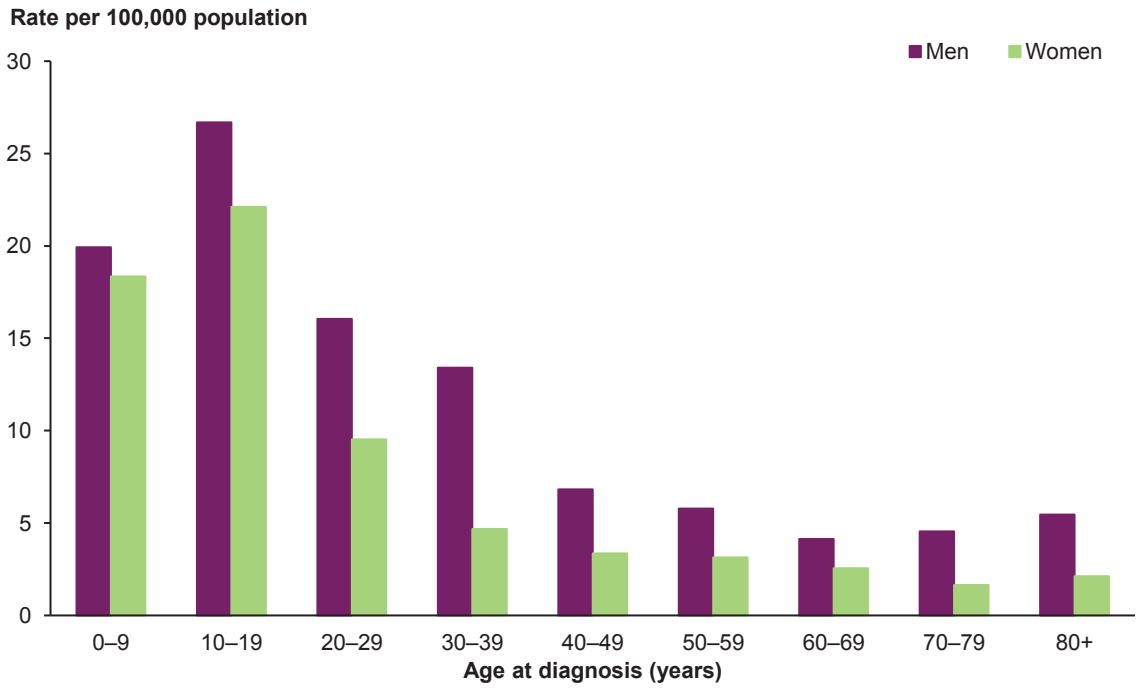
Incidence

In 2011, based on data from the NDR, there were around 2,400 new cases of people with type 1 diabetes in Australia; this represents 11 cases per 100,000 population (AIHW 2014b).

Age and sex

The incidence of type 1 diabetes was higher in males than in females— an age and sex standardised rate of 13 in every 100,000 males compared to 8 in every 100,000 females. However, females were more likely to be diagnosed at a younger age than males—the mean age at diagnosis for females was 21 compared with 25 for males.

Approximately half of those diagnosed with type 1 diabetes in 2011 were aged 19 or under, with the peak age of diagnosis at 10–19 years. In this age group, incidence was 24 per 100,000 population, 5 times the rate at age 40–49 (5 per 100,000) and 7 times the rate at age 80 and over (3 per 100,000 population) (Figure 3.5 and Table C7).



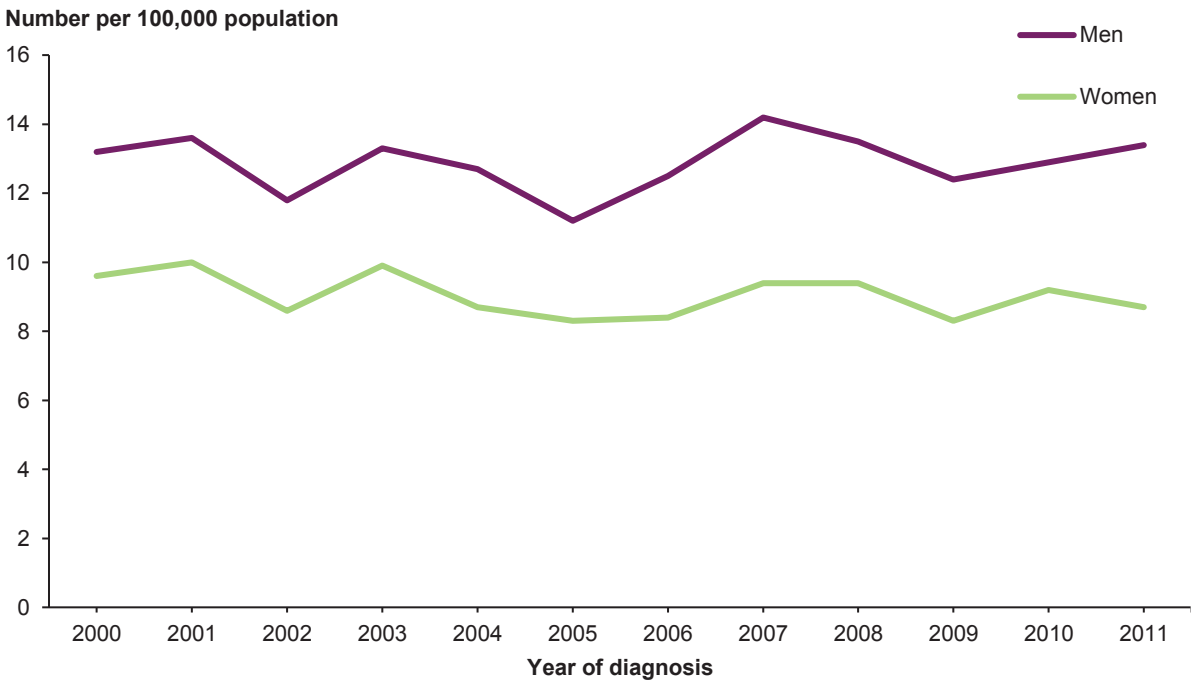
Note: Year of first insulin use is a proxy for year of diagnosis.
Sources: AIHW analysis of 2011 National (insulin-treated) Diabetes Register; Table C7.

Figure 3.5: Incidence of type 1 diabetes, by age at diagnosis and sex, 2011

Trends

Between 2000 and 2011, there were, on average, around 2,200 new cases of type 1 diabetes each year, equating to around 6 new cases per day over this period (AIHW 2014b). After taking into account differences in the age and sex structure, the incidence of type 1 diabetes has remained similar over the last decade, fluctuating between 10 and 12 cases per 100,000 population each year.

There were no substantial differences in trends in the incidence rate of type 1 diabetes among either males or females between 2000 and 2011. The number of new cases for females ranged from an age-adjusted rate of 8 to 10 cases per 100,000 each year and for males, 11 to 14 cases per 100,000 each year (Figure 3.6).



Notes
1. Year of first insulin use is a proxy for year of diagnosis.
2. Age and sex-standardised to the 2001 Australian standard population.

Source: AIHW analysis of 2011 National (insulin-treated) Diabetes Register.

Figure 3.6: Trends in incidence of type 1 diabetes, by year of diagnosis and sex, 2000–2011

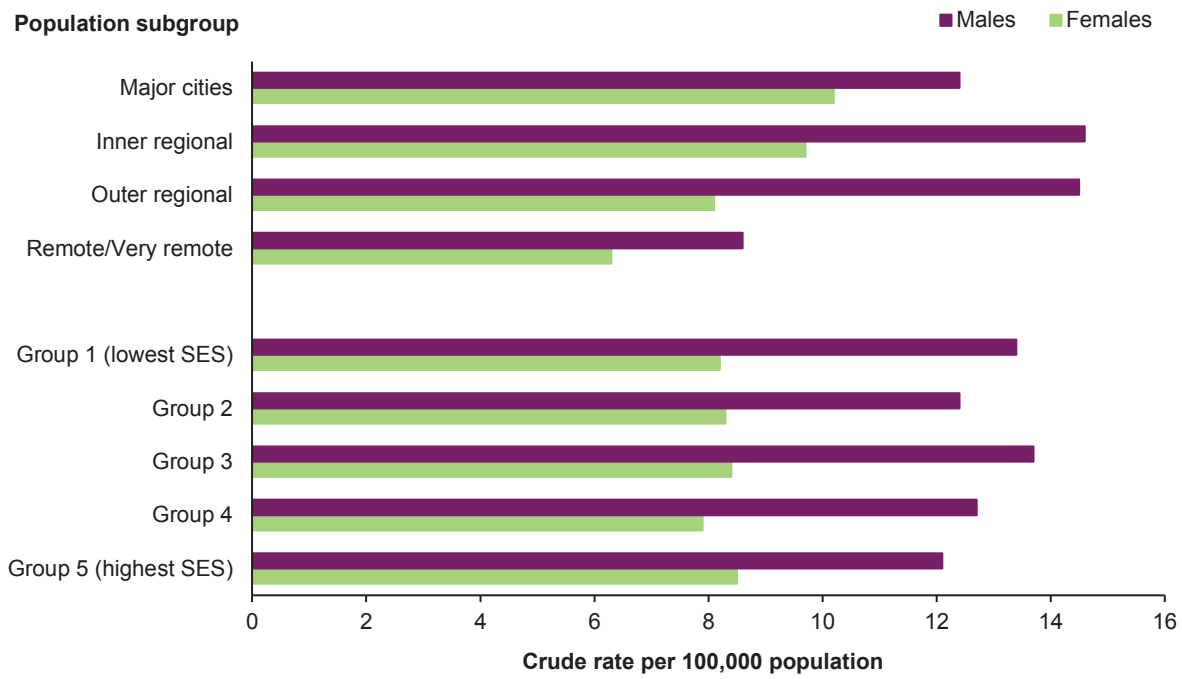
Inequalities

Remoteness

Based on data from the NDR, the incidence of type 1 diabetes was slightly lower in *Remote* and *Very remote* areas than in *Major cities* and other regional areas—8 per 100,000 people in *Remote* and *Very remote* areas compared with, respectively, 10 per 100,000 people in *Major cities* and 12 per 100,000 people in *Inner regional* areas and 11 per 100,000 people in *Outer regional* areas in 2011 (Figure 3.7 and Table C7). The lower incidence of type 1 diabetes in *Remote* and *Very remote* areas may be due to the high proportion of Aboriginal and Torres Strait Islander people residing there, who also have a lower incidence of type 1 diabetes than non-Indigenous people (AIHW 2014b).

Socioeconomic status

In 2011, the incidence of type 1 diabetes did not vary by SES group, with rates remaining around 10 to 11 new cases per 100,000 people across all SES groups (Figure 3.7 and Table C7).



Note: Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

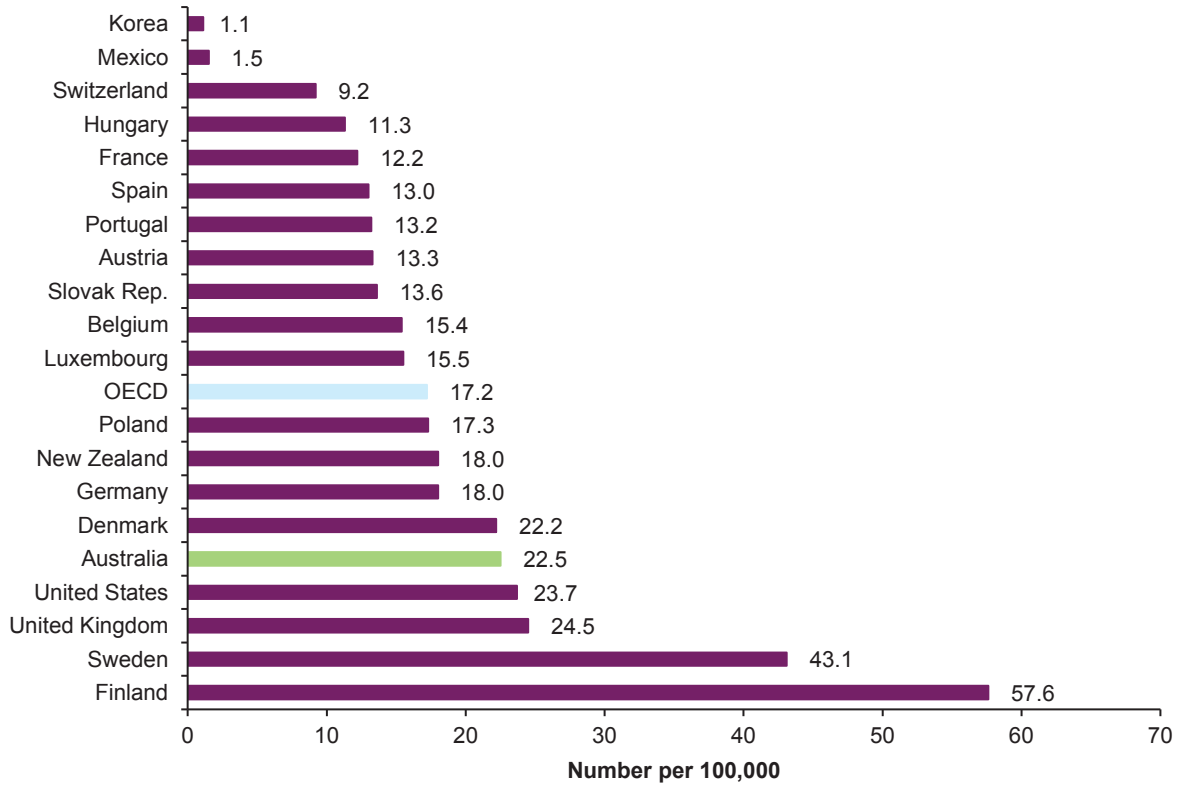
Sources: AIHW analysis of 2011 National (insulin-treated) Diabetes Register; Table C7.

Figure 3.7: Incidence of type 1 diabetes, by sex and selected population characteristics, 2011

International comparisons

Because diagnosis is usually made in childhood, much of the international literature on the incidence of type 1 diabetes focuses on young people.

Australia's incidence rate of type 1 diabetes (23 per 100,000 population aged 0–14) was high compared with those for the 30 Organisation for Economic Co-operation and Development (OECD) countries for which comparable data were available. Australia's rate was the fifth highest and above the OECD average (17 per 100,000) (Figure 3.8). Australia's incidence rate was similar to that for Denmark (22 per 100,000), the United States (24 per 100,000) and the United Kingdom (25 per 100,000). Finland had the highest rate (58 per 100,000), while Korea had the lowest rate (1 per 100,000).



Notes

1. OECD estimates are based on estimates from the International Diabetes Federation for 2011; the data were age-standardised to the World Standard Population.
2. The incidence rate for Australia presented in this figure (23 per 100,000), is slightly lower than the rate from the NDR (24 per 100,000).

Source: OECD 2013.

Figure 3.8: Incidence of type 1 diabetes for those aged 0–14, selected countries, 2011

Type 2 diabetes

Type 2 diabetes is the most common form of diabetes. It occurs when the body becomes resistant to the insulin being produced by the pancreas and the amount produced is inadequate to meet the body's needs. Insulin is often used in the treatment of type 2 diabetes, but not in all cases. As well as their insulin resistance, whether or not a person with type 2 diabetes requires insulin often depends on blood glucose control, comorbidities, duration of the disease, age at onset, and other risk factors that influence the development of the disease such as age, family history and ethnic background (AIHW 2014b; Shaw & Chisholm 2003). When a person is first diagnosed with type 2 diabetes, their blood glucose levels can often be maintained at normal levels through lifestyle modification and/or oral glucose lowering medication, although insulin may eventually be required as the condition progresses.

Box 3.4: Type 2 diabetes data sources

Prevalence

Self-reported information from the ABS 2011–12 AHS has been used to estimate the national prevalence of type 2 diabetes in Australia. Note that no national survey data are available on diabetes type based on measured data (see Box 3.1).

The NDSS–APEG data set also provides information on the prevalence of type 2 diabetes in Australia. This data set comprises data from several sources: the NDSS, APEG data, and the National Death Index (see Appendix A for further information).

Several factors make counting the number of people who have type 2 diabetes, at any age, difficult. Self-reported data from the AHS are likely to underestimate the true prevalence of type 2 diabetes as many cases remain unreported, due to survey participants either not knowing or not accurately reporting their diabetes status. Data from the NDSS–APEG also has its limitations, including missing undiagnosed cases of diabetes or misreporting of diabetes type, the inconsistency of the scope of the APEG Register at the state level, and the fact that registration with the NDSS is voluntary and motivated by a need for access to subsidised consumables and support (AIHW 2014c).

Because of these limitations, detailed data on type 2 diabetes have not been presented in this report.

Incidence

There are no reliable national data available to estimate the overall incidence of type 2 diabetes in Australia. It is difficult to capture the incidence of type 2 diabetes as many cases are recorded after the condition has started, remain undiagnosed, or do not require insulin treatment.

Prevalence

The prevalence data presented in this section are likely to be an underestimate of the true prevalence of type 2 diabetes in Australia (see Box 3.4 for further details).

Prevalence based on AHS

In 2011–12, an estimated 849,000 Australians aged 18 and over self-reported that they had type 2 diabetes, which corresponds to 5% of the Australian adult population. This represents 86% of people who self-reported having any type of diabetes (an estimated 990,000). The prevalence of self-reported type 2 diabetes among Australian adults:

- was higher among men than women—an age-standardised rate of 5% and 4%, respectively
- was similar around 5% across *Major cities*, *Inner regional* and *Outer regional* and *Remote* areas
- was twice as high in the lowest SES group than in the highest SES group (7% and 3%, respectively) (Table C8).

Prevalence based on NDSS–APEG

As at June 2012, according to data from NDSS–APEG, there were an estimated 881,000 Australians aged 10 and over with diagnosed type 2 diabetes (AIHW 2014c):

- The vast majority (96%) were aged 40 and over; however, 4% or 31,000 were aged 10–39, including 2,200 cases among those aged 10–24.
- Rates were higher for males than for females, being 5% and 4%, respectively.

Gestational diabetes

Gestational diabetes is a form of diabetes that involves high blood sugar levels appearing for the first time during pregnancy, generally in the second or third trimester, among women who have not previously been diagnosed with other forms of diabetes. It can result in complications for mother and baby. While gestational diabetes may resolve after the baby is born, it can recur in later pregnancies and greatly increases the risk that both the mother and the baby may develop type 2 diabetes later in life—approximately 17% of women who have had gestational diabetes develop type 2 diabetes within 10 years, and up to 50% within 30 years (AIHW 2010). Some women can manage their gestational diabetes by changes to diet and exercise, while others require insulin treatment.

Box 3.5: Gestational diabetes data sources

National Perinatal Data Collection

The National Perinatal Data Collection is an administrative data source containing selected information relating to births that are reported to the perinatal data collection in each Australian state and territory. From 2009 to 2011, the National Perinatal Data Collection recorded information on around 650,000 women who gave birth in Australia and whose age and pregnancy diabetes status was recorded.

National Hospital Morbidity Database

The NHMD is a compilation of episode-level records from admitted patient morbidity data collection systems in Australian hospitals. It is a comprehensive data set that has records for all episodes of admitted patient care from essentially all public and private hospitals in Australia. The NHMD can be used to calculate the proportion of hospitalisations (separations) for women who gave birth as admitted patients in a reference year who had gestational diabetes. *International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification* (ICD-10-AM) (NCCH [National Centre for Classification in Health] 2010) code O24.4 was used to define gestational diabetes (see Glossary and Box B3 for more information).

National (insulin-treated) Diabetes Register

The NDR provides data to estimate the incidence of insulin-treated gestational diabetes.

Gestational diabetes and in-hospital births

Based on data from the National Perinatal Data Collection, 6% of women who gave birth were diagnosed with gestational diabetes in 2009–2011 (Table 3.1).

Table 3.1: Women who gave birth in selected Australian states, by diabetes in pregnancy status, 2009–2011

	Pre-existing diabetes	Gestational diabetes	No diabetes	Total
Number of mothers	4,282	37,877	608,157	**650,316**
Percentage	0.7	5.8	93.5	**100.0**

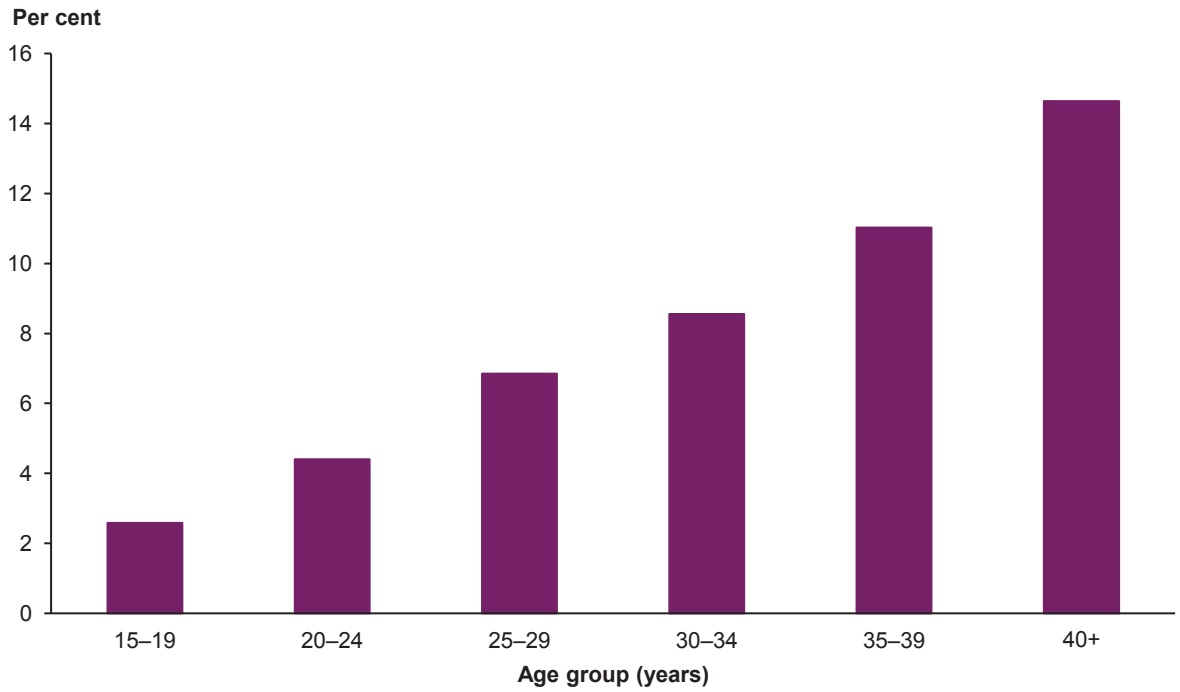
Notes

1. Total excludes 57 women who gave birth and had missing or not stated diabetes in pregnancy status (2) or missing age (55).
2. Data for this period were not supplied from Victoria and incomplete from Tasmania.

Source: National Perinatal Data Collection.

According to the NHMD, in 2012–13, around 24,100 hospitalisations for women who gave birth were recorded with either a principal or additional diagnosis of gestational diabetes.

Hospitalisations for women who delivered and had gestational diabetes increased considerably with age—3% of all hospitalisations for women aged 15–19 who gave birth had a diagnosis (principal or additional) of gestational diabetes, increasing to 11% of all hospitalisations for women aged 35–39 and 15% of all mothers aged 40 and over (Figure 3.9 and Table C9).



Note: The following care types were excluded: 9.0: Organ procedure—posthumous; and 10.0: Hospital boarder.
Sources: AIHW analysis of AIHW National Hospital Morbidity Database; Table C9.

Figure 3.9: Proportions of hospitalisations for women, who gave birth, with a diagnosis of gestational diabetes, by age, 2012–13

In 2011, based on the NDR, 6,400 women aged 15–49—representing 117 per 100,000 women aged 15–49—began using insulin to treat their gestational diabetes in Australia. The mean age was 33. These figures are likely to be an underestimate of the true prevalence of gestational diabetes, as not all women use insulin to treat their gestational diabetes. As well, the rate refers to the female population aged 15–49, not to the population at risk: those who are pregnant.

4 Chronic kidney disease

Chronic kidney disease refers to all kidney conditions where a person has evidence of kidney damage and/or reduced kidney function, lasting at least 3 months. Many people do not know that they have kidney disease, as up to 90% of kidney function can be lost before symptoms are evident. Fortunately, simple tests of a person's urine and blood can identify most cases of CKD when the disease is in its early stages, enabling treatment to prevent, or slow down, its progression.

CKD is common and largely preventable in many cases, as many of its risk factors are modifiable, such as high blood pressure, tobacco smoking and overweight and obesity (for further details, see AIHW, forthcoming 2015a). Many of the risk factors for CKD also apply to other chronic diseases such as CVD (including CHD and stroke) and diabetes, which in turn, are risk factors for CKD.

Chronic kidney disease

CKD is usually categorised into 5 stages according to the level of kidney function, or evidence of kidney damage indicated by biological markers such as blood or protein in the urine (see Box 4.1 and Box B5 in Appendix B).

Box 4.1: Estimating CKD prevalence

Self-reported CKD data are likely to underestimate the prevalence of the disease because approximately 90% of kidney function can be lost before any symptoms appear. However, by conducting tests to determine kidney function (estimated glomerular filtration rate [eGFR]) and kidney damage (albumin creatinine ratio [ACR]) (see below), most cases of CKD can be identified when the disease is in its early stages, enabling treatment to prevent or slow down the progression of the disease.

The ABS 2011–12 AHS provides biomedical (measured data) that can be used to estimate the national prevalence of biomedical signs of CKD. These data are based on measures of eGFR and ACR. These two measures are combined to identify signs of CKD staging (see below). However, while abnormal eGFR and ACR measurements may indicate impaired kidney function, kidney disease can be confirmed only if albuminuria (see below) or eGFR of less than 60 mL/min/1.73 m^2 has persisted for at least 3 months (ABS 2013c; Kidney Health Australia 2012a).

The AHS biomedical data can provide only prevalence estimates for signs of CKD. Formal diagnosis of CKD cannot be based on a single test. Multiple tests are needed due to the CKD diagnostic requirement of kidney damage and/or reduced kidney function lasting at least 3 months.

CKD biomedical tests in ABS 2011–12 AHS

Estimated glomerular filtration rate

In Australia, eGFR is accepted as the best measure of assessing kidney function (Kidney Health Australia 2012a). Measured via a blood test, eGFR is an estimation of the flow rate of filtered fluid through the kidney based on the levels of creatinine in the blood, using a formula that takes into account age, sex and ethnicity. Abnormal kidney function using eGFR is defined as a reading of less than 60 mL/min/1.73m^2.

Albuminuria

Albuminuria is a key marker of kidney damage (Kidney Health Australia 2012a). In the AHS, presence of albuminuria was measured via a urine test. Presence of albuminuria was defined as an ACR reading of greater than or equal to 2.5 mg/mmol for males and greater than or equal to 3.5 mg/mmol for females.

Staging of CKD

CKD is usually categorised into 5 stages (1 to 5) according to the level of kidney function and evidence of kidney damage, indicated by biological markers such as blood or protein in the urine. In the AHS, stages for signs of CKD were defined using both the eGFR (kidney function) and ACR (kidney damage) results (see Box B5 for information on CKD staging).

Source: ABS 2013a.

Prevalence

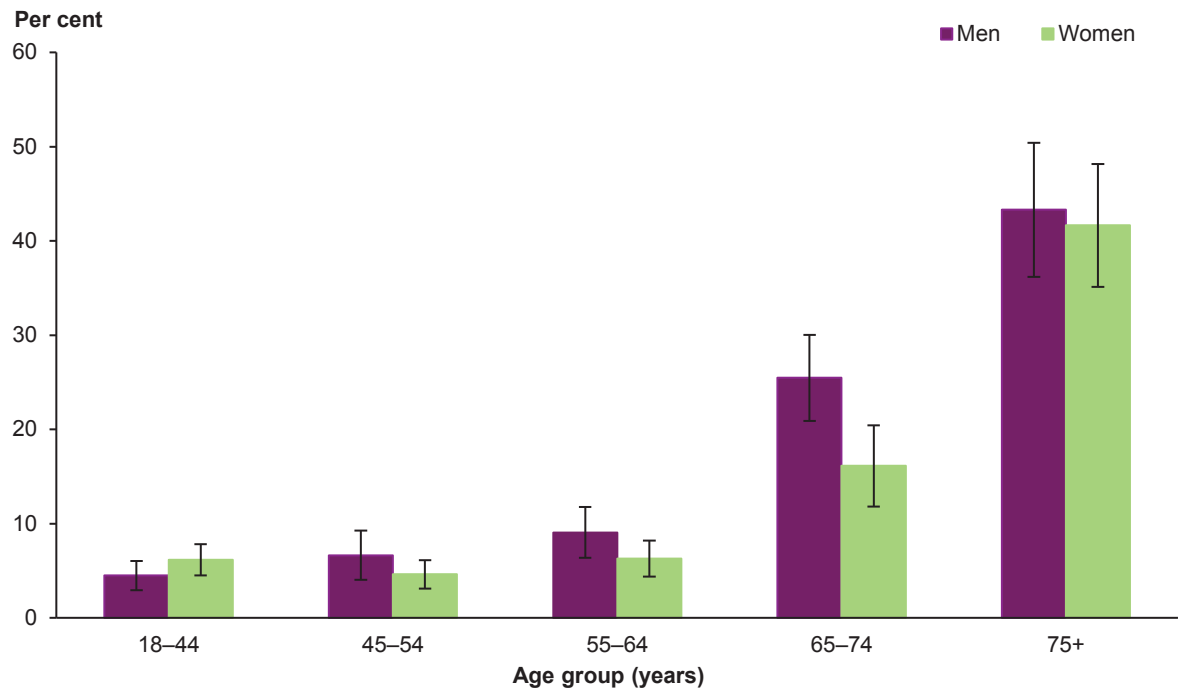
In 2011–12, an estimated 1.7 million Australian adults (10% of the population aged 18 and over) had biomedical signs of CKD. The vast majority of these (97%) showed signs of the early stages of the disease (Stages 1–3). Identification of CKD in the early stages, followed by appropriate management, can slow the progression of the disease and reduce the deterioration of kidney function by up to 50% (Kidney Health Australia 2012a) (see Table C10 and Box B5 for information on CKD staging).

By comparison, self-reported data from the AHS indicate that only 1% of all adults had CKD. The large difference between self-reported and measured results (1% and 10%, respectively) reflects the fact that CKD remains a highly under-diagnosed condition. As well, of the 1.7 million Australian adults who showed biomedical signs of CKD, only 10% self-reported that they had the condition.

Sex and age

The prevalence of biomedical signs for CKD was similar for men and women—with age-standardised rates of 10.3% and 9.5%, respectively (Figure 4.1 and Table C10).

The prevalence of CKD increased rapidly with age after age 74, with rates among those aged 75 and over (42%) being twice as high as for those aged 65–74 (21%) and 8 times as high as for those aged 18–54 (6%).



Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C10.

Figure 4.1: Prevalence of CKD, based on eGFR and ACR results, among persons aged 18 and over, by age and sex, 2011–12

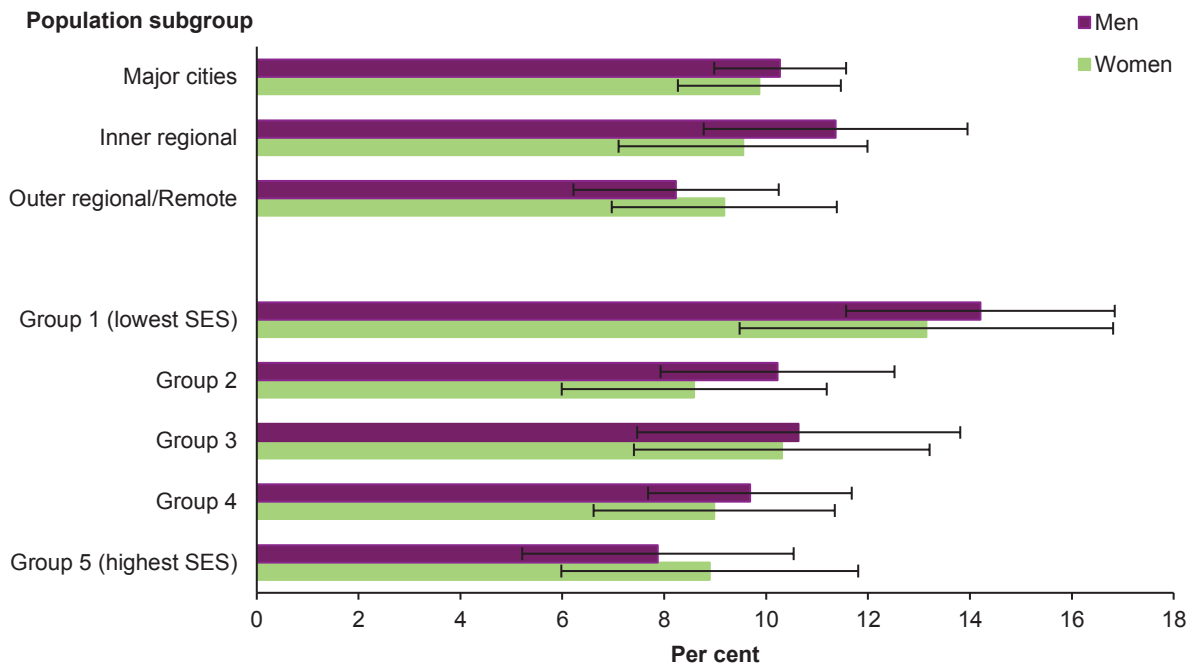
Inequalities

Remoteness

In 2011–12, there were no statistically significant differences in the prevalence of biomedical signs of CKD between *Major cities* (10%), *Inner regional* areas (11%) and *Outer regional* and *Remote* (9%) areas of Australia (Figure 4.2 and Table C10). The aggregation of *Remote* areas with *Outer regional* and the exclusion of *Very remote* areas in the AHS mean that the influence of remoteness on CKD prevalence could not be fully assessed in this report. The complex issue of remoteness and CKD for Indigenous Australians will be further explored in the AIHW's upcoming publication *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: Indigenous Australians* (AIHW, forthcoming 2015b).

Socioeconomic group

In 2011–12, the prevalence of biomedical signs of CKD for adults among the lowest SES group (14%) was 1.6 times the rate of that for the highest SES group (8%) (Figure 4.2 and Table C10).



Note: Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C10.

Figure 4.2: Prevalence of CKD, based on eGFR and ACR results, among persons aged 18 and over, by selected population characteristics, 2011–12

End-stage kidney disease

ESKD is the most severe form of CKD. To survive, those with ESKD usually require kidney replacement therapy (KRT). KRT has 2 forms—kidney transplant or dialysis. Dialysis is an artificial way of removing waste substances from the blood and is mostly provided in hospitals or satellite dialysis units, but can also be provided in a home setting (Kidney Health Australia 2007).

Not all patients with ESKD receive KRT. Non-KRT medical management of ESKD is another treatment choice and involves a shift from efforts to prolong life to focusing on care, quality of life and symptom control (Chandna et al. 2011). Prognosis, anticipated quality of life (with or without dialysis), treatment burden (if dialysis is undertaken) and patient preferences all play a part in the decision for or against KRT (Murtagh et al. 2007). Medications, diet and other therapies may be used to lessen symptoms. It is generally older patients who do not receive KRT to treat their ESKD due to factors such as comorbidities, expected length of lifespan, and quality of life (Murtagh et al. 2007).

Box 4.2: ESKD data sources

Treated-ESKD (prevalence and incidence)

The prevalence and incidence of treated-ESKD can be accurately determined using data from the Australian and New Zealand Dialysis and Transplant (ANZDATA) Registry, which contains information on all people in Australia (and New Zealand) receiving KRT where the intention to treat is long-term (ANZDATA 2013).

Treated and untreated-EKSD (incidence)

Traditionally, data for ESKD in Australia have been available only for those treated with KRT, with virtually all of these cases recorded in the ANZDATA Registry. However, because not all people will be suitable candidates for KRT, and some may choose not to take up this treatment, measuring the incidence of ESKD based on treated-ESKD will likely underestimate the total incidence (including untreated cases) in the community.

To estimate the total incidence of ESKD, the AIHW has developed a method that links data from the NMD and the National Death Index to estimate the number of new cases of ESKD not treated with KRT (AIHW 2011b). This number is added to the number of dialysis and transplant cases recorded in the ANZDATA Registry. This method is not able to estimate the total prevalence of ESKD.

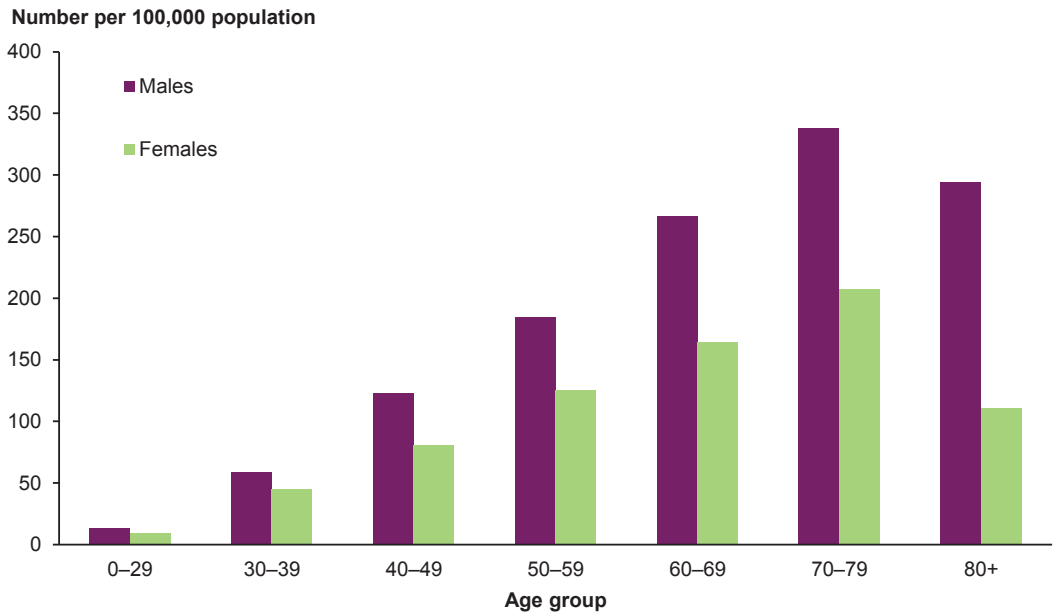
Prevalence (treated-ESKD)

As at 31 December 2012, there were around 20,600 people with treated-ESKD—11,500 were receiving dialysis, while around 9,200 had a functioning kidney transplant. This equates to an overall ESKD-treated prevalence rate of 90 per 100,000 population.

Sex and age

In 2012, the overall prevalence of treated-ESKD was substantially higher in males than in females (1.6 times as high)—104 compared with 66 per 100,000 population, respectively. This pattern was consistent across all age groups, with the largest difference in rates occurring in the oldest age group (80 and over) where the male rate was 2.6 times as high as the female rate (294 and 111 per 100,000 population, respectively) (Figure 4.3 and Table C11).

The prevalence of treated-ESKD increases steadily with age and was highest among those aged 70–79, with a rate of 270 per 100,000 population. This compares with 215 per 100,000 population for those aged 60–69 and 102 per 100,000 population for those aged 40–49. This same pattern was observed for both males and females.



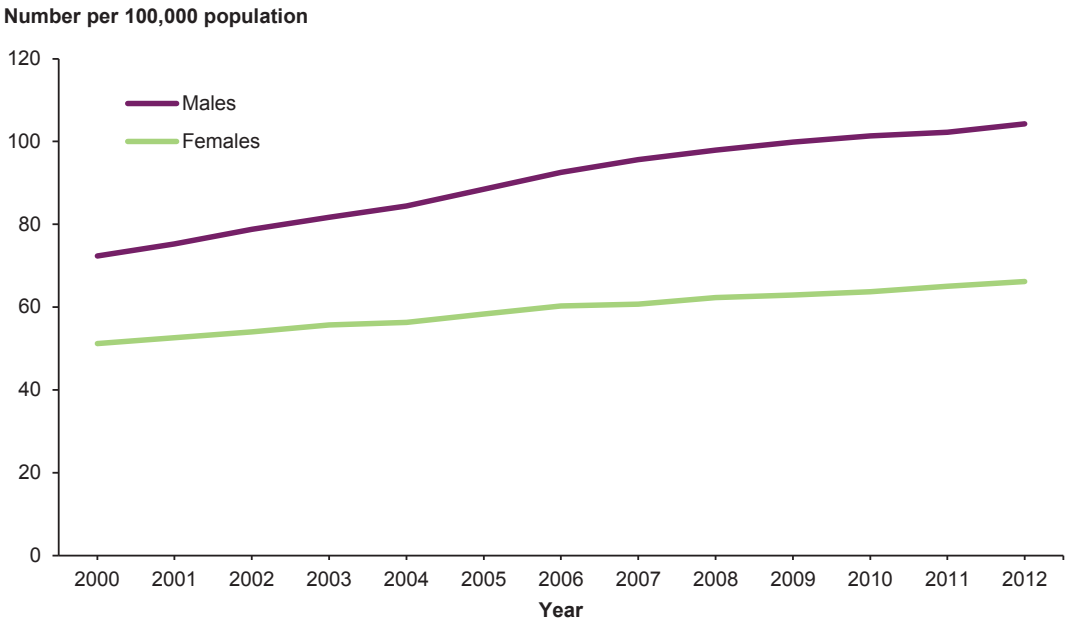
Sources: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data; Table C11.

Figure 4.3: Prevalence of treated-ESKD, by age and sex, Australia, 2012

Trend

The number of people receiving dialysis or who had a functioning kidney transplant for ESKD has almost doubled since 2000, increasing from 11,700 in 2000 to 20,600 in 2012. Since 2000, the age-standardised rate of treated-ESKD has increased 38%, from 61 to 84 per 100,000 population.

The rate of increase has been faster among males than females—the male rate increased by 44% (from 72 to 104 per 100,000 population) while the female rate increased by 29% (from 51 to 66 per 100,000 population) (Figure 4.4).



Note: Rates have been age-standardised to the 2001 Australian population.

Source: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data.

Figure 4.4: Trends in the prevalence of treated-ESKD, by sex, Australia, 2000–2012

Inequalities

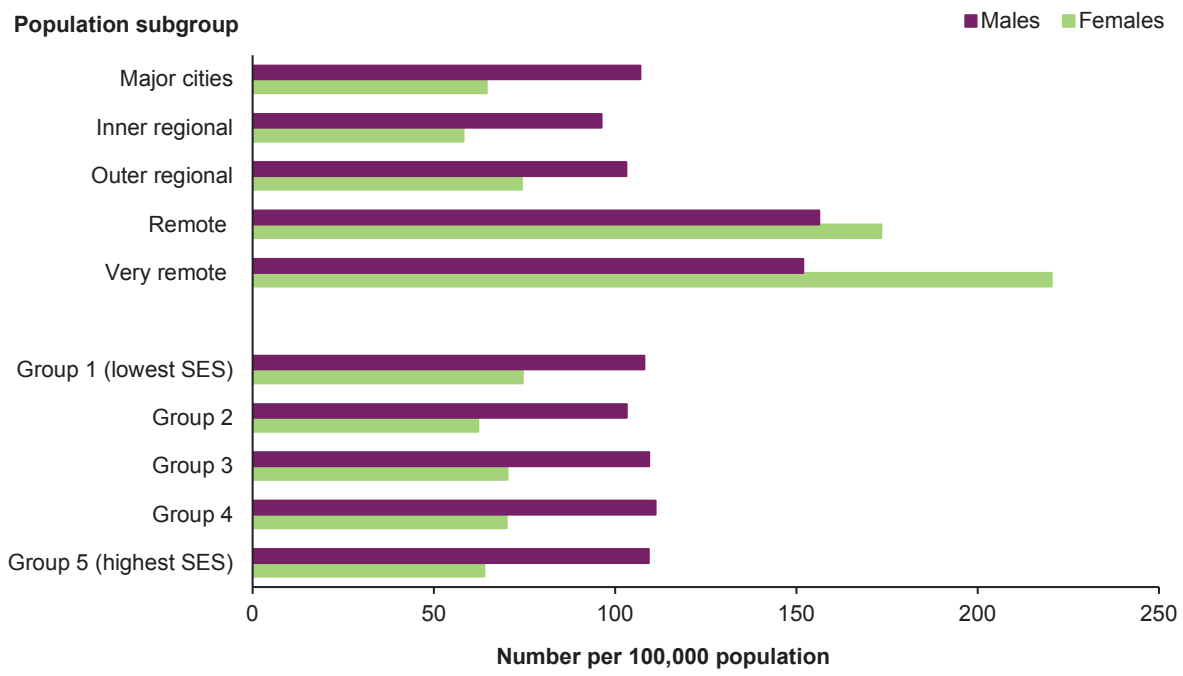
Remoteness

The prevalence of treated-ESKD increased with increasing remoteness, with rates twice as high in *Remote* and *Very remote* areas (163 and 181 cases per 100,000 population, respectively) compared with *Major cities* (85 cases per 100,000 population) as at 31 December 2012 (Figure 4.5 and Table C11). This largely reflects the relatively high proportion of Aboriginal and Torres Strait Islander people living in *Remote* and *Very remote* areas who have higher rates of ESKD. The rate of treated-ESKD among Indigenous Australians is around 6 times the non-Indigenous rate (ANZDATA 2013) and this difference increases with remoteness (AIHW 2011a).

Males had higher rates of treated-ESKD than females in *Major cities*, *Inner regional* and *Outer regional* areas. The opposite trend occurred in *Remote* and *Very remote* areas where females had higher rates (Figure 4.5), possibly reflecting the high proportion of Aboriginal and Torres Strait Islander people living in these areas and the higher levels of albuminuria (the early marker of CKD) found among Indigenous females compared with their male counterparts (Hoy et al. 2010,Hoy et al. 2012). The reasons for this are complex and are likely to be influenced by several factors, including higher rates of diabetes and obesity in Indigenous females—both key risk factors for CKD (Hoy et al. 2010, 2012; AIHW, forthcoming 2015b).

Socioeconomic group

Prevalence rates for treated-ESKD were relatively similar across SES groups—91% in the lowest SES group and 85% in the highest SES group—as at 31 December 2012 (Figure 4.5 and Table C11).



Notes

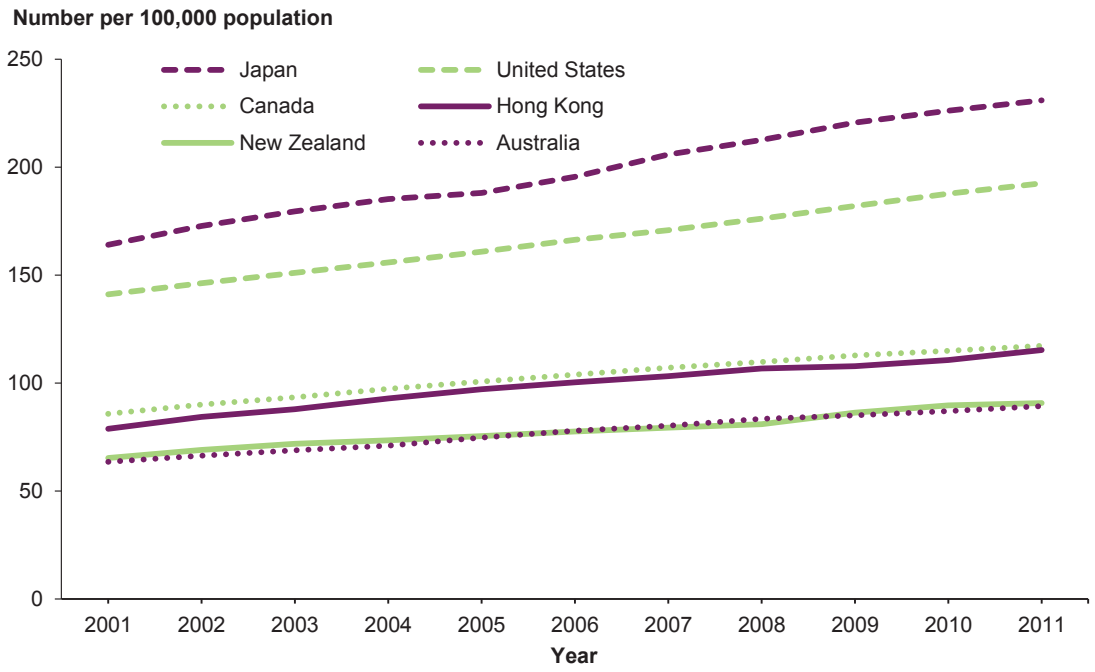
1. Rates are age-standardised to the 2001 Australian population.
2. Excludes 87 cases where remoteness could not be determined and 104 cases where socioeconomic status could not be assigned.
3. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Sources: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data; Table C11.

Figure 4.5: Prevalence of treated-ESKD, by sex and selected population characteristics, Australia, 2012

International comparison

According to the United States Renal Data System, the prevalence rates of treated-ESKD in all countries compared increased between 2001 and 2011. Australia appeared to have a prevalence rate at the lower end among the group of selected developed countries, with rates similar to New Zealand and consistently lower than Canada and the United States (Figure 4.6; US Renal Data System 2013). However, caution should be used in comparing countries due to differences in data collection methodologies, age structures and the different access to treatment for those with ESKD in these countries.



Note: Caution should be used in directly comparing countries as rates are unadjusted for age differences, and data collections are inconsistent across countries.

Source: Figure adapted from USRDS Annual Report 2013 data.

Figure 4.6: Trends in prevalence rates of treated-ESKD, selected developed countries, 2001–2011

Incidence (treated-ESKD)

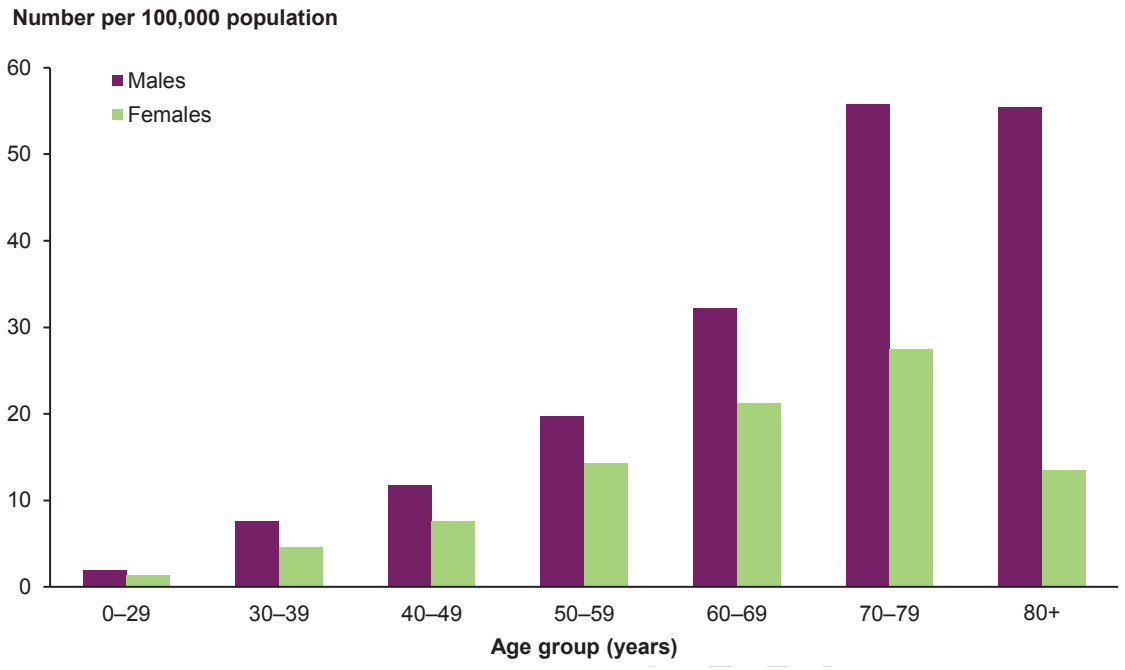
In 2012, there were approximately 2,500 new cases of KRT-treated-ESKD, equating to a rate of 11 per 100,000 population or 7 new treated-ESKD cases per day. Diabetes was the leading cause of KRT-treated-ESKD in 2011, accounting for 1 in 3 new cases (ANZDATA 2013).

Sex and age

The incidence of treated-ESKD was almost twice as high for males as for females in 2012 (age-standardised rate of 14 per 100,000 compared with 8, respectively).

The rate of people starting KRT treatment for ESKD generally increased with age, with the peak age range being 70–79 (41 per 100,000 population). Rates in this age group were 2.4 and 4.3 times as high as rates in the 50–59 and 40–49 age groups (16.9 and 9.6 per 100,000 population, respectively) (Figure 4.7 and Table C12). This same overall pattern was observed for both males and females, although rates of treated-ESKD increased more rapidly for males than females.

Males had higher incidence rates of treated-ESKD than females across all age groups. The greatest difference between males and females was for those aged 80 and over, where the male rate was over 4 times the female rate.

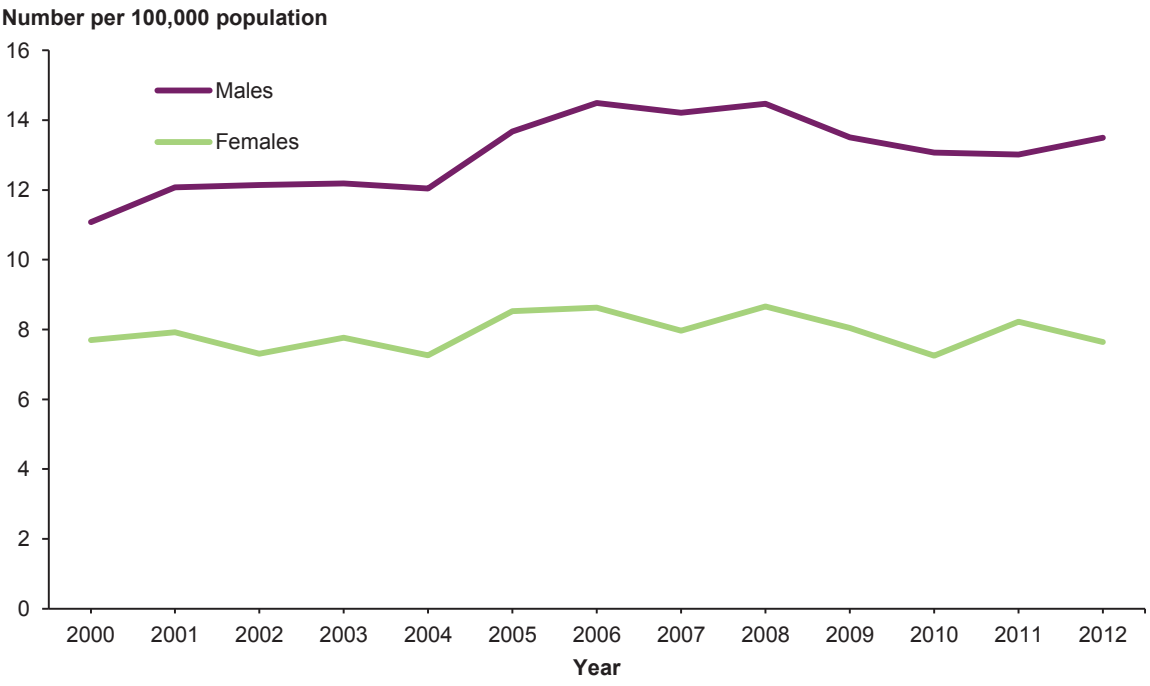


Sources: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data; Table C12.

Figure 4.7: Incidence of treated-ESKD, by age and sex, Australia, 2012

Trend

From 2000 to 2012, while the number of new cases of treated-ESKD has increased from 1,800 cases in 2000 to 2,500 cases in 2012, the age-standardised rate has remained relatively similar (10 per 100,000 population). Male age-standardised rates were consistently higher than female rates over this period (Figure 4.8).



Note: Rates have been age-standardised to the 2001 Australian population.
Source: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data.

Figure 4.8: Trends in incidence of treated-ESKD, by sex, Australia, 2000–2012

Inequalities

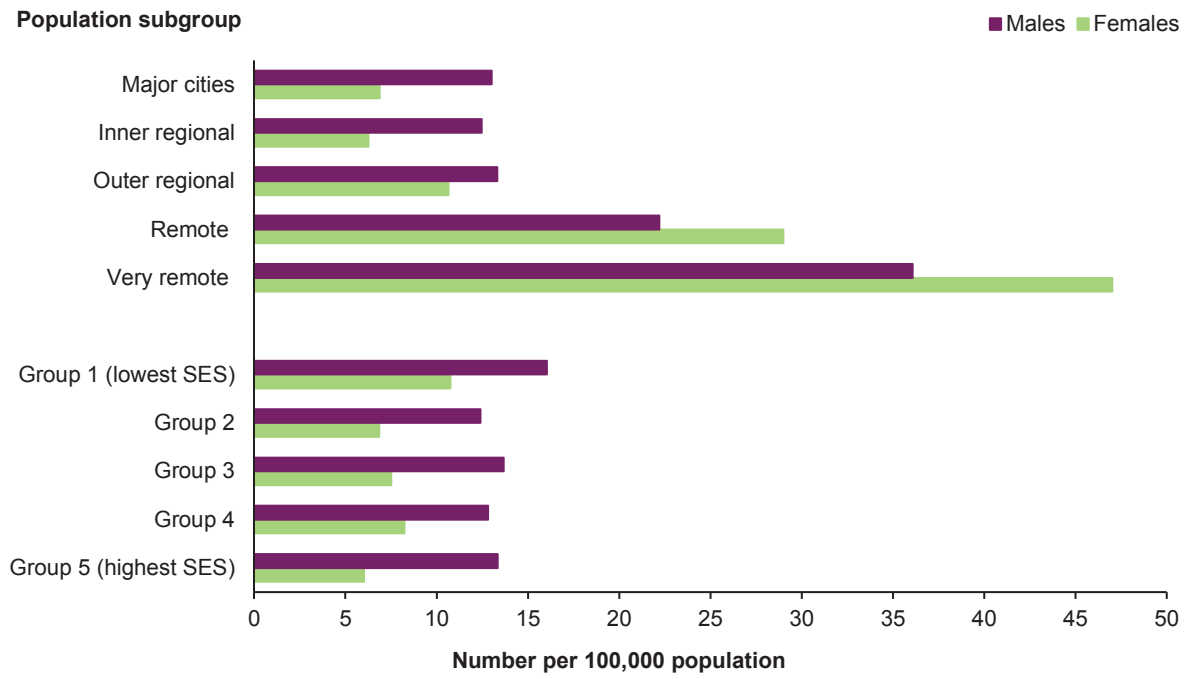
Remoteness

In 2012, the incidence of treated-ESKD was at least twice as high in *Remote* and *Very remote* areas (age-standardised rates of 25 and 41 per 100,000 population, respectively) as in *Major cities*, *Inner regional* and *Outer regional* areas where the rates were similar (between 9 and 12 per 100,000 population) (Figure 4.9 and Table C12).

Similar to the prevalence of treated-ESKD (Figure 4.5), the high rates in *Remote* and *Very remote* areas, particularly among females, is likely due to the high proportion of Aboriginal and Torres Strait Islander people in these areas and the higher levels of albuminuria (the early marker of CKD) found among Indigenous females.

Socioeconomic group

In 2012, the incidence of treated-ESKD in the lowest SES group was 41% higher as that in the highest SES group (age-standardised rates of 13.3 and 9.4 per 100,000, respectively) (Figure 4.9 and Table C12).



Notes

1. Rates are directly age-standardised to the 2001 Australian population.
2. Excludes 42 cases where remoteness could not be determined and 47 cases where socioeconomic status could not be assigned.
3. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Sources: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data; Table C12.

Figure 4.9: Incidence of treated-ESKD by sex, by selected population characteristics, Australia, 2012

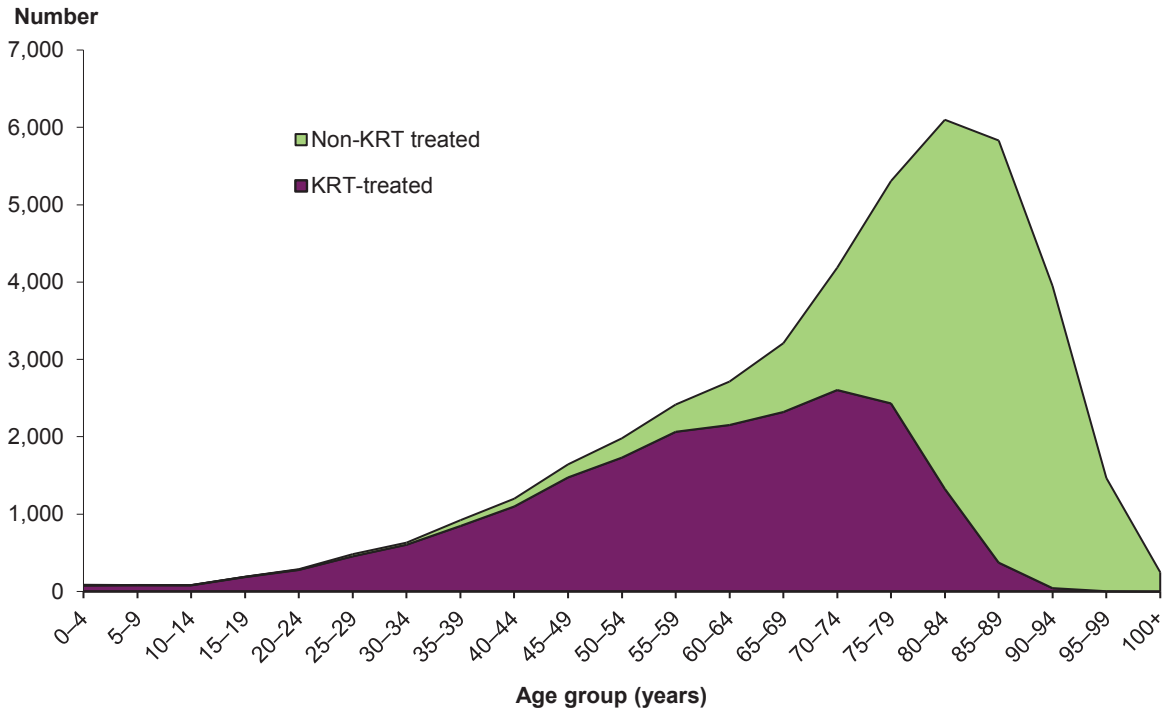
Total incidence of ESKD

The incidence of treated-ESKD may underestimate the true incidence of the disease as not all people with ESKD receive KRT (see Box 4.2). In 2010, there were over 4,800 new cases of ESKD (including non-KRT treated cases) in Australia, equating to about 22 cases per 100,000 people. This compares with around 2,500 new cases of KRT-treated-ESKD in 2011.

Kidney replacement therapy treatment rates

For the period 2002–2010, analysis based on linked ANZDATA and death certificate data (AIHW 2011b; Sparke et al. 2013) indicates that there was about 1 new case of ESKD that did not receive KRT for each case that did, suggesting that the treated-ESKD incidence rates underestimate the true incidence of ESKD. The vast majority (82%) of new cases of ESKD that did not receive KRT were among those aged over 75.

The actual treatment rates (proportion of all cases who receive KRT treatment) differed by age (Figure 4.10 and Table C13). Up to the age of 60, around 90% of all new cases of ESKD were treated with KRT, with a sharp drop in treatment rates among the oldest age groups. It is likely that most of these non-KRT treated cases receive non-KRT medical management for their ESKD. This type of treatment involves a shift from efforts to prolong life to focusing on care, quality of life and symptom control (Chandna et al. 2011).



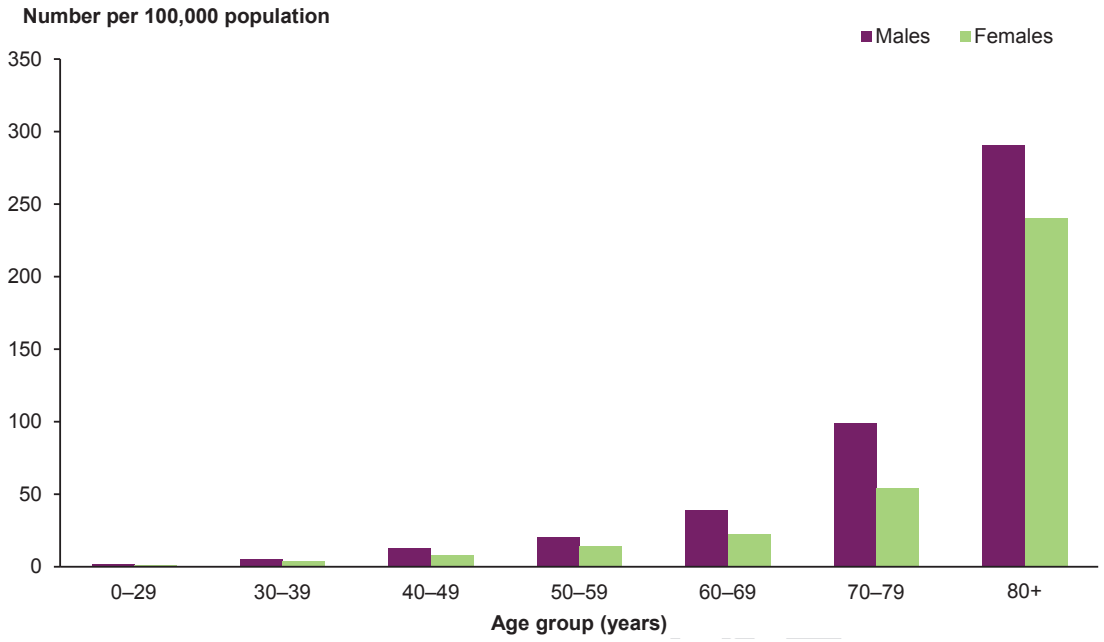
Sources: Linked Australia and New Zealand Dialysis and Transplant Registry Registry data; AIHW National Mortality Database and National Death Index; Table C13.

Figure 4.10: Number of KRT treated and non-KRT treated incident ESKD cases, by age at ESKD onset, Australia, 2002–2010

Sex and age

In 2010, the incidence rate of ESKD was around 1.5 times as high among males as among females (age-standardised rate of 24 and 16 per 100,000 population, respectively) and this difference was consistent across all age groups (Figure 4.11 and Table C14).

For both males and females, the total incidence of ESKD increased with age, peaking at age 80 and over (76 per 100,000). This age pattern differs slightly from that for treated-ESKD cases, which peaked 10 years younger at age 70–79 (Figure 4.7). This reflects the high proportion of untreated ESKD incident cases in people aged 80 and over (Figure 4.10 and Table C14).

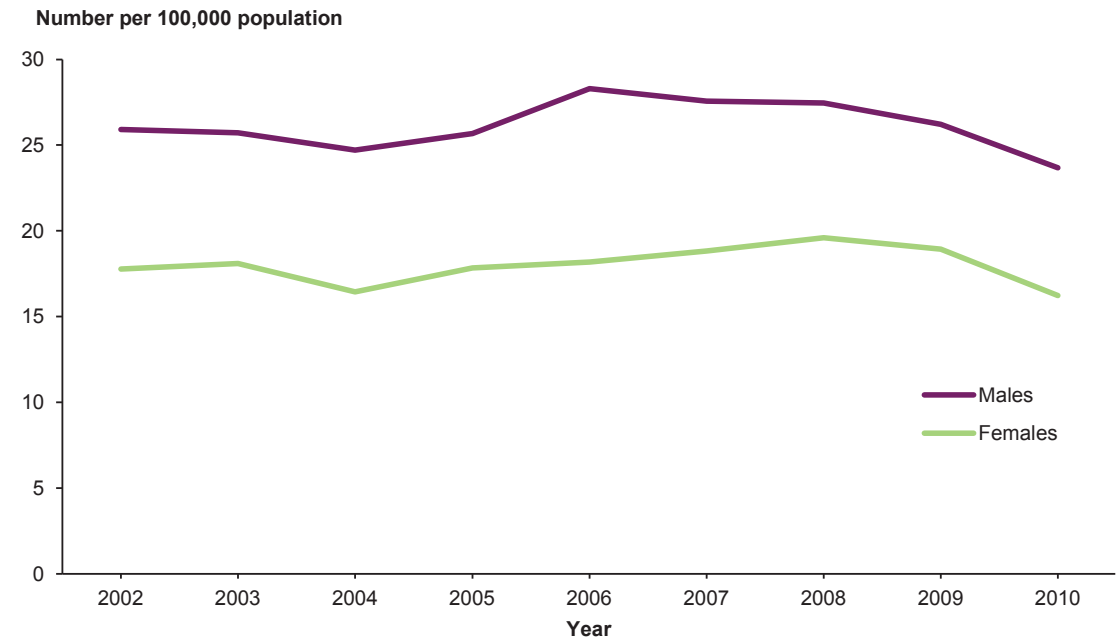


Sources: Linked Australia and New Zealand Dialysis and Transplant Registry Registry data, AIHW National Mortality Database and National Death Index; Table C14.

Figure 4.11: Total incidence of ESKD, by age and sex, Australia, 2010

Trend

Trends in the total incidence rate of ESKD show a similar (stable) pattern to those for treated-ESKD incidence rates (Figure 4.12). During the period 2002 to 2010, the overall age-standardised total incidence rate has remained relatively stable (21 and 20 per 100,000 population, respectively).



Note: Rates have been age-standardised to the 2001 Australian population.

Sources: Linked Australia and New Zealand Dialysis and Transplant Registry Registry data, AIHW National Mortality Database and National Death Index.

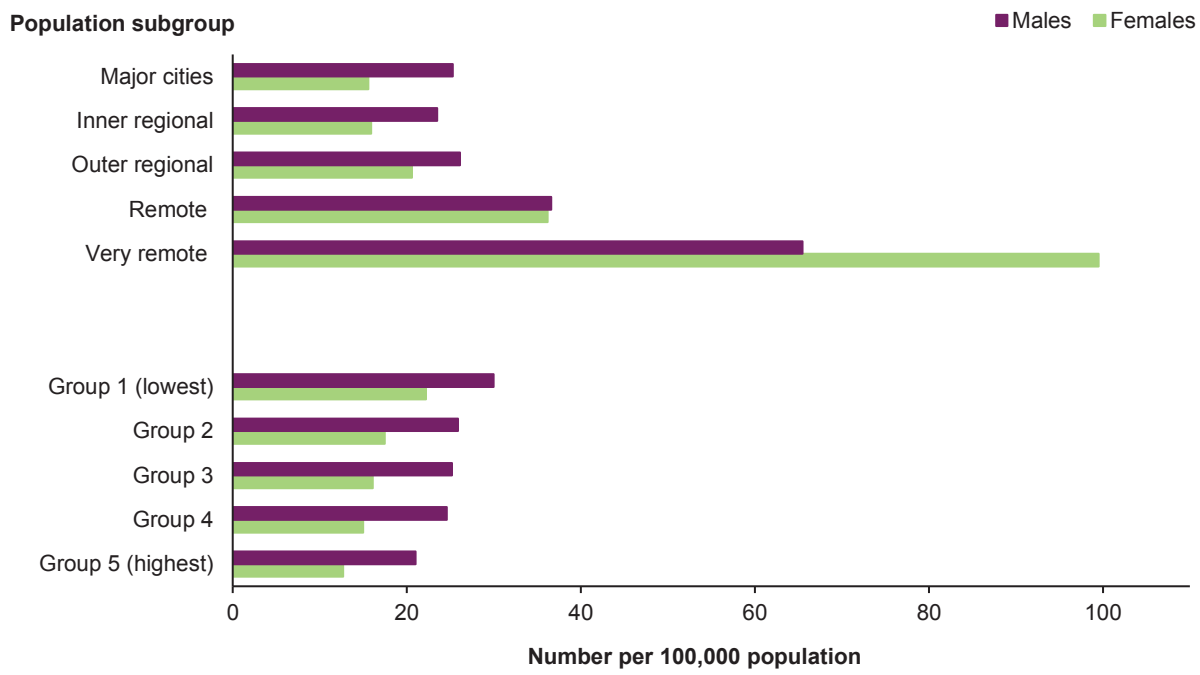
Figure 4.12: Trends in the total incidence of ESKD, by sex, Australia, 2002–2010

Inequalities

For comparisons by remoteness and SES, data have been reported for 3 aggregated years to ensure statistical validity while using data collected as close to a Census year (2006) as possible.

The total incidence of ESKD increased with increasing remoteness and socioeconomic disadvantage. In 2005–2007, age-adjusted total incidence rates were:

- 4 times as high in *Very remote* areas (81 per 100,000 population) as in *Major cities* (20 per 100,000)
- 1.6 times as high in the lowest SES group (26 per 100,000 population) as in the highest SES group (16 per 100,000 population) (Figure 4.13 and Table C14).



Note: Rates have been age-standardised to the 2001 Australian population.

Sources: Linked Australia and New Zealand Dialysis and Transplant Registry Registry data, AIHW National Mortality Database and National Death Index; Table C14.

Figure 4.13: Total incidence of ESKD, by sex and selected population characteristics, Australia, 2005–2007

5 Cardiovascular disease, diabetes and chronic kidney disease comorbidity

As noted in the preface and introduction, CVD (including heart disease and stroke), diabetes and CKD are serious, chronic and long-lasting diseases. They have complex causalities where each of them may be associated with, or exacerbate the presence of, the others. This, combined with shared risk factors and pathologies, often results in CVD, diabetes and CKD occurring together in an individual—a condition known as *comorbidity*. It is widely recognised that the effects of comorbidity may be greater than the sum of the effects of each disease and that their presence may lead to both more severe illness, poorer prognosis and premature death (Wee et al. 2005; Wermeling et al. 2012). This may result in greater levels of health care utilisation, including more hospital admissions and longer stays in hospital, and increased contact with primary health care professionals (Kuwabara et al. 2008; Struijs et al. 2006).

The increasing risk of developing these diseases with age, an increase in unfavourable risk factor trends, and the high prevalence of CVD, diabetes and CKD in the community are expected to result in a rise in these comorbidities among Australia's ageing population. This will escalate the burden of these diseases on individuals, families and the health-care system in the future. However, there is great potential for integrating prevention and care, and treating these diseases collectively, leading to improved health outcomes.

Regular monitoring of comorbidity levels for CVD, diabetes and CKD is important to measure the impact of these diseases collectively on the Australian population and to inform health-care policy and service planning, as well as to evaluate progress in disease prevention and management.

This chapter looks at the overall prevalence of these diseases, collectively and individually, and at the extent to which they overlap. It examines whether comorbidity varies with demographic characteristics, using data from the ABS 2011–12 AHS. The data presented in this chapter of the report can illustrate only the co-occurrence of CVD, diabetes and CKD, and cannot be used to infer causality between one or more of the conditions. The analysis methodology is outlined in Box 5.1.

Relationships between CVD, diabetes and CKD

Some of the causal relationships between CVD, diabetes and CKD are outlined below and summarised in Figure 5.1.

CVD→CKD

CVD, especially hypertension (high blood pressure), is one of the major causes of CKD. Untreated hypertension can damage the blood vessels in the kidneys, leading to reduced blood supply and decreased kidney function (National Heart Foundation of Australia 2010). Hypertension is a major cause of treated-ESKD in Australia, accounting for 15% of new cases in 2011 (ANZDATA 2013).

Diabetes→CVD

Diabetes is a well-known risk factor for CVD. Diabetes increases atherosclerosis (thickening of the wall of a blood vessel with deposits of plaque) by driving inflammation and slowing blood flow (Woo et al. 2008). People with diabetes tend to have higher blood pressure and abnormal cholesterol levels, both of which are factors that increase the risk of atherosclerosis and CVD. High blood sugar levels associated with diabetes can interfere with the chemical signalling involved in regulating normal cardiac functions (Erickson et al. 2013).

Diabetes→CKD

Diabetes can lead to kidney damage—a complication known as diabetic nephropathy—which results from high blood glucose levels damaging the blood-filtering capillaries in the kidneys. Diabetes is now the leading cause of treated-ESKD in Australia, accounting for 1 in 3 new cases in 2011 (ANZDATA 2013).

CKD→CVD

CKD has been found to independently increase the risk of hypertension and other cardiovascular diseases, including heart attack, angina, coronary artery disease, stroke and heart failure (Hajhosseiny et al. 2013). CKD often causes anaemia which is a drop in the number of red blood cells. This results in the heart having to work harder to maintain oxygen levels. If the heart works too hard, the heart muscle becomes larger and this can lead to heart failure (Kidney Health Australia 2012b). CKD complications, such as disturbed mineral metabolism, contribute to increased risk of CVD (Kaisar et al. 2007).

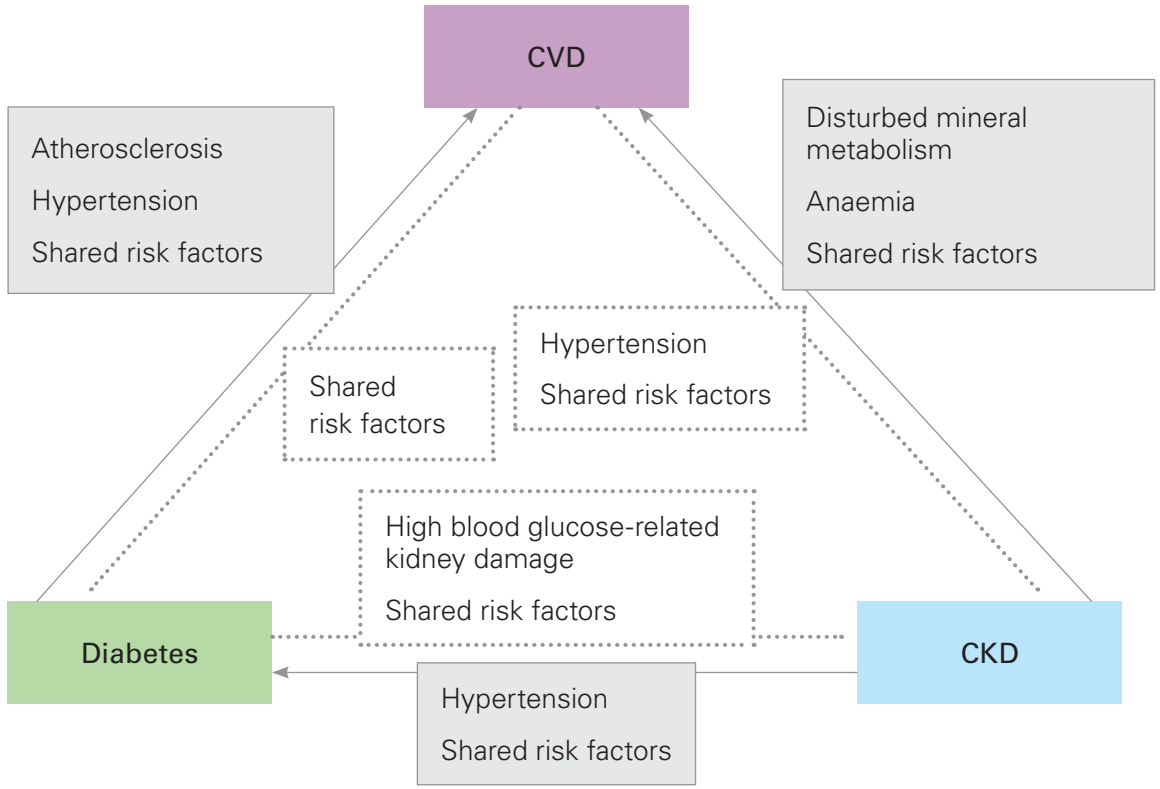


Figure 5.1: Relationship between CVD, diabetes and CKD

Box 5.1: ABS 2011–12 AHS cross-disease data analysis

Data sources

Data presented in this chapter may vary slightly from those presented in earlier chapters, due to their being extracted using different approaches. The data presented in this chapter were from a specific data request provided to the AIHW by the ABS; the other AHS data in this report were obtained largely through AIHW analysis of the ABS Survey Tablebuilder microdata tool for the AHS. As a result of this, small discrepancies may occur in the data sourced from Tablebuilder due to random cell and variable adjustment to avoid the release of confidential data. Different population weights were also applied to the data, depending on which component of the survey was used. This has also led to small discrepancies in the results presented.

Deriving CVD, diabetes and CKD status

Diabetes and CKD status were derived using biomedical data from the ABS 2011–12 AHS (see Box 3.1 and Box 4.1) to minimise the potential for missing undiagnosed cases. As a result, only data from the measured component of the AHS (approximately 9,500 participants aged 18 and over) were used in the comorbidity analyses, including for self-reported estimates of CVD. This chapter uses the same disease definitions as those presented in earlier chapters (see Appendix B for more information).

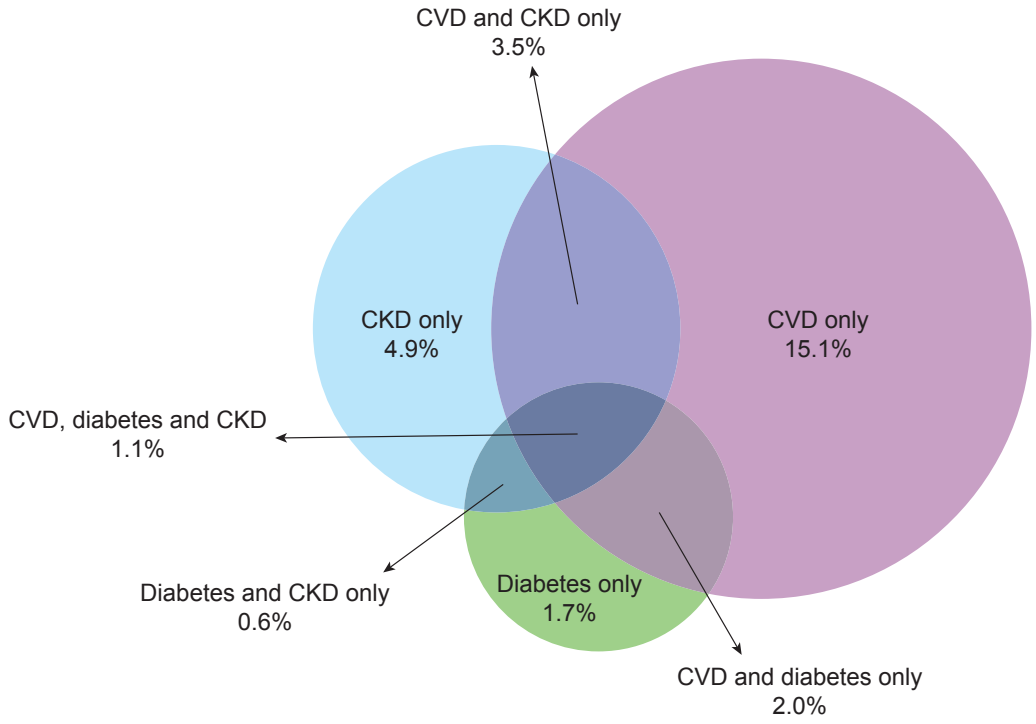
Potential under-count

As illustrated in the previous chapters, CVD, diabetes and CKD are more common among older people; consequently, the likelihood of comorbidities of these diseases is also expected to be higher among older Australians. However, as the AHS samples from the non-institutionalised Australian population, the data presented in this report potentially underestimate the true prevalence and level of comorbidity in the entire population, given that older people in institutionalised dwellings (such as residential care facilities) are not included in these results.

Prevalence of CVD, diabetes and CKD

In 2011–12, an estimated 4.9 million Australian adults, or more than 1 in 4 (29%), had CVD, CKD or diabetes. Of these, over three-quarters (3.7 million or 22% of Australian adults) had only 1 of CVD, diabetes or CKD.

Around 1.2 million Australian adults (7.2%) had at least 2 of CVD, diabetes and CKD—2.0% (342,000) had CVD and diabetes only, 3.5% (601,000) had CVD and CKD only and 0.6% had diabetes and CKD only (96,000). An estimated 1.1% (182,000) of the adult population had all 3 conditions (Figure 5.2 and Table C15).



Notes

1. CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.
2. The relative proportions displayed in each component of this Venn diagram are specific to that component and are not intended for comparison between Figure 5.3 and Figure 5.4.

Sources: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'; Table C15.

Figure 5.2: Prevalence of CVD, diabetes, CKD, and their comorbidity, among persons aged 18 and over, 2011–12

Sex

The prevalence of CVD, diabetes or CKD was similar overall for men and women (30% and 28%, respectively). However, men were more likely than women to have all 3 conditions (1.5% and 0.6%, respectively) (Figure 5.3 and Table C15).

Notes

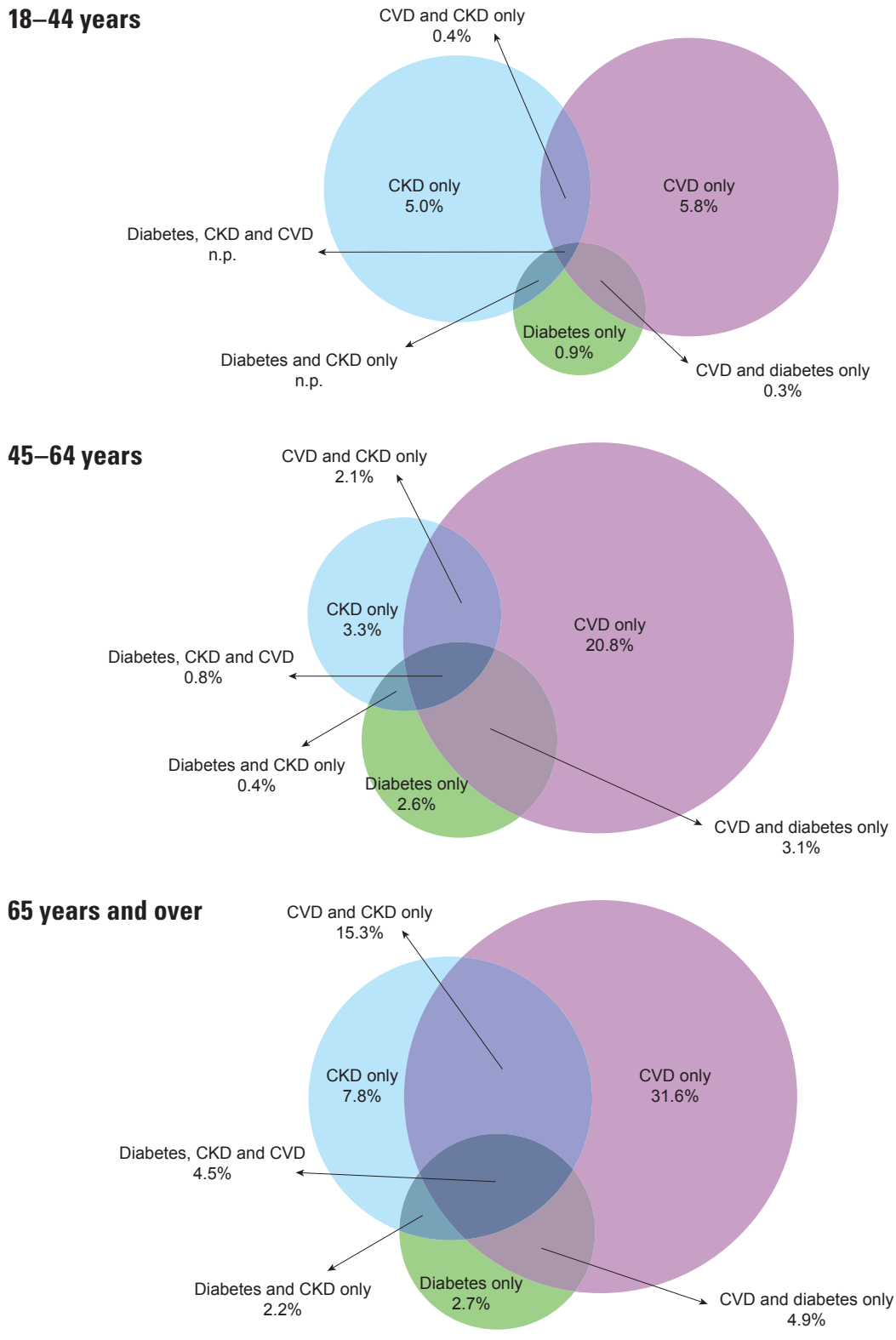
1. CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data, and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.
2. The relative proportions displayed in each component of this Venn diagram are specific to that component and are not intended for comparison between Figure 5.2 and Figure 5.4.

Sources: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'; Table C15.

Figure 5.3: Prevalence of CVD, diabetes, CKD, and their comorbidity, among persons aged 18 and over, by sex, 2011–12

Age

As demonstrated in each of the disease-specific chapters, the prevalence of CVD, diabetes or CKD, both individually and collectively, is also highly correlated with age. Figure 5.4 and Table C16 highlight that, as age increases, so does the presence of comorbidity in the population. People aged 45–64 were 4 to 10 times as likely to have 1 combination of comorbidity recorded as were people aged 18–44. For those aged 65 and over, this difference increased to between 16 and 45 times the rate of those aged 18–44. For example, 0.4% of those aged 18–44 had CVD and CKD; this increased to 2.1% for those aged 45–64 and to 15.3% for those aged 65 and over.



Notes

1. CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.
2. The relative proportions displayed in each component of this Venn diagram are specific to that component and are not intended for comparison between Figure 5.2 and Figure 5.3.

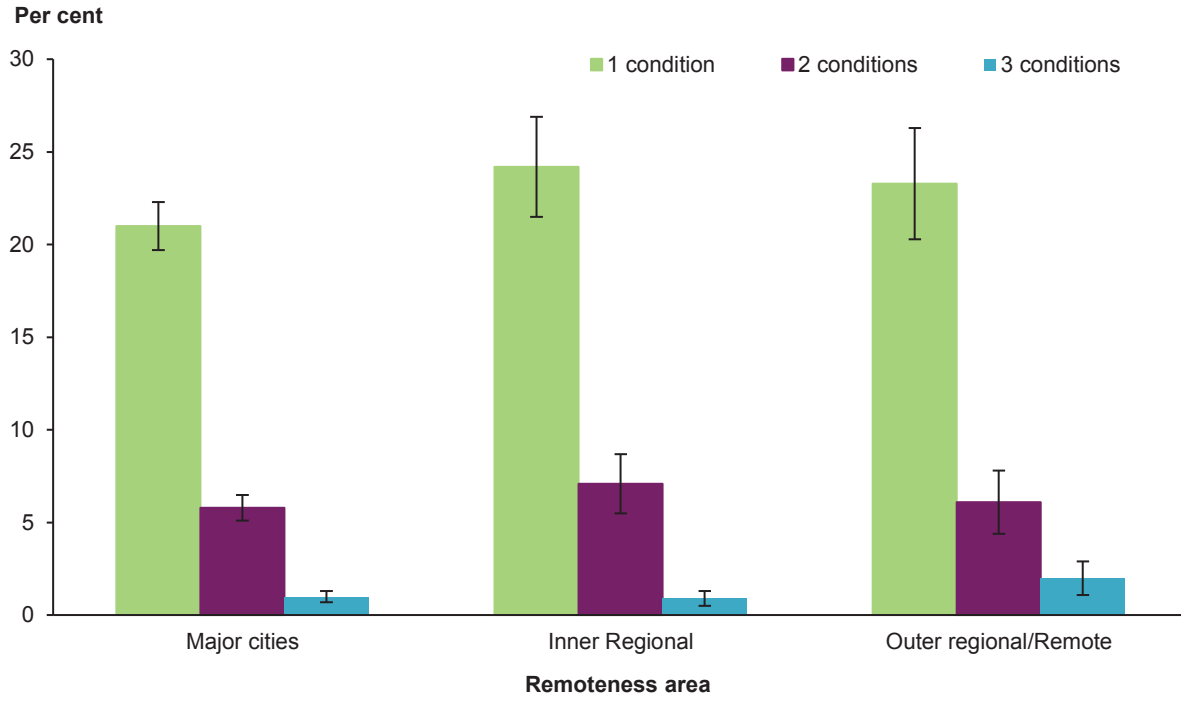
Sources: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'; Table C16.

Figure 5.4: Prevalence of CVD, diabetes, CKD, and their comorbidity, among persons aged 18 and over, by age, 2011–12

Inequalities

Remoteness

In 2011–12, people aged 18 and over in *Outer regional* and *Remote* areas were twice as likely to have all 3 conditions as those aged 18 and over in *Major cities*. However, this disparity deceases for those with 1 condition only or with 2 conditions, where rates were similar between these areas (Figure 5.5 and Table C17).



Notes

1. '1 condition' refers to 1 condition only (CVD only or diabetes only or CKD only). '2 conditions' refers to 'CVD and diabetes or CVD and CKD or CKD and diabetes'. '3 conditions' refers to all 3 conditions.
2. CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.

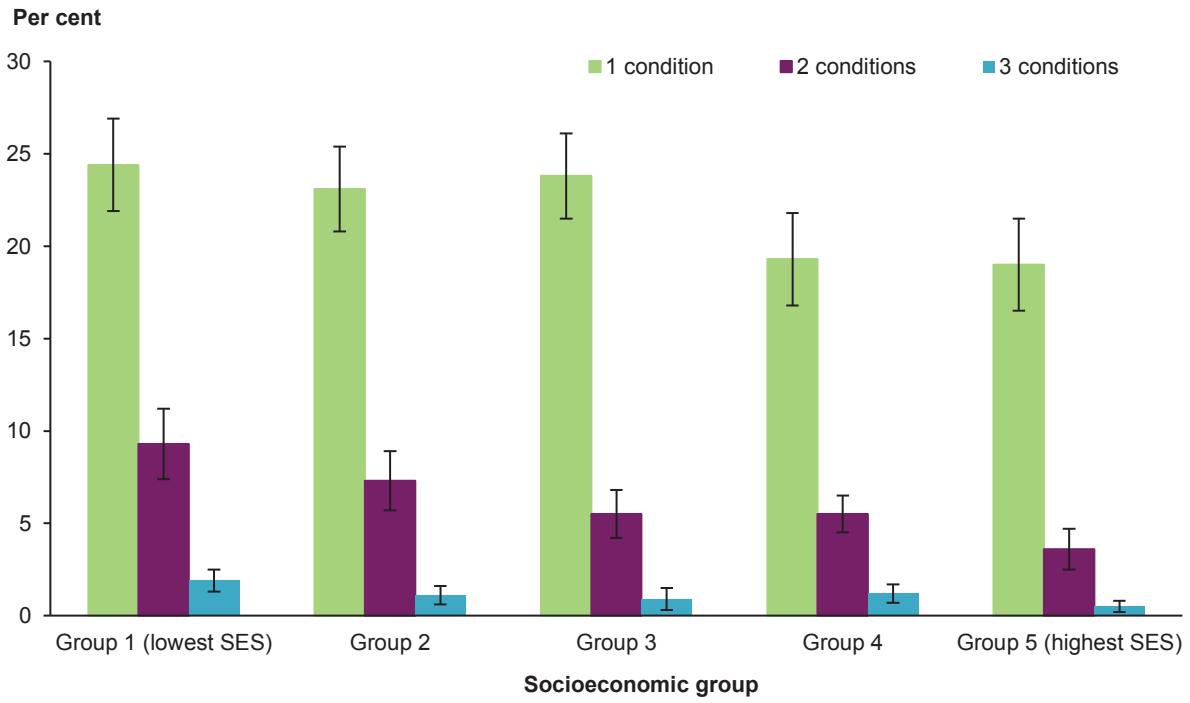
Sources: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'; Table C17.

Figure 5.5: Prevalence of comorbidity for CVD, diabetes, and CKD, among persons aged 18 and over, by remoteness, 2011–12

Socioeconomic group

People in the lowest SES group were more likely to have CVD, diabetes or CKD than those in the highest SES group, regardless of their level of comorbidity status; however, the disparity increases as comorbidities increase.

In 2011–12, people from the lowest SES group were almost 4 times as likely to have all 3 conditions as those from the highest SES group (1.9% and 0.5%, respectively), while for those who had 1 condition only, the gap between the lowest and highest SES group was 1.3 (24% and 19%, respectively) (Figure 5.6 and Table C17).



Notes

1. '1 condition' refers to 1 condition only (CVD only or diabetes only or CKD only). '2 conditions' refers to 'CVD and diabetes or CVD and CKD or CKD and diabetes'. '3 conditions' refers to all 3 conditions.
2. CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.

Sources: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'; Table C17.

Figure 5.6: Prevalence of comorbidity for CVD, diabetes, and CKD, among persons aged 18 and over, by socioeconomic group, 2011–12

Prevalence with comorbidity in the context of each disease

The following section explores the level of comorbidity for specific diseases. Comorbid conditions were grouped together due to small cell sizes.

In 2011–12, the prevalence with comorbidity was different for each disease for Australians aged 18 and over. Diabetes had the highest prevalence with comorbidity at 68%, followed by CKD at 51% and CVD at 30%.

Comorbidity among people with CVD

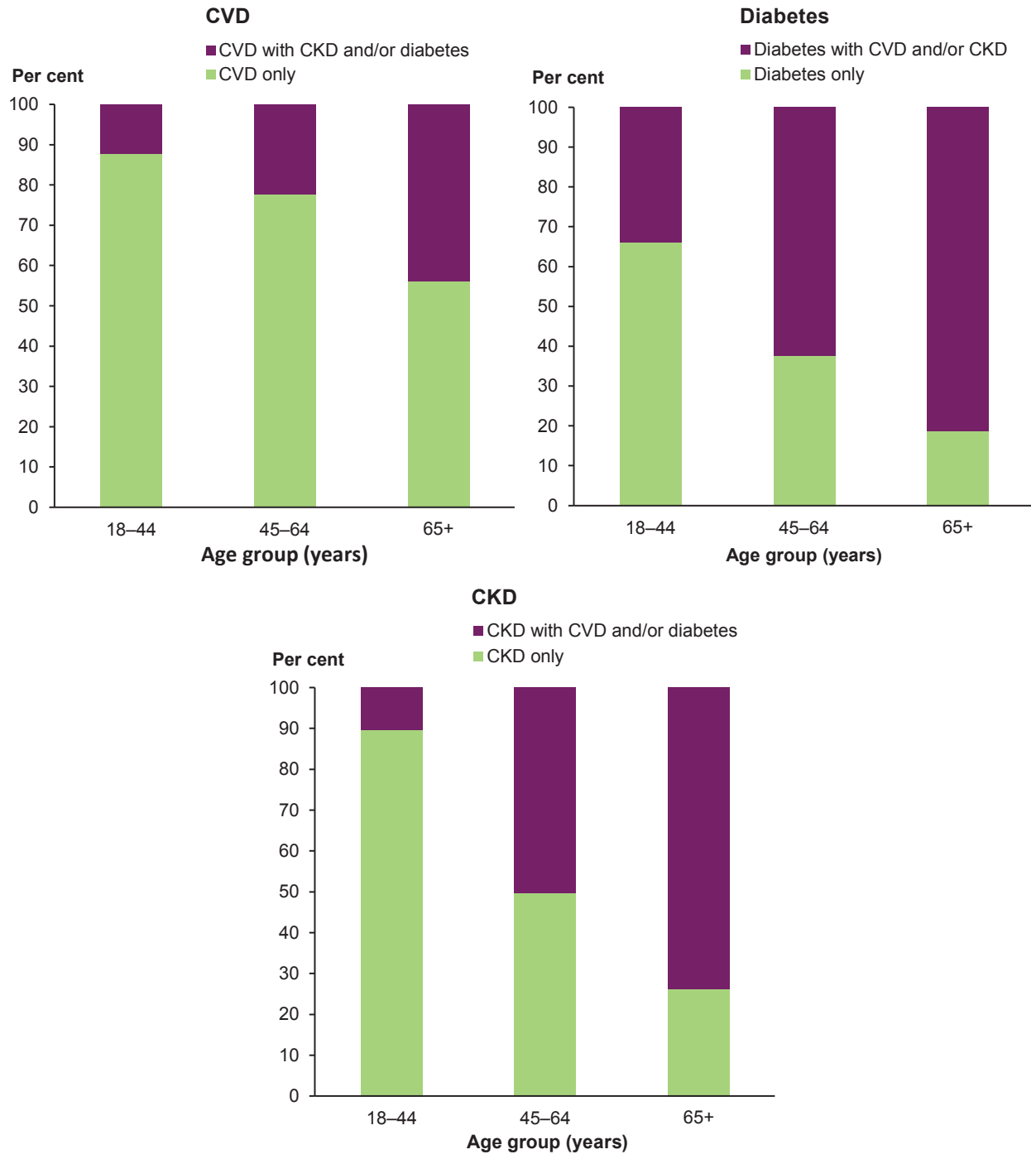
Among people with CVD, 30% also had diabetes and/or CKD, according to the ABS 2011–12 AHS (Figure 5.7 and Table C18). The prevalence of comorbidity of CVD, diabetes and/or CKD increased with age, more than tripling between the ages of 18–44 and 65 and over (rising from 12% to 44%, respectively).

Comorbidity among people with diabetes

In 2011–12, CVD and CKD were commonly present together among adults with diabetes. It was estimated that 68% of people who had diabetes also had at least one form of CVD and/or CKD (Figure 5.7 and Table C18). Almost two-thirds (63%) of people aged 45–64 with diabetes also had CVD and/or CKD; this increased to 81% for those aged 65 and over.

Comorbidity among people with CKD

Similar to people with diabetes, the level of comorbidity among people with CKD is also estimated to be high. In 2011–12, over half of adults (51%) with CKD were estimated to have a comorbidity of CVD and/or diabetes (Figure 5.7 and Table C18). The level of comorbidity for people with CKD increased with age—from 10% in the 18–44 age group to 74% in the 65 and over age group.



Note: CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data, and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.

Sources: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'; Table C18.

Figure 5.7: Comorbidity of CVD, diabetes and CKD, among persons aged 18 and over, by age group and disease, 2011–12

Appendix A: Data sources

Australia and New Zealand Dialysis and Transplant Registry

ANZDATA collects information to monitor dialysis and transplant treatments from all renal units in Australia and New Zealand on all patients receiving KRT where the intention to treat is long term. Cases of acute kidney failure are excluded. The registry is coordinated within the Queen Elizabeth Hospital in Adelaide, and compiles data on incidence and prevalence of treated-ESKD, complications, comorbidities and patient deaths. All relevant hospitals and related dialysis units participate. While patients have the option of opting out of having part or all of their data recorded, this rarely happens. This report includes ANZDATA from the period 2000 to 2012 by calendar year.

The interpretation and reporting of these data are the responsibility of the AIHW and in no way should be seen as an official policy or interpretation of the ANZDATA Registry.

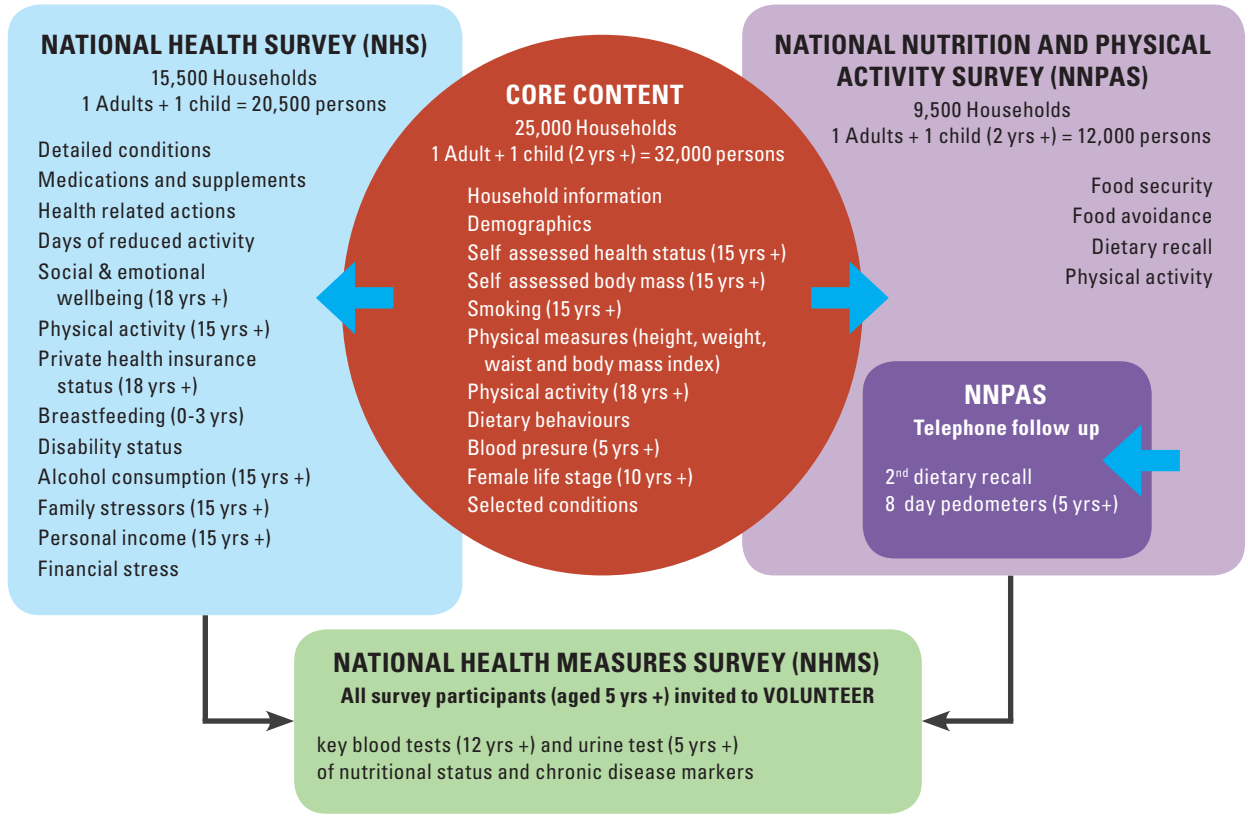
Information about the data quality of ANZDATA can be found in the *The 35th Annual ANZDATA Report 2012* <http://www.anzdata.org.au/v1/report_2012.html>.

Australian Health Survey

The AHS currently combines the existing National Health Survey with two new components: a National Nutrition and Physical Activity Survey and a National Health Measures Survey.

All people selected in the AHS were selected in either the National Health Survey or the National and Physical Activity Survey. However, there was a core set of data items common to both surveys; therefore, information for these data items is available for all persons in the AHS (approximately 32,000). This core set of data items included household information, demographics, self-assessed health status and self-assessed body mass.

All people aged 5 and over were then invited to participate in the voluntary NHMS. Figure A1 shows the structure of the various components of the AHS.



Source: ABS 2013d.

Figure A1: Structure of the AHS

Indigenous components of the AHS

The National Aboriginal and Torres Strait Islander Health Survey has also been incorporated as part of the AHS. It is made up of the National Aboriginal and Torres Strait Islander Health Survey, the National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey and the National Aboriginal and Torres Strait Islander Health Measures Survey. Information from these surveys is expected to be included in subsequent published reports as part of the *Cardiovascular disease, diabetes and chronic kidney disease: Australian facts* series.

Scope of the AHS

The ABS 2011–12 AHS covered approximately 25,000 private dwellings across Australia. Urban and rural areas in all states and territories were included, while *Very remote* areas of Australia and discrete Aboriginal and Torres Strait Islander communities (and the remainder of the Collection Districts in which these communities were located) were excluded. These exclusions are unlikely to affect national estimates, but will impact on prevalence estimates by remoteness. The aggregation of *Remote* areas with *Outer regional* areas and the exclusion of *Very remote* areas mean that the influence of remoteness on disease prevalence could not be fully assessed in this report.

Non-private dwellings such as institutional care facilities (including hospitals and aged care facilities), hotels, motels and short-stay caravan parks were excluded from the survey. The following groups were also excluded: certain diplomatic personnel of overseas governments, customarily excluded from the Census and estimated resident population; persons whose usual place of residence was outside Australia; members of non Australian Defence forces (and their dependants) stationed in Australia; and visitors to private dwellings.

In this report, analyses were conducted only for respondents aged 18 and over. This is to ensure comparability across different data items as not all items were collected for those aged under 18.

National Health Survey

The National Health Surveys are a series of surveys conducted by the ABS. They are designed to obtain national benchmarks on a wide range of health issues, and to enable change in health to be monitored over time. One (1) adult (aged 18 and over) and 1 child (where applicable) for each sampled dwelling were included in the survey. In 2011–12, the National Health Survey formed part of the AHS, and collected information including detailed conditions, medications and supplements and health-related actions.

This report presents findings from the 1989–90, 1995, 2001, 2004–05, 2007–08 and 2011–2012 National Health Surveys.

National Health Measures Survey

The first National Health Measures Survey was run in the 2011–2012 survey period. It collected voluntary samples from around 11,200 Australian adults and children across urban, remote and very remote locations (very remote was only sampled in the Indigenous component of the survey). Voluntary urine samples were collected from respondents aged 5 and over, and voluntary blood samples from respondents aged 12 and over. The survey focuses on test results from these samples for chronic diseases, including diabetes, CVD, CKD and liver function. Results also include measures of exposure to tobacco smoke, and risk of anaemia.

All comorbidity data from the AHS in this report are based on the sample that completed the National Health Measures Survey and were aged 18 and over (approximately 9,500 people).

Data quality

Information about the data quality of the AHS can be found in *Australian Health Survey: Users' Guide, 2011–13* (ABS cat. no. 4363.0.55.001) <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4363.0.55.001Main+Features12011-13?OpenDocument>.

AIHW National Hospital Morbidity Database

The NHMD is a compilation of episode-level records from admitted patient morbidity data collection systems in Australian hospitals. It is a comprehensive dataset, maintained by the AIHW using data supplied by state and territory health authorities that has records for all episodes of admitted patient care from essentially all public and private hospitals in Australia. The counting unit for the NHMD is the separation (or hospitalisation), which is an episode of care for an admitted patient, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care. The data supplied are based on the National Minimum Data Set (NMDS) for Admitted patient care and include demographic, administrative and length of stay data, as well as data on the diagnoses of the patients, the procedures they underwent in hospital and external causes of injury and poisoning.

In this report, disease data relate to both principal and additional diagnoses reported for hospitalisations unless otherwise specified.

The data quality statement for the AIHW NHMD can be found at on the AIHW's MetadataOnline Registry (METeOR)—National Hospital Morbidity Database Data Quality Statement: 2011–12 <http://meteor.aihw.gov.au/content/index.phtml/itemId/529483>.

AIHW National Mortality Database

The mortality data used in this report were provided by the state and territory *Registries of Births, Deaths and Marriages,* the *Coroners* and the *National Coronial Information System*. These data are maintained at the AIHW in the NMD.

Deaths registered in 2010 that occurred before 2007 for usual residents of Queensland were excluded from the 2010 year of registration data as recommended by the ABS. This is to minimise the impact of late registration of deaths due to recent changes in the timeliness of death registrations in Queensland.

For more detail about the issue and the adjustments, refer to the Technical Note 3 for *Causes of death, Australia, 2012* (ABS cat. no. 3303.0):

<http://www.abs.gov.au/Ausstats/abs@.nsf/0/D4A300EE1E04AA43CA2576E800156A24?OpenDocument>

and to the Quality declaration summary for *Deaths, Australia, 2010* (ABS cat. no. 3302.0):

<http://www.abs.gov.au/Ausstats/abs@.nsf/0/E6A33E9F81491381CA257AAF0013D786?OpenDocument>.

Since 2007, the ABS has put in place a mortality data revision process that supplies up to 3 levels of data releases: preliminary, revised and final. NMD data for 2010 and 2011 have been revised since the previous reporting cycle. In this reporting cycle, deaths registered in 2010 and earlier are based on the final version of cause of death data; deaths registered in 2011 and 2012 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.

National Death Index

The National Death Index is a database, housed at the AIHW, which contains records of all deaths occurring in Australia since 1980. The data are obtained from the *Registries of Births, Deaths and Marriages* in each state and territory. The index is designed to facilitate the conduct of epidemiological studies and its use is strictly confined to medical research.

National (insulin-treated) Diabetes Register

The NDR is maintained by the AIHW under contract with the Department of Health. The NDR is derived from two primary data sources: the NDSS and the APEG.

- The NDSS, which was established in 1987 and is administered by Diabetes Australia, is an initiative of the Australian Government to subsidise the supply of diabetes-related products—such as pens and needles to administer insulin, blood glucose test strips and insulin pump consumables—to people who are registered with the scheme.
- The APEG is a professional body that represents health professionals involved in the management and research of children and adolescents with disorders of the endocrine system, including diabetes. The APEG maintains clinic-based state and territory diabetes registers, with paediatricians, physicians, paediatric endocrinologists, endocrinologists, diabetes educators and nurses reporting incident cases to these registers.

The NDR is a database of people living in Australia with insulin-treated diabetes. It was established in 1999 to monitor the incidence and prevalence of insulin-treated diabetes in Australia. The NDR aims to record all new cases of people who use insulin to treat their diabetes, and includes people with type 1, type 2, gestational and other forms of diabetes. As people with type 1 diabetes require insulin for survival, almost all new cases of type 1 diabetes should be covered by the NDR. Only a proportion of type 2 and gestational diabetes cases require insulin treatment; those that do not are not within the scope of the NDR.

Information about limitations and issues regarding the NDR are found in the Data Quality Statement: National (insulin-treated) Diabetes Register 2011, which is located at: <http://meteor.aihw.gov.au/content/index.phtml/itemId/563407>.

National Perinatal Data Collection

The National Perinatal Data Collection is a national data set maintained by the National Perinatal Statistics Unit, one of the collaborating units of the AIHW and part of the University of New South Wales. The National Perinatal Statistics Unit contains selected information relating to births that are reported to the perinatal data collection in each Australian state and territory. The National Perinatal Data Collection includes demographic, diagnostic, procedural and duration-of-stay information for both mothers and babies. Selected information is compiled annually into this collection by the National Perinatal Statistics Unit. For the 2009–2011 period, Victoria did not supply data and Tasmania only incomplete data.

ABS Surveys of Disability, Ageing and Carers—1993, 2003, 2009 and 2012

These surveys were conducted by the ABS to collect information about the following: people of all ages with a disability, older people (aged 60 and over), and people who provide assistance to older people and people with disabilities. The surveys included people in both private and non-private dwellings (including people in establishments where care is provided) but excluded those in correctional institutions.

The data quality declaration for the 2012 SDAC can be found in the ABS publication *Disability, Ageing and Carers, Australia: Summary of Findings, 2012* (ABS cat. no. 4430.0) <http://www.abs.gov.au/Ausstats/abs@.nsf/0/FB632AC7C773292BCA2577FA0011C48D?OpenDocument>.

Appendix B: Methods and classifications

Methods

Also see the Glossary for specific disease-related definitions used in this report.

Age-specific rates

An age-specific rate is defined as the number of events for a specified age group over a specified period (for example, a year) divided by the total population at risk of the event in that age group. Age-specific rates in this report were calculated by dividing, for example, the number of people with a condition in each specified age group by the mid-year population in the same age group.

Age-standardised rates

Age-standardisation is a technique used to eliminate the effect of differences in population age structures when comparing rates for different periods of time and/or different population groups. In this report, direct age-standardisation has been used.

Direct age-standardisation

Direct age-standardisation applies the age-specific rates to a 'standard population' in order to determine the rate that would have occurred in the standard population. This allows direct comparison of different rates applied to the same standard population. The 2001 Australian population was used as the standard population in calculating age-standardised rates, as described in the 3 steps below:

Step 1: Calculate the age-specific rate for each age group.

Step 2: Calculate the expected number of cases in each age group by multiplying the age specific rates by the corresponding standard population for each group.

Step 3: Sum the expected number of cases in each age group and divide this sum by the total of the standard population to give the age-standardised rate.

Significance testing for survey data

The observed value of a rate may vary because of the influence of chance and natural variation. Therefore, to provide an approximate indication of whether two rates are statistically different, 95% confidence intervals can be calculated, and significant differences highlighted.

A 95% confidence interval describes a span of numbers around the estimate which has a 95% chance of including the true value. When comparing two groups, if the 2 confidence intervals do not overlap, the reader can be confident that the difference between the groups is real, and not due to chance.

Confidence intervals were calculated only for survey data in this report.

Calculation of confidence intervals for survey data

For the majority of ABS 2011–12 AHS data, the standard error and confidence interval were provided directly by the ABS. However, confidence intervals have been calculated where other available data are weighted estimates based on survey data.

The lower 95% confidence limit = (ASR) – (1.96 x SE)

The upper 95% confidence limit = (ASR) + (1.96 x SE)

where:

ASR = age-specific rate

SE = the standard error of the expected number of cases in a specific age group.

As with all statistical comparisons, care should be exercised in interpreting the results. A non-significant difference between 2 rates may indicate no true difference, or could indicate that the numbers of observations are too small to detect a true statistically significant difference. Judgment should be exercised in deciding whether the size of the difference observed is of practical importance.

Populations used in this report

Population data are used throughout this report to calculate rates. The population data used are estimated resident populations derived from the ABS Census of Population and Housing. Estimated resident populations adjust Census data to add people that the Census missed and people overseas on Census night, and to remove overseas visitors. In between Census years, the estimated resident populations are updated using indicators of population change such as deaths, births and net migration. The estimated resident populations used for the majority of this report are based on the 2011 Census, with the exception of type 1 diabetes data from the NDR and NDSS–APEG, for which estimated resident populations based on the 2006 Census were used.

Where a rate is calculated for a calendar year (for example, with the ANZDATA Registry incidence data), the population used is the estimated resident population as reported at 30 June of that year. Where a rate is calculated for a financial year, the population used is as at 31 December.

Where age-standardised rates are presented (that have been calculated by the AIHW), the standard population used to calculate the age-standardised rate is the Australian estimated resident population as at 30 June 2001.

Geographical structures used in this report

The data were analysed in this report using the Australian Statistical Geography Standard (ASGS) and, for some cases, the Australian Standard Geographical Classification (ASGC). The ASGS and ASGC are hierarchical classification systems of geographical areas and consist of a number of interrelated structures. They provide a common framework of statistical geography and enable production of statistics that are comparable.

Reporting data by remoteness

Where possible, comparisons of regions in this report use 5 of the 6 ASGS and ASGC remoteness areas, based on their distance from major population centres and services. The six remoteness areas are:

1. *Major cities*
2. *Inner regional*
3. *Outer regional*
4. *Remote*
5. *Very remote*
6. *Migratory.*

Data from *Migratory* areas are not analysed in this report. In the case of the AHS (due to its sampling frame), data for *Outer regional* and *Remote* areas have been combined and data were not collected for *Very remote* areas. In the case of the SDAC, remoteness areas were limited to *Major cities*, *Inner regional* and *Other* areas. The boundaries of the different remoteness areas are re-drawn after each Census to account for changes to available services and population change. The remoteness areas used in this report are based on the 2011 Census, unless otherwise specified.

Allocating cases to ASGS and ASGC categories

For remoteness allocations, different geographic variables are used to allocate persons to remoteness categories.

- ABS 2011–12 AHS data, based on Statistical Area Level 1, were assigned directly to the relevant remoteness category by the ABS.
- ANZDATA Registry data and NDR records used postcode at entry (Incidence) and current postcode (Prevalence) as a proxy for postal area. These postcodes were then assigned to a remoteness area using the ABS 2012 Postcode to 2011 ASGS Remoteness Area correspondence. As postcodes may cross remoteness boundaries, residential postcode areas were apportioned according to a population weighting.
- Data from the SDAC used the ASGC, based on the 2006 Census.

Reporting data by socioeconomic status

The ABS has constructed a number of socioeconomic indexes, collectively known as the Socio-Economic Index for Areas (SEIFA) to classify areas on the basis of social and economic information collected in the Census of Population and Housing.

In this report, the SEIFA index of relative socioeconomic disadvantage is used. This is derived from social and economic characteristics of the local area, such as low income, low educational attainment, high levels of public sector housing, high unemployment, and jobs in relatively unskilled occupations.

For analysis, the population was divided into 5 groups with roughly equal populations (each around 20% of the total), based on the level of disadvantage of the statistical local area of their usual residence. So the first group includes the 20% of the population living in areas with the highest levels of relative disadvantage, while the last group includes the 20% of the population living in areas with the lowest levels of relative disadvantage.

It is important to note that the index of relative socioeconomic disadvantage relates to the average disadvantage of all people living in a statistical local area, not to the level of disadvantage of a specific individual. As the population of many areas covers a broad range of socioeconomic disadvantage, these measures will generally underestimate the true effect of disadvantage on health.

The index of relative socioeconomic disadvantage values used in this report are based on the 2011 Census.

Estimating heart attack events

Currently, there is no national heart disease register for calculating the incidence of acute coronary events. The AIHW has developed a proxy measure that uses unlinked episode based hospital data from the NHMD and deaths data from the NMD to estimate acute coronary events. As these data are unlinked, an algorithm is required to take account of duplicates across the 2 data sets and multiple episodes for the 1 event within the NHMD (see Box B1).

The previous algorithm used was developed in the late 1990s and validated against the WHO MONICA study (AIHW: Jamrozik et al. 2001; AIHW: McElduff et al. 2000). Work by the AIHW found that the algorithm was no longer valid, due to changes in clinical and treatment patterns and diagnostics (AIHW 2011c). In 2012, the AIHW revised the methodology for estimating the incidence of acute coronary events. The revised method includes both acute myocardial infarction and unstable angina hospitalisations and has been restricted to acute CHD deaths. These fundamental changes to the definition result in these data not being comparable with previous estimates released by the AIHW.

Box B1: Algorithm for estimating the incidence of acute coronary events

Number of fatal events:

Count the number of deaths where 'acute coronary heart disease' (ICD-10 codes I20–I24) is the underlying cause of death in each calendar year (based on year of registration of death).

PLUS the number of non-fatal events:

Count the number of non-fatal hospitalisations where 'acute myocardial infarction' (AMI) (ICD-10-AM I21) or 'unstable angina'(UA) (ICD-10-AM I20.0) are the principal diagnosis, and separation mode is not equal to 'died' or 'transferred to another acute hospital', and care type is not equal to '*new born-unqualified days only*' or '*organ procurement—posthumous*' or '*hospital boarder*' in each calendar year (based on discharge date from hospital).

The incidence of acute coronary events is calculated using the current algorithm and the following formula:

$$\textit{Incidence of heart attack events} = \frac{\textit{Non-fatal events} + \textit{Fatal events}}{\textit{Estimated resident population Australia}} \times 100{,}000$$

Estimating stroke events

Currently, there is no national stroke events register that can be used to estimate stroke events. However, a method developed by Thrift et al. (2012) estimates first and recurrent stroke events by counting acute stroke hospitalisations and stroke deaths in a given year (Box B2).

Box B2: Algorithm for estimating stroke events

Number of stroke deaths

Count the number of deaths where stroke (ICD-10 codes I60–I64) is the underlying cause of death registered in each calendar year.

PLUS the number of acute and non-fatal stroke hospitalisations (first and recurrent stroke events):

Count the number of acute and non-fatal hospitalisations defined as *separations* where the care type was *Acute*, *Newborn* (for separations with at least 1 qualified day) or was *Not reported* with a principal diagnosis of stroke (ICD-10-AM codes I60–I64), excluding any *separation* that had a Mode of admission of *Admitted patient transferred from another hospital* or *Statistical admission: care type change*, or had a Mode of separation of Died in each calendar year (based on discharge date from hospital) (see Glossary).

$$\textit{Stroke event rate} = \frac{\textit{Non-fatal acute stroke hospitalisations} + \textit{Stroke deaths}}{\textit{Estimated resident population Australia}} \times 100{,}000$$

For more details, refer to the National Hospital Data Quality Statement below: <http://meteor.aihw.gov.au/content/index.phtml/itemId/529483>.

Estimating hospitalisations for women who gave birth with a diagnosis of gestational diabetes

The method for estimating hospitalisations (separations) for women, who gave birth, with a diagnosis of gestational diabetes is shown in Box B3.

Box B3: Estimating hospitalisations for women who gave birth with a diagnosis of gestational diabetes

Using data from the NHMD, count separations for women where a delivery was recorded (ICD-10-AM codes O80–O84, principal or additional diagnosis) coinciding with a diagnosis (principal or additional) of gestational diabetes (GDM) (ICD-10-AM code O24.4).

Exclusions were care type not equal to '*organ procurement—posthumous*' or '*hospital boarder*' in each calendar year (based on discharge date from hospital). Records were filtered by age (greater than 14 years).

Total incidence of ESKD

Traditionally, data for ESKD in Australia have been available only for those treated with KRT, with virtually all of these cases recorded in the ANZDATA Registry. However, because not all people will be suitable candidates for KRT, and some may choose not to take it up, this method of measuring incidence of ESKD underestimates the total incidence (including untreated cases) in the community.

Box B4: Total incidence of ESKD methodology

To estimate the total incidence of ESKD, the AIHW used data linkage to estimate the number of new cases of ESKD not treated with KRT (AIHW 2011b).

Incidence of ESKD is:

- the number of unique individuals who appeared as new cases on the ANZDATA Registry in the reference period (KRT-treated cases), plus
- the number of people who died during the reference period who were not registered with ANZDATA, and for whom ESKD was recorded as a cause of death (non KRT treated cases). This estimates the number of non-KRT-treated cases in the reference period, because survival for this group of people is relatively short.

ESKD in mortality data is defined as a person who died with:

- chronic renal failure (ICD-10 codes N18.0, N18.8, N18.9), hypertensive renal failure (ICD-10 codes I12.0, I13.1, I13.2) or unspecified renal failure (ICD-10 code N19) as an underlying cause of death, or
- chronic renal failure, end-stage (ICD-10 code N18.0) as an associated cause of death.

Classifications

Australian Health Survey

This section provides classification information for CVD, diabetes and CKD for ABS 2011–12 AHS estimates. For more detailed information, visit the *Australian Health Survey: Users' Guide, 2011–13* at <http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/4363.0.55.001?OpenDocument>

Cardiovascular disease

The prevalence of CVD was generated using self-reported data only for people who participated in the biomedical component of the 2011–12 AHS. The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) was used in the AHS as the basis for coding long-term conditions.

The conditions listed in Table B1 were included as part of the definition for CVD. CHD, stroke and heart failure were included as part of the definition for overall CVD prevalence. Different condition statuses were included for counts of each of the conditions:

1: Ever told has condition, still current and long term.

2: Ever told has condition, still current but not long term.

3: Ever told has condition, not current.

Table B1: 2011–12 Australian Health Survey CVD classification

Condition	Condition status
Hypertensive diseases	1
Ischaemic heart diseases (also known as CHD)	1, 2 and 3
Other heart diseases	1, 2 and 3
Tachycardia	1
Cerebrovascular diseases	1, 2 and 3
Oedema	1
Diseases of arteries arterioles and capillaries	1
Diseases of veins, lymphatic vessels etc	1
Other diseases of circulatory system	1
Symptoms signs involving circulatory system	1

Coronary heart disease

The prevalence of CHD was generated using self-reported data only from ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'. ICD-10 was used in the AHS as the basis for the coding of long-term conditions. CHD was defined as:

- angina, with condition status 1, 2, or 3 (see CVD section above for further information on condition status)
- other ischaemic heart diseases, with condition status 1, 2, or 3.

Heart failure

The prevalence of heart failure was generated using self-reported data only from the 2011–12 AHS core component. ICD-10 was used in the AHS as the basis for the coding of long-term conditions. Heart failure was a single category, and condition statuses 1, 2 or 3 were included for analyses in this report.

Stroke

The stroke data presented in this report are from two different data sources: ABS 'Microdata: Australian Health Survey, Core Content - Risk Factors and Selected Health Conditions, 2011–12' and the 2012 SDAC. Both the AHS and the SDAC used the ICD-10 as the basis for coding long-term conditions; however, they are not comparable as different ICD-10 codes were used to classify stroke.

The ABS SDAC provides more reliable estimates on the prevalence of stroke than the ABS 2011–12 AHS. This is because the SDAC includes more comprehensive questions on long term conditions and associated activity limitations; it also includes non-private dwellings, such as residential aged-care facilities. Note that of those people who reported having stroke as a main condition, around 2,800 did not report whether they had a disability as a result of stroke.

Reliable information on socioeconomic disadvantage cannot be obtained from the SDAC and so stroke data from the ABS 2011–12 AHS have been used to fill this gap. It should be noted that this survey did not collect information from those living in non-private dwellings (see Box 2.1 for more information).

Diabetes

As part of the biomedical component of the ABS 2011–12 AHS, two blood tests for diabetes were performed: FPG and HbA1c. Diabetes prevalence was then derived using a combination of blood test results and self-reported information (also from the AHS) on diabetes diagnosis and medication use.

Table B2: 2011–12 National Health Measures Survey diabetes classifications

Diabetes status	Criteria for survey participant
Known diabetes*	Ever been told by a doctor or nurse that they have diabetes and they were taking diabetes medication (either insulin or tablets); OR Ever been told by a doctor or nurse that they have diabetes and their blood test result for FPG was greater than or equal to the cut-off point for diabetes (that is, ≥7.0 mmol/L); OR Ever been told by a doctor or nurse that they have diabetes and their blood test result for HbA1c was greater than or equal to the cut-off point for diabetes (that is, 6.5%). * People with known diabetes were further classified as having type I, type II or type unknown, based on the type of diabetes they were told they had by a doctor or nurse. Women with gestational diabetes were excluded.
Newly diagnosed diabetes	Reported no prior diagnosis of diabetes but had a FPG value ≥7.0 mmol/L.
Total persons with diabetes	*Known diabetes + newly diagnosed diabetes*
At high risk of diabetes	No current diabetes, but had an impaired FPG level ranging from 6.1 mmol/L to less than 7.0 mmol/L; OR Reported no prior diagnosis of diabetes but had an HbA1c result of 6.0% to <6.5%.

Source: Adapted from ABS 2014.

Measured diabetes prevalence estimates in this report use HbA1c results rather than FPG results. HbA1c results were used in this report so as to be able to include the greatest number of respondents with biomedical markers for diabetes, as approximately 21% of people aged 18 and over who participated in the AHS did not fast, meaning that their FPG results could not be used. In 2011–12, the prevalence of diabetes among people aged 18 and over based on FPG (5.1%) and the HbA1c (5.4%) was relatively similar.

Chronic kidney disease

CKD stages were derived using a combination of survey participants' eGFR and ACR results. The different stages are defined in Box B5.

Box B5: Stages of chronic kidney disease

Stage 1: Kidney damage with normal kidney function (eGFR ≥ 90 mL/min/1.73 m^2)

Usually no symptoms but high blood pressure is more frequent than for patients without CKD. Patients also had albuminuria.

Stage 2: Kidney damage with mild loss in kidney function (eGFR 60–89 mL/min/1.73 m^2)

Most patients have no symptoms but high blood pressure is frequent. Patients also had albuminuria.

Stage 3a and b: Mild—moderate loss of kidney function (eGFR 45–59 mL/min/1.73 m^2) (3a), or moderate–severe loss of kidney function (eGFR 30–44 mL/min/1.73 m^2) (3b)

Possibly no symptoms, or may experience an increased need to urinate during the night (nocturia), a mild feeling of being ill and loss of appetite. Common complications include high blood pressure, mineral and bone disorders, anaemia, sleep apnoea, restless legs, CVD, malnutrition and depression.

Stage 4: Severe loss of kidney function (eGFR 15–29 mL/min/1.73 m^2)

Symptoms are as for Stage 3, plus nausea, itching skin, restless legs and shortness of breath. Common complications of this stage are also as for Stage 3, along with electrolyte disturbances such as raised blood levels of phosphate and potassium and increased acidity of the blood.

Stage 5: End-stage kidney disease (eGFR <15 mL/min/1.73 m2 or on dialysis)

Symptoms are as for Stage 4. Additional common complications include inflammation of the tissue layers surrounding the heart, bleeding in the gastrointestinal tract, altered brain function and structure, and disturbances or structural or functional changes in the peripheral nervous system.

Source: Adapted from Kidney Health Australia 2007; Kidney Health Australia 2012a.

Appendix C: Detailed statistical tables

Table C1: Prevalence of self-reported CVD among persons aged 18 and over, by selected population characteristics, 2011–12

	Number ('000)			Per cent (95% CI)*		
Population subgroup	**Men**	**Women**	**Persons**	**Men**	**Women**	**Persons**
Age group (years)						
18–44	208.9	358.8	565.3	4.9 [3.5–6.2]	8.4 [6.9–10.0]	6.6 [5.5–7.7]
45–54	279.2	341.6	622.2	18.8 [14.9–22.6]	22.3 [18.5–26.0]	20.6 [17.8–23.4]
55–64	454.3	414.6	865.7	36.0 [31.4–40.5]	31.8 [28.0–35.7]	33.7 [30.8–36.7]
65–74	403.0	449.2	851.1	49.0 [44.1–53.9]	52.3 [47.3–57.3]	50.6 [47.0–54.3]
75+	355.3	439.7	796.2	64.3 [57.7–70.9]	63.7 [56.3–71.2]	64.2 [59.0–69.3]
Persons (number/age standardised rate[(a)])	**1,698.2**	**2,007.3**	**3,705.7**	**19.8 [18.5–21.2]**	**22.1 [20.7–23.4]**	**20.9 [19.9–21.9]**
Remoteness						
Major cities	1125.3	1392.6	2513.2	18.5 [17.1–19.9]	22.1 [20.4–23.9]	20.3 [19.2–21.4]
Inner regional	390.3	431.6	817.9	23.8 [20.4–27.2]	25.9 [22.7–29.2]	24.7 [22.1–27.3]
Outer regional and Remote	185.0	183.5	364.7	27.1 [23.9–30.3]	27.1 [22.8–31.4]	26.8 [24.6–29.0]
Socioeconomic group						
Group 1 (lowest SES)	380.5	389.0	767.3	26.2 [22.5–29.8]	26.0 [22.5–29.6]	26.0 [23.3–28.8]
Group 2	376.4	451.9	828.4	23.3 [19.9–26.7]	26.1 [22.7–29.5]	24.8 [21.8–27.7]
Group 3	333.5	456.0	788.2	19.6 [16.2–22.9]	25.5 [22.4–28.6]	22.5 [20.4–24.6]
Group 4	330.1	356.0	634.1	18.6 [15.3–22.0]	20.9 [17.9–23.9]	18.2 [15.9–20.5]
Group 5 (highest SES)	282.7	344.6	634.1	15.2 [12.9–17.5]	17.9 [15.2–20.6]	16.8 [15.1–18.4]

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

(a) Age-standardised to the 2001 Australian population.

Notes

1. CVD prevalence is based on the self-reported data of people who participated in the National Health Measures Survey.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.
3. Cells and continuous variables in this table have been randomly adjusted to avoid the release of confidential data. Discrepancies may occur between sums of the component items and totals.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Table C2: Prevalence of self-reported CHD among persons aged 18 and over, by selected population characteristics, 2011–12

Population subgroup	Number ('000)			Per cent (95% CI)*		
	Men	Women	Persons	Men	Women	Persons
Age group (years)						
18–44	**20.1	**9.5	30.4	0.5 [0.2–0.7]	0.2 [0.1–0.4]	0.4 [0.2–0.5]
45–54	40.2	**14.2	55.5	2.7 [1.7–3.7]	0.9 [0.4–1.4]	1.8 [1.3–2.4]
55–64	87.5	38.5	126.0	6.9 [5.5–8.3]	3.0 [2–3.9]	4.9 [4.1–5.7]
65–74	107.4	60.2	166.5	13.1 [11.0–15.1]	7.0 [5.6–8.4]	9.9 [8.6–11.2]
75+	119.3	96.2	213.8	21.6 [17.4–25.8]	14.0 [11.4–16.6]	17.2 [14.8–19.7]
Persons (number/age standardised rate[(a)])	**372.6**	**219.2**	**590.2**	**4.4 [4.0–4.9]**	**2.4 [2.1–2.6]**	**3.3 [3.1–3.6]**
Remoteness						
Major cities	249.3	131.5	381.1	4.2 [3.6–4.8]	2.1 [1.8–2.4]	3.1 [2.8–3.5]
Inner regional	76.0	60.2	138.0	4.6 [3.7–5.6]	3.7 [3.0–4.5]	4.3 [3.7–4.8]
Outer regional and Remote	42.3	27.8	72.1	5.3 [3.9–6.7]	3.3 [2.2–4.4]	4.4 [3.4–5.4]
Socioeconomic group						
Group 1 (lowest SES)	97.7	52.9	153.0	6.5 [5.0–8.0]	3.4 [2.5–4.3]	5.0 [4.1–5.9]
Group 2	82.2	54.9	140.0	4.8 [3.9–5.7]	3.1 [2.4–3.8]	4.0 [3.5–4.6]
Group 3	61.5	43.4	108.6	3.6 [2.4–4.7]	2.4 [1.7–3.0]	3.1 [2.4–3.7]
Group 4	69.9	40.8	113.7	4.0 [3.1–4.9]	2.5 [1.7–3.2]	3.3 [2.8–3.9]
Group 5 (highest SES)	56.6	25.4	80.7	3.3 [2.4–4.1]	1.4 [0.9–2]	2.3 [1.8–2.8]

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

** The Relative Standard Error for this estimate is between 25% and 50% and should be treated with caution.

(a) Age-standardised to the 2001 Australian population.

Notes

1. CHD is based on self-reported results only.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.
3. Cells and continuous variables in this table have been randomly adjusted to avoid the release of confidential data. Discrepancies may occur between sums of the component items and totals.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey: Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Table C3: Incidence of acute coronary events among persons aged 25 and over, by age and sex, 2007–2012

Year		Age group (years)							
		25–34	35–44	45–54	55–64	65–74	75–84	85+	Total[(a)]
		Rate per 100,000 population							
2012	Men	15.2	132.9	399.8	752.1	1,194.6	2,019.1	3,610.7	558.3
	Women	5.3	40.9	135.6	256.5	521.0	1,220.8	2,677.2	266.4
	Total	**10.3**	**86.6**	**266.5**	**502.2**	**854.0**	**1,581.2**	**3,005.4**	**405.9**
2011	Men	15.8	125.7	416.8	784.4	1,265.0	2,127.5	3,834.8	584.0
	Women	6.4	40.6	134.3	274.1	578.4	1,287.7	2,901.3	283.9
	Total	**11.1**	**82.8**	**274.2**	**527.7**	**917.9**	**1,663.9**	**3,222.9**	**427.1**
2010	Men	17.3	131.3	437.3	823.5	1,325.2	2,225.4	3,979.2	611.3
	Women	5.2	43.3	139.9	283.6	620.5	1,395.3	2,943.8	299.2
	Total	**11.3**	**87.0**	**287.3**	**552.3**	**967.9**	**1,765.5**	**3,296.2**	**447.8**
2009	Men	18.4	140.4	438.5	882.3	1,399.8	2,334.5	4,104.6	639.9
	Women	5.1	46.3	139.6	296.9	641.1	1,442.7	3,102.1	310.2
	Total	**11.8**	**93.0**	**287.8**	**588.7**	**1,014.1**	**1,838.7**	**3,439.7**	**467.2**
2008	Men	18.8	142.0	457.1	907.6	1,556.2	2,519.7	4,408.5	682.7
	Women	5.3	40.9	144.0	314.1	721.0	1,599.7	3,402.9	337.4
	Total	**12.1**	**91.1**	**299.2**	**610.4**	**1,130.7**	**2,006.3**	**3,737.6**	**501.7**
2007	Men	22.3	149.3	492.7	979.0	1,650.8	2,710.5	4,586.1	729.0
	Women	6.4	44.1	148.1	350.7	785.8	1,683.5	3,475.5	358.2
	Total	**14.4**	**96.3**	**319.0**	**664.7**	**1,209.3**	**2,135.1**	**3,840.9**	**534.2**

(a) Total refers to people aged 25 years and over; the Australian total is age-standardised to the 2001 Australian population.

Notes

1. Acute coronary events include heart attack (acute myocardial infarction) and unstable angina.
2. In 2012, the method for calculating acute coronary events was revised to reflect changes in diagnostic techniques and clinical practice. Therefore, rates presented in this report are not comparable with previously published rates on acute coronary events in Australia.

Sources: AIHW analysis of AIHW National Hospital Morbidity Database and AIHW National Mortality Database.

Table C4: Prevalence of stroke, by selected population characteristics, 2012

Population subgroup	Number ('000)			Per cent (95% CI)*		
	Males	Females	Persons	Males	Females	Persons
Age group (years)						
0–44	10.2	12.9	23.1	0.1 [0.1–0.2]	0.2 [0.1–0.3]	0.2 [0.1–0.2]
45–54	13.2	14.8	28.0	0.9 [0.6–1.2]	1.0 [0.7–1.3]	0.9 [0.7–1.1]
55–64	30.7	26.4	57.0	2.4 [1.9–2.9]	2.0 [1.5–2.5]	2.2 [1.8–2.5]
65–74	55.3	33.8	89.1	6.3 [5.4–7.2]	3.7 [3.0–4.4]	5.0 [4.4–5.5]
75–84	64.4	48.8	113.2	13.9 [11.8–16.0]	8.8 [7.7–9.8]	11.1 [10.0–12.3]
85+	31.8	34.3	66.1	20.1 [16.3–24.0]	12.4 [10.7–14.0]	15.2 [13.4–16.9]
Persons (number/age standardised rate[(a)])	**205.6**	**171.0**	**376.6**	**1.8 [1.6–1.9]**	**1.3 [1.2–1.4]**	**1.5 [1.4–1.6]**
Remoteness						
Major cities	128.7	113.6	242.3	1.7 [1.5–1.9]	1.2 [1.1–1.3]	1.4 [1.3–1.5]
Inner regional	53.9	41.3	95.2	1.9 [1.6–2.2]	1.3 [1.1–1.6]	1.6 [1.4–1.8]
Outer areas	23.0	16.0	39.0	1.8 [1.4–2.2]	1.2 [0.9–1.6]	1.5 [1.3–1.8]

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

(a) Rates are age-standardised to the 2001 Australian population.

Note: Refer to Appendix B for definitions of classifications for remoteness.

Source: AIHW analysis of ABS 2012 Survey of Disability, Ageing and Carers, Basic CD-ROM.

Table C5: Prevalence of self-reported stroke among persons aged 18 and over, by socioeconomic group, 2011–12

	Number ('000)			Per cent (95% CI)*		
	Males	Females	Persons	Males	Females	Persons
Socioeconomic group						
Group 1 (lowest SES)	38.6	22.8	61.4	2.6 [1.7–3.5]	1.5 [1.0–2.0]	2.0 [1.5–2.5]
Group 2	40.7	19.9	60.5	2.4 [1.6–3.2]	1.1 [0.7–1.5]	1.7 [1.3–2.1]
Group 3	22.2	28.8	51.1	1.3 [0.8–1.8]	1.6 [1.0–2.2]	1.4 [1.0–1.8]
Group 4	24.5	22.6	47.1	1.4 [0.9–1.9]	1.4 [0.9–1.9]	1.4 [1.1–1.7]
Group 5 (highest SES)	**17.3	**13.7	30.9	1.0 [0.5–1.5]	0.8 [0.4–1.2]	0.9 [0.6–1.2]

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

** The Relative Standard Error for this estimate is between 25% and 50% and should be treated with caution.

Note: Refer to Appendix B for definitions of classifications for socioeconomic status.

Source: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011-12 (Core component)'.

Table C6: Prevalence of diabetes, based on HbA1c and self-reported results among persons aged 18 and over, by selected population characteristics, 2011–12

	Number ('000)			Per cent (95% CI)*		
Population subgroup	**Men**	**Women**	**Persons**	**Men**	**Women**	**Persons**
Age group (years)						
18–44	**65.4	**40.4	122.3	1.5 [0.7–2.4]	0.9 [0.2–1.7]	1.4 [0.9–1.9]
45–54	101.9	54.0	161.0	6.8 [4.3–9.4]	3.5 [2.0–5.0]	5.3 [3.8–6.8]
55–64	137.9	95.2	222.4	10.9 [8.2–13.7]	7.3 [5.4–9.3]	8.7 [7.0–10.3]
65–74	164.6	98.9	262.6	20.0 [16.3–23.7]	11.5 [8.9–14.1]	15.6 [13.3–17.9]
75+	87.5	71.9	158.2	15.8 [11.3–20.4]	10.4 [6.1–14.8]	12.7 [9.2–16.3]
Persons (number/age standardised rate[(a)])	**552.6**	**363.6**	**916.5**	**6.4 [5.6–7.3]**	**3.9 [3.2–4.6]**	**5.2 [4.6–5.7]**
Remoteness						
Major cities	396.4	261.1	650.0	6.5 [5.5–7.6]	4.1 [3.3–5.0]	5.3 [4.6–6.0]
Inner regional	111.2	70.0	183.7	6.8 [4.8–8.8]	4.2 [2.6–5.8]	5.5 [4.2–6.9]
Outer regional and Remote	45.1	**34.1	83.0	6.6 [4.9–8.3]	5.0 [2.7–7.4]	6.1 [4.7–7.5]
Socioeconomic group						
Group 1 (lowest SES)	162.0	107.2	275.5	11.1 [8.4–13.9]	7.2 [5.5–8.8]	9.4 [7.6–11.1]
Group 2	122.1	103.3	215.5	7.6 [5.5–9.6]	6.0 [3.9–8.1]	6.4 [5.0–7.9]
Group 3	89.6	64.9	160.0	5.3 [3.5–7.0]	3.6 [1.9–5.3]	4.6 [3.4–5.7]
Group 4	116.1	57.6	169.5	6.6 [4.9–8.2]	3.4 [2.2–4.6]	4.9 [3.8–5.9]
Group 5 (highest SES)	66.0	32.2	98.7	3.6 [2.4–4.7]	1.7 [0.9–2.4]	2.6 [1.9–3.3]

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

** The Relative Standard Error for this estimate is between 25% and 50% and should be treated with caution.

(a) Age-standardised to the 2001 Australian population.

Notes

1. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.
2. Cells and continuous variables in this table have been randomly adjusted to avoid the release of confidential data. Discrepancies may occur between sums of the component items and totals.
3. Small sample sizes have limited the ability to disaggregate the data for remoteness and socioeconomic group by the required age groups for age-standardisation. As a result, crude rates have been presented.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Table C7: Incidence of type 1 diabetes, by age at diagnosis and sex, 2011

	Number			Rate (per 100,000 population)		
Population subgroup	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Age group (years)						
0–9	291	254	545	19.9	18.3	19.2
10–19	389	306	695	26.7	22.1	24.5
20–29	267	153	420	16.0	9.5	12.8
30–39	208	73	281	13.4	4.7	9.0
40–49	106	53	159	6.8	3.4	5.1
50–59	81	45	126	5.8	3.2	4.5
60–69	45	28	73	4.1	2.6	3.3
70–79	28	11	39	4.5	1.6	3.0
80+	18	11	29	5.5	2.1	3.4
Total	**1,433**	**934**	**2,367**	**12.9**	**8.3**	**10.6**
Remoteness						
Major cities	960	634	1,594	12.4	8.0	10.2
Inner regional	297	199	496	14.6	9.7	12.1
Outer regional	149	81	230	14.5	8.1	11.3
Remote/Very remote	24	15	39	8.6	6.3	7.7
Socioeconomic group						
Group 1 (lowest SES)	300	183	483	13.4	8.2	10.8
Group 2	276	186	462	12.4	8.3	10.4
Group 3	303	189	492	13.7	8.4	11.0
Group 4	280	177	457	12.7	7.9	10.3
Group 5 (highest SES)	269	194	463	12.1	8.5	10.3

Notes

1. Year of first insulin use is a proxy for year of diagnosis.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Source: AIHW analysis of 2011 National (insulin-treated) Diabetes Register.

Table C8: Prevalence of self-reported type 2 diabetes among persons aged 18 and over, by selected population characteristics, 2011–12

	Number ('000)			Per cent (95% CI)*		
Population subgroup	**Men**	**Women**	**Persons**	**Men**	**Women**	**Persons**
Age group (years)						
18–44	39.6	31.1	70.0	0.9 [0.6–1.2]	0.7 [0.4–1.0]	0.8 [0.6–1.0]
45–54	78.5	47.4	127.5	5.3 [4.0–6.5]	3.1 [2.2–4.0]	4.2 [3.4–5.0]
55–64	120.6	104.9	223.0	9.5 [7.8–11.2]	8.1 [6.3–9.8]	8.7 [7.6–9.8]
65–74	136.6	117.2	248.7	16.6 [14.3–18.9]	13.7 [11.2–16.1]	14.8 [13.1–16.5]
75+	87.9	87.9	175.8	15.9 [13.0–18.8]	12.8 [10.4–15.2]	14.2 [12.3–16.0]
Persons (number/age standardised rate[(a)])	**459.4**	**387.5**	**848.8**	**5.4 [4.9–5.8]**	**4.2 [3.7–4.6]**	**4.7 [4.4–5.0]**
Remoteness						
Major cities	314.9	263.9	580.1	5.3 [4.7–5.8]	4.3 [3.7–4.8]	4.8 [4.4–5.1]
Inner regional	104.1	76.4	178.1	6.4 [5.0–7.8]	4.8 [3.9–5.6]	5.5 [4.7–6.3]
Outer regional and Remote	41.0	46.9	87.2	5.1 [4.0–6.3]	5.6 [4.1–7.1]	5.3 [4.4–6.3]
Socioeconomic group						
Group 1 (lowest SES)	116.4	102.3	220.0	7.8 [6.3–9.3]	6.5 [5.4–7.7]	7.2 [6.2–8.2]
Group 2	99.5	97.4	198.6	5.8 [4.8–6.8]	5.5 [4.5–6.5]	5.7 [5.0–6.5]
Group 3	87.5	62.4	144.9	5.1 [4.1–6.1]	3.4 [2.7–4.1]	4.1 [3.5–4.6]
Group 4	100.7	71.5	170.8	5.8 [4.7–6.8]	4.3 [3.1–5.5]	5.0 [4.1–5.9]
Group 5 (highest SES)	58.5	56.1	112.7	3.4 [2.5–4.3]	3.1 [2.4–3.8]	3.2 [2.7–3.7]

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

(a) Age-standardised to the 2001 Australian population.

Notes

1. This table presents self-reported type 2 diabetes only.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.
3. Cells and continuous variables in this table have been randomly adjusted to avoid the release of confidential data. Discrepancies may occur between sums of the component items and totals.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Table C9: Hospitalisations for women who gave birth, with a diagnosis of gestational diabetes, by age, 2012–13

Age group (years)	Number	Age-specific proportion of all births
15–19	273	2.6
20–24	1,790	4.4
25–29	5,720	6.8
30–34	8,499	8.6
35–39	5,928	11.0
40+	1,882	14.6
Total	**24,092**	**8.0**

Note: The following care types were excluded:
9.0: Organ procedure—posthumous; and 10.0: Hospital boarder.

Source: AIHW analysis of AIHW National Hospital Morbidity Database.

Table C10: Prevalence of CKD, based on eGFR and ACR results among persons aged 18 and over, by selected population characteristics, 2011–12

	Number ('000)			Per cent (95% CI)*		
Population subgroup	**Men**	**Women**	**Persons**	**Men**	**Women**	**Persons**
Age group (years)						
18–44	192.2	262.4	466.3	4.5 [2.9–6.0]	6.2 [4.5–7.8]	5.5 [4.3–6.6]
45–54	99.0	70.9	169.5	6.7 [4.0–9.3]	4.6 [3.1–6.1]	5.6 [4.2–7.0]
55–64	114.6	82.0	203.9	9.1 [6.4–11.8]	6.3 [4.4–8.2]	7.9 [6.2–9.7]
65–74	209.6	138.5	351.5	25.5 [20.9–30.0]	16.1 [11.8–20.4]	20.9 [18.1–23.8]
75+	239.3	287.4	523.1	43.3 [36.2–50.4]	41.7 [35.1–48.2]	42.1 [37.4–46.9]
All persons (number/age standardised rate[(a)])	**871.1**	**847.6**	**1,712.5**	**10.3 [9.1–11.5]**	**9.5 [8.4–10.7]**	**10 [9.2–10.8]**
Remoteness						
Major cities	624.4	621.0	1,249.1	10.3 [9.0–11.6]	9.9 [8.3–11.5]	10.1 [9.0–11.2]
Inner regional	186.6	159.0	353.5	11.4 [8.8–14.0]	9.5 [7.1–12.0]	10.7 [8.7–12.7]
Outer regional and Remote	56.2	62.1	118.4	8.2 [6.2–10.2]	9.2 [7.0–11.4]	8.7 [7.6–9.8]
Socioeconomic group						
Group 1 (lowest SES)	206.7	196.4	397.0	14.2 [11.6–16.8]	13.1 [9.5–16.8]	13.5 [11.2–15.7]
Group 2	165.2	148.5	316.7	10.2 [7.9–12.5]	8.6 [6.0–11.2]	9.5 [7.7–11.2]
Group 3	181.4	184.6	363.2	10.6 [7.5–13.8]	10.3 [7.4–13.2]	10.4 [8.5–12.3]
Group 4	171.6	153.0	318.5	9.7 [7.7–11.7]	9.0 [6.6–11.3]	9.2 [7.8–10.5]
Group 5 (highest SES)	146.2	171.2	315.5	7.9 [5.2–10.5]	8.9 [6.0–11.8]	8.3 [6.6–10.1]

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

(a) Age-standardised to the 2001 Australian population.

Notes

1. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.
2. Cells and continuous variables in this table have been randomly adjusted to avoid the release of confidential data. Discrepancies may occur between sums of the component items and totals.
3. Small sample sizes have limited the ability to disaggregate the data for remoteness and socioeconomic group by the required age groups for age-standardisation. As a result, crude rates have been presented.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Table C11: Prevalence of treated-ESKD, by selected population characteristics, Australia, 2012

Population subgroup	Number			Number per 100,000 population		
	Males	Females	Persons	Males	Females	Persons
Age group (years)						
0–29	619	423	1,042	13.3	9.5	11.4
30–39	933	714	1,647	58.8	45.0	51.9
40–49	1,946	1,288	3,234	123.4	80.4	101.7
50–59	2,664	1,853	4,517	184.7	125.7	154.9
60–69	3,027	1,890	4,917	266.6	164.1	215.0
70–79	2,194	1,454	3,648	337.9	207.7	270.4
80+	1,019	591	1,610	294.1	111.2	183.4
Total/ age-standardised rate[(a)]	**12,402**	**8,213**	**20,615**	**104.3**	**66.2**	**84.5**
Remoteness[(a)]						
Major cities	8,460	5,500	13,960	106.9	64.5	84.5
Inner regional	2,258	1,403	3,661	96.2	58.1	76.5
Outer regional	1,192	833	2,025	103.0	74.2	88.7
Remote	280	263	543	156.3	173.4	163.1
Very remote	162	176	338	151.9	220.4	180.6
Socioeconomic group[(a)]						
Group 1 (lowest SES)	2,538	1,797	4,335	108.0	74.5	90.7
Group 2	2,456	1,535	3,991	103.1	62.2	82.0
Group 3	2,532	1,708	4,240	109.4	70.2	89.0
Group 4	2,413	1,619	4,032	111.1	70.1	89.4
Group 5 (highest SES)	2,399	1,514	3,913	109.2	63.8	85.1

(a) Rates are age-standardised to the 2001 Australian population.

Notes

1. Excludes 87 cases where remoteness could not be determined and 104 cases where socioeconomic status could not be assigned.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Source: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data.

Table C12: Incidence of treated-ESKD, by selected population characteristics, Australia, 2012

	Number			Number per 100,000 population		
Population subgroup	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Age group (years)						
0–29	87	60	147	1.9	1.4	1.6
30–39	119	71	190	7.6	4.5	6.1
40–49	184	121	305	11.7	7.6	9.6
50–59	281	208	489	19.7	14.2	16.9
60–69	361	242	603	32.2	21.2	26.6
70–79	351	189	540	55.8	27.4	41.0
80+	189	71	260	55.4	13.5	29.9
Total/ age-standardised rate[(a)]	**1,572**	**962**	**2,534**	**13.5**	**7.6**	**10.4**
Remoteness[(a)]						
Major cities	1,020	595	1,615	13.0	6.9	9.7
Inner regional	295	154	449	12.5	6.3	9.2
Outer regional	154	118	272	13.3	10.7	12.0
Remote	37	43	79	22.2	29.0	24.9
Very remote	38	39	77	36.1	47.0	40.5
Socioeconomic group[(a)]						
Group 1 (lowest SES)	379	255	634	16.0	10.8	13.3
Group 2	295	170	465	12.4	6.8	9.5
Group 3	315	186	501	13.7	7.5	10.4
Group 4	271	193	464	12.8	8.2	10.3
Group 5 (highest SES)	281	142	423	13.3	6.0	9.4

(a) Rates are age-standardised to the 2001 Australian population.

Notes

1. Excludes 42 cases where remoteness could not be determined and 47 cases where socioeconomic status could not be assigned.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups

Source: AIHW analysis of Australia and New Zealand Dialysis and Transplant Registry data.

Table C13: Number of KRT-treated and non-KRT-treated incident ESKD cases, by age at ESKD onset, Australia, 2002–2010

	Number		
Age group (years)	**Treated**	**Non-treated**	**Total**
0–4	77	9	86
5–9	81	n.p.	n.p.
10–14	80	n.p.	n.p.
15–19	187	n.p.	n.p.
20–24	279	9	288
25–29	455	27	482
30–34	605	26	631
35–39	847	74	921
40–44	1,099	100	1,199
45–49	1,475	168	1,643
50–54	1,731	249	1,980
55–59	2,065	352	2,417
60–64	2,153	561	2,714
65–69	2,321	889	3,210
70–74	2,605	1,581	4,186
75–79	2,432	2,876	5,308
80–84	1,327	4,772	6,099
85–89	373	5,458	5,831
90–94	43	3,907	3,950
95–99	n.p.	n.p.	1,466
100+	n.p.	n.p.	248
Total	**20,238**	**22,774**	**43,012**

Source: Linked Australia and New Zealand Dialysis and Transplant Registry data, AIHW National Mortality Database and National Death Index.

Table C14: Total incidence of ESKD, by selected population characteristics, Australia

Year	Population subgroup	Number			Number per 100,000 population		
		Males	Females	Persons	Males	Females	Persons
2010	**Age group (years)**						
	0–29	75	51	126	1.6	1.2	1.4
	30–39	82	60	142	5.3	3.8	4.6
	40–49	195	124	319	12.7	7.9	10.3
	50–59	284	200	484	20.7	14.3	17.5
	60–69	409	235	644	38.9	22.1	30.5
	70–79	591	356	947	99.5	54.0	75.6
	80+	925	1,216	2,141	291.1	240.1	259.8
	Total/ age-standardised rate[(a)]	**2,561**	**2,242**	**4,803**	**23.7**	**16.2**	**19.7**
2005–2007	**Remoteness[(a)]**						
	Major cities	4,847	3,978	8,825	25.3	15.6	19.9
	Inner regional	1,507	1,299	2,806	23.5	15.9	19.4
	Outer regional	759	690	1,449	26.1	20.6	23.2
	Remote	144	147	290	36.6	36.2	35.7
	Very remote	129	169	299	65.5	99.5	81.1
2005–2007	**Socioeconomic group[(a)]**						
	Group 1 (lowest SES)	1,848	1,672	3,520	30.0	22.2	25.8
	Group 2	1,613	1,363	2,976	25.9	17.5	21.3
	Group 3	1,438	1,161	2,599	25.2	16.1	20.2
	Group 4	1,282	1,043	2,325	24.6	15.0	19.4
	Group 5 (highest SES)	1,184	1,015	2,198	21.0	12.7	16.3

(a) Rates are age-standardised to the 2001 Australian population.

Source: Linked Australia and New Zealand Dialysis and Transplant Registry data, AIHW Mortality Database and National Death Index.

Table C15: Prevalence of CVD, diabetes and CKD and their comorbidity among persons aged 18 and over, by sex, 2011–12

	Number ('000)			Per cent (95% CI)*		
	Men	Women	Persons	Men	Women	Persons
CVD only	1,112.6	1,467.2	2,579.8	13.2 [12.1–14.3]	17.0 [15.7–18.3]	15.1 [14.3–15.9]
Diabetes only	185.3	112.8	298.1	2.2 [1.7–2.7]	1.3 [0.9–1.7]	1.7 [1.4–2.0]
CKD only	390.6	443.3	833.9	4.6 [3.8–5.4]	5.1 [4.2–6.0]	4.9 [4.3–5.5]
CVD and diabetes only	177.0	165.0	341.9	2.1 [1.7–2.5]	1.9 [1.5–2.3]	2.0 [1.7–2.3]
CVD and CKD only	284.1	316.7	600.8	3.4 [2.8–4]	3.7 [3.1–4.3]	3.5 [3.1–3.9]
Diabetes and CKD only	65.9	**30.0	95.9	0.8 [0.5–1.1]	0.3 [0.1–0.5]	0.6 [0.4–0.8]
CVD, diabetes and CKD	127.3	54.5	181.9	1.5 [1.2–1.8]	0.6 [0.3–0.9]	1.1 [0.9–1.3]

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

** Estimate has a relative standard error between 25% and 50% and should be used with caution.

Note: CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.

Source: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'.

Table C16: Prevalence of CVD, diabetes and CKD and their comorbidity among persons aged 18 and over, by age group, 2011–12

	Number ('000)			Per cent (95% CI)*		
	18–44	45–64	65+	18–44	45–64	65+
CVD only	496.6	1,160.0	923.2	5.8 [4.8–6.8]	20.8 [18.9–22.7]	31.6 [28.9–34.3]
Diabetes only	75.8	144.0	78.3	0.9 [0.5–1.3]	2.6 [1.8–3.4]	2.7 [2.0–3.4]
CKD only	422.7	183.4	227.8	5.0 [4.0–6.0]	3.3 [2.5–4.1]	7.8 [6.2–9.4]
CVD and diabetes only	**27.2	170.7	144.1	0.3 [0.0–0.6]	3.1 [2.3–3.9]	4.9 [3.9–5.9]
CVD and CKD only	**37.2	116.5	447.1	0.4 [0.1–0.7]	2.1 [1.5–2.7]	15.3 [13.2–17.4]
Diabetes and CKD only	n.p.	**24.7	63.7	n.p.	0.4 [0.1–0.7]	2.2 [1.2–3.2]
CVD, diabetes and CKD	n.p.	45.0	132.5	n.p.	0.8 [0.5–1.1]	4.5 [3.3–5.7]

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

** Estimate has a relative standard error between 25% and 50% and should be used with caution.

Note: CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.

Source: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'.

Table C17: Prevalence of CVD, diabetes and CKD and their comorbidity among persons aged 18 and over, by socioeconomic status and remoteness, 2011–12

Population subgroup	Number ('000)			Per cent (95% CI)*		
	1 condition	2 conditions	3 conditions	1 condition	2 conditions	3 conditions
Remoteness						
Major cities	2,592.8	722.5	125.7	21.0 [19.7–22.3]	5.8 [5.1–6.5]	1.0 [0.7–1.3]
Inner regional	801.6	233.8	28.6	24.2 [21.5–26.9]	7.1 [5.5–8.7]	0.9 [0.5–1.3]
Outer regional and Remote	317.4	82.4	27.5	23.3 [20.3–26.3]	6.1 [4.4–7.8]	2.0 [1.1–2.9]
Socioeconomic group						
Group 1 (lowest SES)	719.4	274.7	55.7	24.4 [21.9–26.9]	9.3 [7.4–11.2]	1.9 [1.3–2.5]
Group 2	772.9	243.7	35.4	23.1 [20.8–25.4]	7.3 [5.7–8.9]	1.1 [0.6–1.6]
Group 3	831.4	192.9	**31.1	23.8 [21.5–26.1]	5.5 [4.2–6.8]	0.9 [0.3–1.5]
Group 4	669.0	191.8	40.3	19.3 [16.8–21.8]	5.5 [4.5–6.5]	1.2 [0.7–1.7]
Group 5 (highest SES)	717.5	135.6	**19.4	19.0 [16.5–21.5]	3.6 [2.5–4.7]	0.5 [0.2–0.8]

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

** Estimate has a relative standard error between 25% and 50% and should be used with caution.

Notes

1. '1 condition' refers to 1 condition only (CVD-only or diabetes-only or CKD-only). '2 conditions' refers to 'CVD and diabetes or CVD and CKD or CKD and diabetes'. '3 conditions' refers to all 3 conditions.
2. CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.

Source: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'.

Table C18: Comorbidity[(a)] CVD, diabetes and CKD among persons aged 18 and over, by age group and disease, 2011–12

	Without comorbidity		With comorbidity	
Age group (years)	**Number ('000)**	**Per cent**	**Number ('000)**	**Per cent**
18–44				
CVD	496.6	87.8	68.8	12.2
Diabetes	75.8	66.0	39.1*	34.0
CKD	422.7	89.6	49.1	10.4
45–64				
CVD	1,160.0	77.7	332.2	22.3
Diabetes	114.0	37.5	240.4	62.5
CKD	183.4	49.6	186.2	50.4
65+				
CVD	923.2	56.1	723.7	43.9
Diabetes	78.3	18.7	340.3	81.3
CKD	227.8	26.2	643.3	73.8
Total				
CVD	**2,579.8**	**69.6**	**1,124.6**	**30.4**
Diabetes	**298.1**	**32.5**	**619.7**	**67.5**
CKD	**833.9**	**48.7**	**878.6**	**51.3**

* Estimate has a relative standard error between 25% and 50% and should be used with caution.

(a) CVD comorbidity means diabetes and/or CKD; diabetes comorbidity means CVD and/or CKD; CKD comorbidity means CVD and/or diabetes.

Note: CVD prevalence is based on the self-reported data of people who participated in the measured part of the AHS only; diabetes prevalence is based on HbA1c and self-reported data; and CKD prevalence is based on eGFR and ACR test results. For further disease definitions, see Appendix B.

Source: AIHW analysis of unpublished data from ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey component)'.

Glossary

acute care: See *care type*.

age-specific rate: A rate for a specific age group. The numerator and denominator relate to the same age group.

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

albuminuria: More than normal amounts of a protein called albumin in the urine.

angina: Temporary chest pain or discomfort when the heart's own blood supply is inadequate to meet extra needs, as can occur during exercise. See also *unstable angina* and *cardiovascular disease*.

atherosclerosis: A process in which fatty and fibre-like deposits build up on the inner walls of arteries, often forming *plaques* that can then cause blockages. It is the main underlying condition in *heart attack, angina, stroke* and peripheral vascular disease. Also known as 'thickening of the arteries'.

cardiomyopathy: A condition in which there is direct and widespread damage to the heart muscle, weakening it. The condition can be due to various causes such as viral infections and severe alcohol abuse. It can lead to an enlarged, thickened and dilated heart as well as heart failure.

cardiovascular disease: Any disease of the circulatory system, namely the heart (cardio) or blood vessels (vascular). Includes *heart attack, angina, stroke, heart failure* and peripheral vascular disease. Cardiovascular disease is 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 (care other than admitted 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 patient care—this is where the principal clinical intent does not meet the criteria for any of the above.

Care other than admitted care include: posthumous organ procurement, hospital boarder.

cerebrovascular disease: Any disorder of the blood vessels supplying the brain or its covering membranes. A notable and major form of cerebrovascular disease is *stroke*.

chronic kidney disease: Refers to all the conditions of the kidney, lasting at least 3 months, where a person has had evidence of kidney damage and/or reduced kidney function, regardless of the specific diagnosis of disease or condition causing the disease.

circulatory disease: Alternative name for *cardiovascular disease*.

circulatory system: The heart and the blood vessels, comprising the system that circulates blood around the body to supply oxygen and nutrients to all body tissues and to carry away waste products from them. Also known as the cardiovascular system.

comorbidity: When a person has 2 or more health problems at the same time.

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

coronary heart disease: Disease due to blockages in the heart's own (coronary) arteries, expressed as *angina* or a *heart attack*.

creatinine: A chemical found in the blood and passed in the urine. A test of the amount of creatinine in blood or in blood and urine indicates functioning of the kidneys.

diabetes (diabetes mellitus): A chronic condition in which the body cannot properly use its main energy source, the sugar glucose. This is due to either the pancreas not producing enough of the hormone insulin or the body being unable to effectively use the insulin produced. Insulin helps glucose enter the body's cells from the bloodstream and then be processed by them. Diabetes is marked by an abnormal build-up of glucose in the blood and it can have serious short-term and long-term effects on any of the body's systems, especially the blood vessels and nerves. Different types of diabetes are *type 1 diabetes*, *type 2 diabetes*, *gestational diabetes mellitus* and other types of diabetes.

dialysis: An artificial method of removing waste products and water from the blood as well as regulating levels of circulating chemicals. There are two main forms of dialysis: *haemodialysis* (which occurs outside the body via a machine) and *peritoneal dialysis* (which occurs inside the patient's body via the lining of the abdominal cavity).

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.

end-stage kidney disease: The most severe form of chronic kidney disease, also known as Stage 5 chronic kidney disease or kidney failure. People with end-stage kidney disease generally experience a range of symptoms and abnormalities in several organ systems due to severe loss of kidney function. Kidney replacement therapy in the form of *dialysis* or a kidney transplant is required for survival when kidney function is no longer sufficient to sustain life.

estimated glomerular filtration rate: A measure of the rate at which the kidneys filter wastes from the blood, considered to be the best measure of kidney function.

gestational diabetes: A form of diabetes that is defined as glucose intolerance in pregnant women not previously diagnosed with diabetes. Gestational diabetes mellitus is a temporary form of diabetes that usually disappears after the baby is born. Women who have had gestational diabetes mellitus are at increased risk of developing type 2 diabetes; gestational diabetes mellitus also increases the risk of perinatal morbidity and mortality. Compare with *type 1 diabetes*, and *type 2 diabetes*.

glomerular filtration rate: The amount of blood the kidneys can clear of waste products in 1 minute. Usually estimated (*estimated glomerular filtration rate*) using age, gender, and creatinine levels in the blood.

glucose: The main sugar that the body uses for energy. Glucose is a simple sugar that comes from the breakdown of carbohydrates in the diet as well as from the breakdown of glycogen (the storage form of glucose) in the liver. The body requires the hormone insulin to use glucose properly.

heart attack: A life-threatening emergency that occurs when a vessel supplying blood to the heart muscle is suddenly blocked completely by a blood clot. The medical term commonly used for a heart attack is acute myocardial infarction.

heart failure: When the heart functions less effectively in pumping blood around the body. It can result from a wide variety of diseases and conditions that can impair or overload the heart, such as heart attack, other conditions that damage the heart muscle directly (see *cardiomyopathy*), high blood pressure, or a damaged heart valve.

high blood pressure/hypertension: Definitions of high blood pressure (or hypertension) vary but the World Health Organization definition is well accepted: a systolic blood pressure of 140 mmHg or more or a diastolic blood pressure of 90 mmHg or more, or [the person is] receiving medication for high blood pressure.

impaired glucose tolerance: Slower metabolism of glucose due to insulin deficiency or resistance. Classified as fasting plasma glucose less than 7.0 mmol/L and 2-hour plasma glucose 7.8–11.0 mmol/L after oral glucose tolerance testing.

incidence: The number of new cases (of an illness or event, and so on) occurring during a given period. Compare with *prevalence*.

insulin: A hormone produced in the pancreas that helps glucose to enter body cells for energy metabolism.

insulin-treated diabetes: All types of diabetes treated with insulin; includes type 1, type 2, gestational and other types of diabetes. It is a term used to describe those on the National (insulin-treated) Diabetes Register and is not a standard classification used in clinical practice.

kidney replacement therapy: Includes having a functional kidney transplant or receiving regular dialysis.

mode of admission: The mechanism by which a person begins an episode of admitted patient care.

mode of separation: Status at *separation* of a person (discharge/transfer/death) and place to which a person is released (where applicable).

prevalence: The number or proportion (of cases, instances, and so forth) present in a population at a given time. Compare with *incidence*.

principal diagnosis: The diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care, an episode of residential care or an attendance at the health-care establishment.

separation: An episode of care for an admitted patient, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute care to rehabilitation).

Separation also means the process by which an admitted patient completes an episode of care either by being discharged, dying, transferring to another hospital or changing type of care.

statistical significance: An indication from a statistical test that an observed difference or association may be significant or 'real' because it is unlikely to be due just to chance. A statistical result is usually said to be 'significant' if it would occur by chance only once in 20 times or less often.

stroke: When an artery supplying blood to the brain suddenly becomes blocked (ischaemic stroke) or bleeds (haemorrhagic stroke). Often causes paralysis of parts of the body normally controlled by that area of the brain, or speech problems and other symptoms.

type 1 diabetes: A form of diabetes marked by a complete lack of insulin and needing insulin replacement for survival. This form of diabetes mostly arises in childhood or in young adults, though it can occur at any age. Adults may develop a slowly progressive form of type 1 diabetes called Latent Autoimmune Diabetes in Adults, which can be treated initially without insulin injections. See also *type 2 diabetes*, and *gestational diabetes*.

type 2 diabetes: The most common form of diabetes, which is marked by reduced or less effective insulin. Some cases may be managed with changes to diet along with increased exercise and weight loss. Many require drugs as well— namely oral glucose-lowering drugs that work on the pancreas. Many others require insulin in addition to other treatments. See also *type 1 diabetes* and *gestational diabetes*.

unstable angina: A form of *angina* that is more dangerous than normal angina but less so than a *heart attack*. It can feature chest pain that occurs at rest; in someone who already has angina, it can be marked by new patterns of onset with exertion or by pain that comes on more easily, more often of for longer than previously.

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