

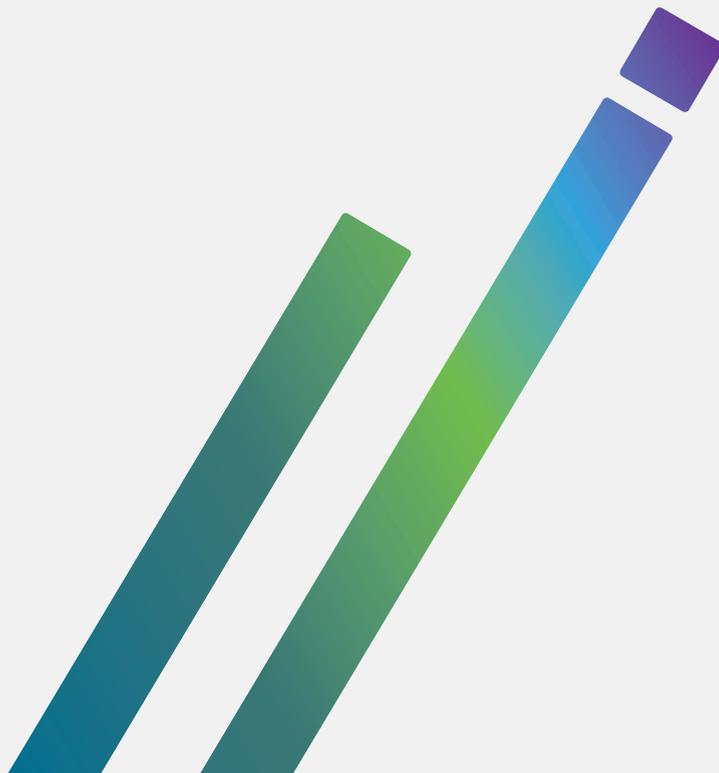


Australian Government
**Australian Institute of
Health and Welfare**



Chronic conditions and disability

2015



AIHW



Australian Government

**Australian Institute of
Health and Welfare**

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Australian Institute of Health and Welfare
Canberra

Cat. no. CDK 8

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ISBN 978-1-76054-433-1 (PDF)

ISBN 978-1-76054-434-8 (Print)

Suggested citation

Australian Institute of Health and Welfare 2018. Chronic conditions and disability 2015. Cat. no. CDK 8. Canberra: AIHW.

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Published by the Australian Institute of Health and Welfare

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Contents

Acknowledgments	v
Abbreviations	v
Summary	vi
1 Introduction	1
Defining chronic conditions.....	1
Defining disability.....	1
Data sources on chronic conditions and disability.....	2
Context of this report	3
2 Results	5
2.1 How common is disability among people with the selected chronic conditions?	7
People with at least 1 selected chronic condition	7
Main condition	9
2.2 What is the severity of disability experienced by people with the selected chronic conditions?	11
2.3 Do people with the selected chronic conditions and disability vary from other people with disability?	13
2.4 What types of impairments, limitations and restrictions do people with the selected chronic conditions and disability experience?	15
2.5 What is the change over time in the prevalence of disability among people with the selected chronic conditions?.....	18
3 Discussion	19
Future work	21
Appendix A: Survey of Disability, Ageing and Carers	22
Aboriginal and Torres Strait Islander people	22
Appendix B: Alternative data sources	24
Australian Longitudinal Study on Women's Health.....	24
45 and Up Study.....	24
ABS National Aboriginal and Torres Strait Islander Social Survey (NATSISS).....	25
Appendix C: Methods and limitations	26
Crude prevalence estimates	26
Age-standardised rates	26
Significance testing for survey data	26
Calculating standard errors, relative standard errors, and confidence intervals	27
Limitations	27
Appendix D: Data Quality Statement	29

Glossary.....30
References.....31
List of tables33
List of figures33

Acknowledgments

This report was prepared by Frances Gibson and Melanie Grimmond of the Population Health Unit at the Australian Institute of Health and Welfare, under the guidance of Claire Sparke and Lynelle Moon.

Valuable input was provided by Mark Cooper-Stanbury, Peta Craig, Annette Dobson, Jenna Haddin, Betsy Joseph, Miriam Lum On, Kevin Monahan, Felicity Murdoch, Naila Rahman, Jonathan Shaw, Veronique Thouroude, Micaella Watson, David Whitelaw and Pam Webster.

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
AIHW	Australian Institute of Health and Welfare
ALSWH	Australian Longitudinal Study on Women's Health
ASR	age-standardised rate
CHD	coronary heart disease
CI	confidence interval
ICF	International Classification of Functioning, Disability and Health
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th Revision
NATSISS	National Aboriginal and Torres Strait Islander Social Survey
SDAC	Survey of Disability, Ageing and Carers
WHO	World Health Organization

Symbols

n.p. not published due to small numbers

Summary

Chronic conditions are the leading cause of illness, disability and death in Australia. People with disability are more likely to develop chronic conditions, and people with chronic conditions are more likely to develop disability.

This report uses data from the Australian Bureau of Statistics' Survey of Disability, Ageing and Carers to explore the association between 8 selected chronic conditions and disability. The selected chronic conditions are: coronary heart disease, diabetes, stroke, emphysema, asthma, arthritis and related disorders, back pain and problems, and osteoporosis.

In 2015, more than 5.4 million Australians were estimated to have 1 of these selected chronic conditions, and for 3.7 million of these people, it was the condition causing them the most problems or their only health condition (main condition).

1 in 2 people with a selected chronic condition have disability

Half of all people with at least 1 of the selected chronic conditions (51%, or 2.8 million) also had disability, and fewer people (41%) reporting 1 of the selected chronic conditions as their main condition also had disability.

Older people have higher rates of disability

Rates of disability associated with each selected chronic condition tended to be higher among people aged 65 and over, but this difference was not always statistically significant.

Rates of disability were similar for men and women for each selected chronic condition and across age groups, except for osteoporosis, where men aged under 65 had a higher rate (79%) than women (64%).

Emphysema has the greatest effect on disability across all age groups

Having emphysema was associated with high rates of disability for all ages (around 88%) compared with those with other selected chronic conditions. For people aged 65 and over, disability rates were also high for those with stroke (82%). The lowest rates among this older group were for those with diabetes (62%). For people aged under 65, the rate of disability was lowest for those with asthma (30%).

Stroke associated with more severe limitations

About three-quarters (77%) of people with stroke as their main condition and disability had a profound or severe core activity limitation, and sometimes or always required assistance with communication, mobility and/or self-care. Those with the other selected chronic conditions did not tend to require assistance with core activities, but often required aids or equipment or had other limitations. Asthma was linked with the least severe limitations—more than one-third (36%) of people with asthma had no core activity limitation.

Common types of impairments, limitations and restrictions across all selected chronic conditions and disability included restrictions in physical activities or work, chronic or recurring pain or discomfort, difficulty gripping or holding things, and hearing loss.

Disability rate for people with chronic conditions has fallen over time

The prevalence of disability among people with the selected chronic conditions as their main condition fell from 36% to 28% between 2003 and 2015. The total number of people reporting these conditions, and these conditions with disability, however, remained stable over the period.

1 Introduction

Chronic conditions are the leading cause of illness, disability and death in Australia (AIHW 2016a). There is a 2-way relationship between chronic conditions and disability. People with disability are more likely to develop chronic conditions, and those with chronic conditions are more likely to develop disability; noting, however, that not all those with chronic conditions will develop disability and vice versa (AIHW 2013; Froehlich-Grobe & Lollar 2011; Hung et al. 2012; Klijs et al. 2011).

Chronic conditions and disability affect a large proportion of the Australian population. In 2014–15, 1 in 2 Australians (over 11 million people) had at least 1 of 8 common chronic conditions: arthritis; asthma; back pain and problems; cancer; cardiovascular disease; chronic obstructive pulmonary disease; diabetes; and mental health conditions (AIHW 2016b). Overall in 2015, 18% of Australians (over 4.2 million people) had disability (ABS 2016a). Disability can refer to problems in body function or structure, difficulties in executing activities, or problems experienced participating in life situations. This report builds on previous work by the Australian Institute of Health and Welfare (AIHW) on chronic conditions and disability by providing an overview of the prevalence of disability, disability severity, and impairments, limitations and restrictions experienced by people with selected chronic conditions.

Defining chronic conditions

The National Strategic Framework for Chronic Conditions is a collaboration between the Australian Government and all state and territory governments, and is the overarching policy for the prevention and management of chronic conditions in Australia. The framework defines chronic conditions as:

- having complex and multiple causes
- affecting individuals on their own or as comorbidities
- usually having a gradual onset; however, can also occur suddenly or have acute stages
- occurring across the life cycle but becoming more prevalent with older age
- compromising quality of life and creating limitations and disability
- being long term and persistent, with an often gradual deterioration of health and loss of independence
- not usually immediately life threatening but the most common and leading cause of premature mortality (AHMAC 2017:6).

The term ‘chronic conditions’ is used in the framework to replace terms such as chronic disease, non-communicable diseases and long-term conditions. It encompasses a broader range of chronic and complex health conditions across the spectrum of illness (AHMAC 2017).

In this report, the 8 selected long-term health conditions are referred to as ‘selected chronic conditions’.

Defining disability

In the Convention on the Rights of Persons with Disabilities, the term ‘disability’ captures those who have long-term physical, mental, intellectual or sensory impairments that, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others (United Nations 2006).

The National Disability Strategy 2010–2020 was developed by the Council of Australian Governments (COAG) to provide a cohesive vision for advancing the interests of people with disability in Australia, and to ensure the principles of the convention are incorporated into policies and programs at all levels of government (COAG 2011). The strategy uses the term ‘people with disability’ to refer to people with all kinds of impairment from birth or acquired through illness, accident or the ageing process, and includes cognitive impairment as well as physical, sensory and psychosocial disability (COAG 2011).

The International Classification of Functioning, Disability and Health (ICF) is a classification of health and health-related domains used to measure health and disability at both individual and population levels. It describes disability as an umbrella term that covers 3 domains:

1. impairments—problems in body function or structure
2. activity limitations—difficulties in executing activities
3. participation restrictions—problems an individual may experience in involvement in life situations (WHO 2001).

Disability denotes the negative aspect of an individual’s interaction between their health condition and environmental and personal factors. Functioning encompasses all body functions, activities and participation, and refers to the positive aspects of an individual’s interaction between their health condition and environmental and personal factors (WHO 2001).

Data sources on chronic conditions and disability

The data presented in this report come from the Australian Bureau of Statistics’ (ABS) Survey of Disability, Ageing and Carers (SDAC) (see Appendix A for detailed information). Some alternative data sources that can be used to assess chronic conditions and disability are summarised in Appendix B.

The ICF informed the development of the SDAC to ensure alignment with definitions and classifications. A person is considered to have disability in the SDAC if they have any limitation, restriction or impairment that restricts everyday activities and has lasted, or is likely to last for, at least 6 months. The severity of disability is further defined according to the degree of assistance or supervision required with core activities—self-care, mobility and communication—and grouped as mild, moderate, severe or profound limitation.

Chronic conditions identified in the SDAC are categorised as *long-term health conditions*. For respondents with more than 1 long-term condition, the one causing the most problems is reported as the *main condition* (Box 1.1). The nature of the survey means that disability cannot be assumed to be a consequence of any reported conditions, as an individual’s health condition is just one of the factors relating to functioning and disability, with environmental and personal factors also contributing (WHO 2001). The prevalence of long-term conditions in the SDAC is generally lower than for other surveys, due to its focus on conditions relating to disability.

The 2015 SDAC included around 1,700 respondents who identified as being of Aboriginal and Torres Strait Islander descent. This is a large enough sample to produce broad estimates; however, too small for finer disaggregation such as by long-term health condition. For this reason, no Indigenous analyses have been included in this report. Data from the SDAC and National Aboriginal and Torres Strait Islander Social Survey (NATSISS; see appendixes A and B for more information) are consistent in showing that Indigenous people generally have higher rates of disability compared with non-Indigenous people.

Confidence intervals are presented throughout this report in order to indicate the span of numbers around an estimate that has a 95% chance of including the true value. Where confidence intervals overlap, it is impossible to say with certainty that the corresponding rates are statistically significantly different from each other. Where the sample size is small, as is the case for some analyses in this report, the confidence intervals may be wider. For more information on the methods used in this report, refer to Appendix C.

Box 1.1: Terminology used in SDAC

Long-term health condition

A disease or disorder that has lasted, or is likely to last, for 6 months or more and is current at the time of the survey. The exception to this is a periodic or episodic condition (for example, asthma, epilepsy or schizophrenia, where people suffer attacks or relapses at irregular intervals) where an attack or relapse has occurred in the last 12 months. Conditions that had not occurred in the last 12 months because they had been controlled by medication were also included. A person can have up to 9 long-term health conditions recorded in the SDAC.

Long-term health conditions were coded to a classification based on the World Health Organization (WHO) International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) (see Table S1 for a detailed list of codes for the selected conditions).

For this report, the 8 selected long-term health conditions are referred to as *selected chronic conditions*. Table S1 contains further information on the selected chronic conditions.

Main condition

A long-term health condition identified by a person as the 1 causing the most problems. Where only 1 long-term health condition is reported, this is recorded as the main condition (ABS 2016a).

The main condition is the one causing the most problems at the time of the survey, and it does not necessarily follow that this condition is the cause of any, or all, reported disability. People's perceptions and understanding of their health conditions can influence their opinion about what caused their disability.

Context of this report

This report focuses on 8 selected chronic conditions: coronary heart disease (CHD), diabetes, stroke, emphysema, asthma, arthritis and related disorders, back pain and problems, and osteoporosis (Table S1). The selected chronic conditions are routinely monitored through the AIHW National Centre for Monitoring Chronic Conditions, and are captured in the main data source for this report.

Some populations experience a higher prevalence and burden of disease from chronic conditions than other Australians due to interactions between the physical environment, social and cultural determinants, and biomedical and behavioural risk factors. The National Strategic Framework for Chronic Conditions recognises this, and identifies people with disability as one such population. It acknowledges that due to the disparity in health outcomes, greater investment and sustained efforts are required to positively advantage priority populations and overcome current inequities (AHMAC 2017). Examining the relationship between chronic conditions and disability at a population level will help inform the evidence base for targeted action in this priority population.

Determining the cause of disability in a self-reported survey is difficult and disability cannot be assumed to be a consequence of any reported conditions. The analyses in this report consider only associations between the selected chronic conditions and disability and not disability caused by the selected chronic conditions.

The key questions considered in this report are:

- How common is disability among people with the selected chronic conditions?
- What is the severity of disability experienced by people with the selected chronic conditions?
- Do people with the selected chronic conditions and disability differ from other people with disability by age, sex and other characteristics?
- What types of impairments, limitations or restrictions do people with the selected chronic conditions experience, and how do these differ from the general population?
- What is the change over time in the prevalence of disability among people with the selected chronic conditions?

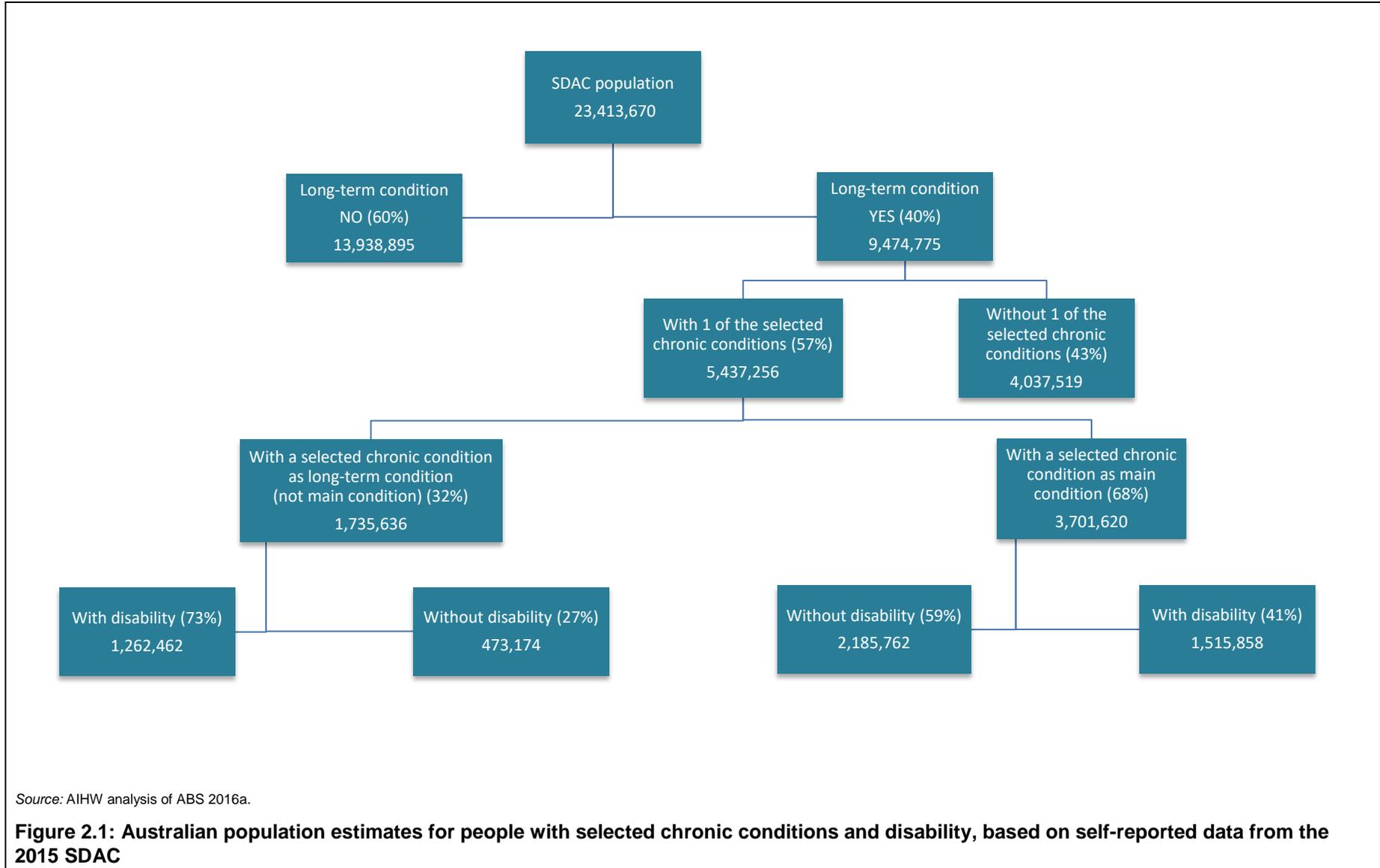
The supplementary tables accompanying this report present the data underlying the figures and tables.

2 Results

An estimated 9.5 million Australians (40%) had a long-term condition in 2015, with more than 5.4 million (23%) having at least 1 of the selected chronic conditions. For the majority of those with a selected chronic condition (68%), it was their main or only condition (Figure 2.1; Box 1.1).

The most common of the selected chronic conditions were arthritis and related disorders, and back pain and problems, each affecting around 2 million people overall. For around 1 million people with each condition it was also their main condition (Table S2).

The average age of people with each of the selected conditions varied (Table S2). Those with disability and a selected chronic condition as their main condition tended to be older than those without disability and also have more comorbidities.



2.1 How common is disability among people with the selected chronic conditions?

People with at least 1 selected chronic condition

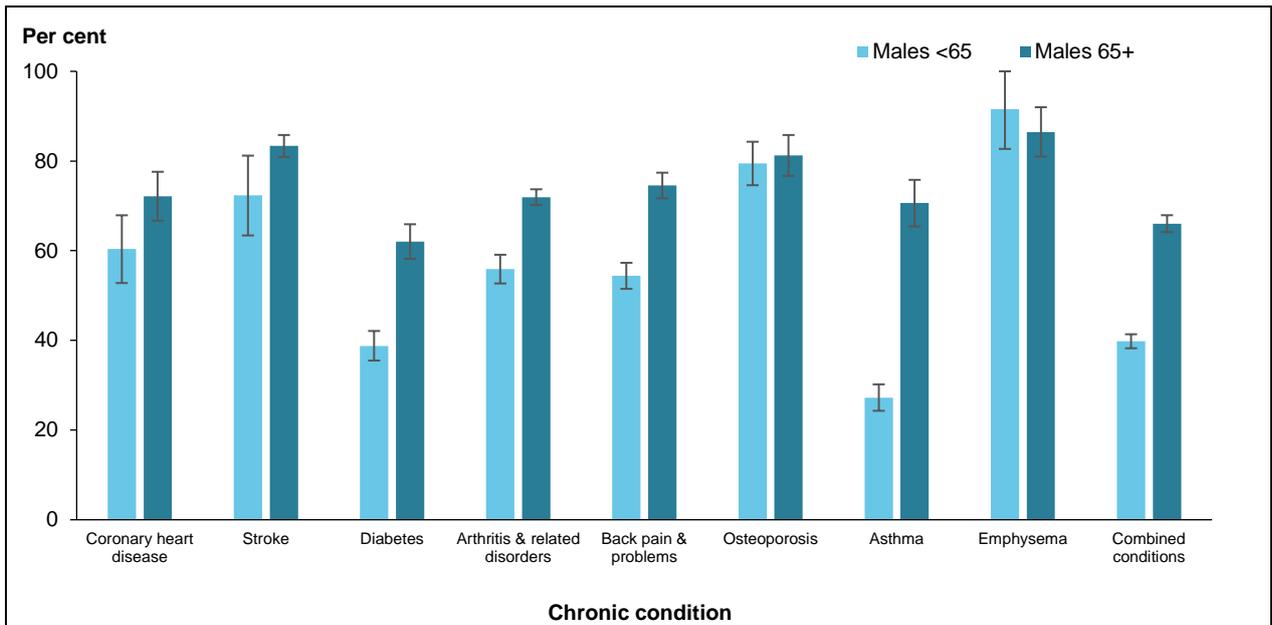
In this section, where a person has more than 1 selected chronic condition, they will be counted in each condition and therefore represented more than once. However, where the selected conditions are combined (combined conditions), each person is only counted once (figures 2.2, 2.3). Those with disability and a selected chronic condition were more likely to report more than 1 condition than those without disability (93% compared with 72%, respectively).

Determining the cause of disability in a self-reported survey is difficult and disability cannot be assumed to be a consequence of any reported conditions. The analyses in this report consider only associations between the selected chronic conditions and disability and not disability caused by the selected chronic conditions.

The prevalence of disability among people with the selected chronic conditions varied by age and type of health condition (figures 2.2, 2.3). Overall, around half (51%, or 2.8 million) of Australians with the selected chronic conditions also had disability in 2015—with prevalence generally higher among those 65 and over (figures 2.2, 2.3; Table S3). Conversely, 65% of people with disability reported having 1 of the selected chronic conditions.

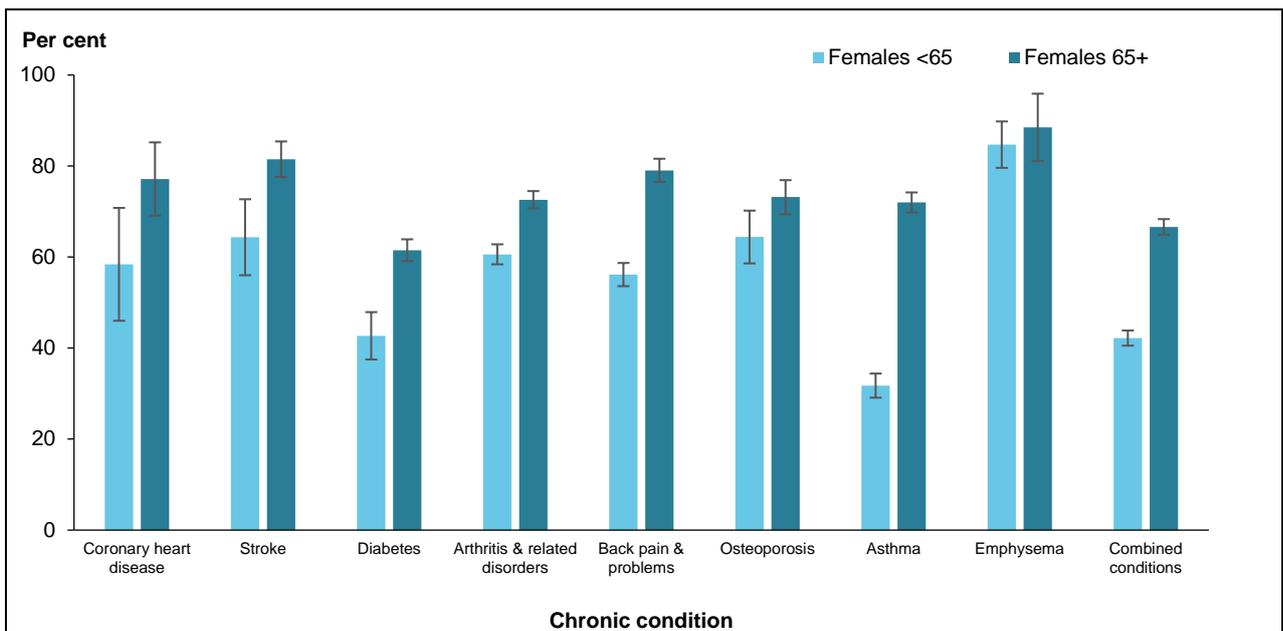
The prevalence of disability was higher for people with emphysema than for most other conditions. The majority of males with emphysema aged under 65 (92%) and 65 and over (86%) reported disability. Disability was similarly high among females in both age groups who had emphysema (85% and 89%, respectively). For people aged under 65, the prevalence of disability was lowest among people with asthma; while for those 65 and over, the prevalence was lowest among those with diabetes (Table S3).

The prevalence of disability was similar for males and females in the same age group for most of the conditions; the exception being males and females aged under 65 with osteoporosis, where disability was more common among males (79% compared with 64% among females).



Source: AIHW analysis of ABS 2016b (Table S3).

Figure 2.2: Prevalence of disability among males with selected chronic conditions, by age, 2015



Source: AIHW analysis of ABS 2016b (Table S3).

Figure 2.3: Prevalence of disability among females, with selected chronic conditions, by age, 2015

Main condition

Where a person reports more than 1 chronic condition, they are asked to nominate the condition causing the most problems—the *main condition*. For those with only 1 condition, this is recorded as their main condition.

From the 2015 SDAC, it is estimated there were nearly 3.7 million Australians with a selected chronic condition as their main condition, of which 41% (1.5 million) also had disability (Figure 2.1). As a person can only nominate 1 condition as their main condition, each person will be represented once in this section. People with disability and a selected chronic condition as their main condition were more likely to report having 2 or more conditions than those without disability (87% compared with 59%, respectively).

Overall, 29% of males and 32% of females aged under 65 with a selected chronic condition as their main condition also experienced disability. Disability was more common among both males and females aged over 65 (56% and 61%, respectively) (figures 2.4, 2.5—combined conditions).

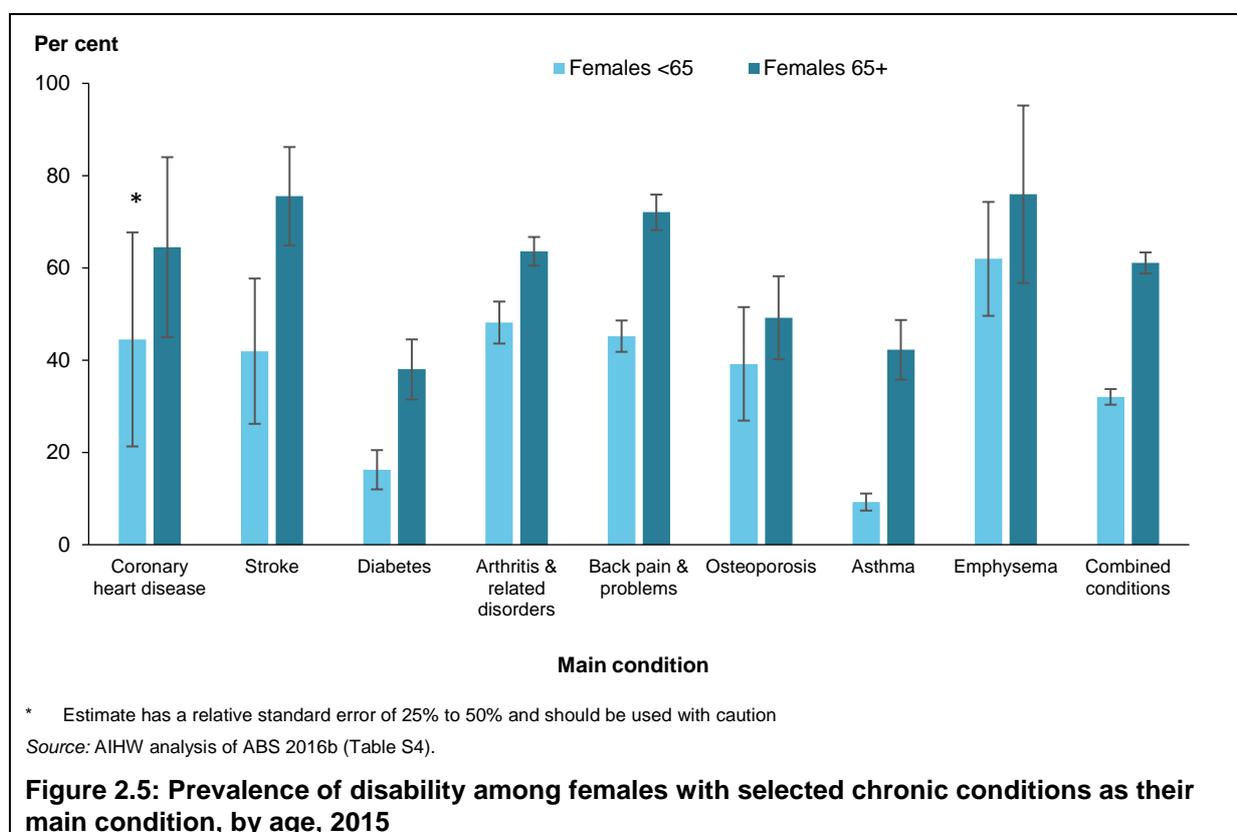
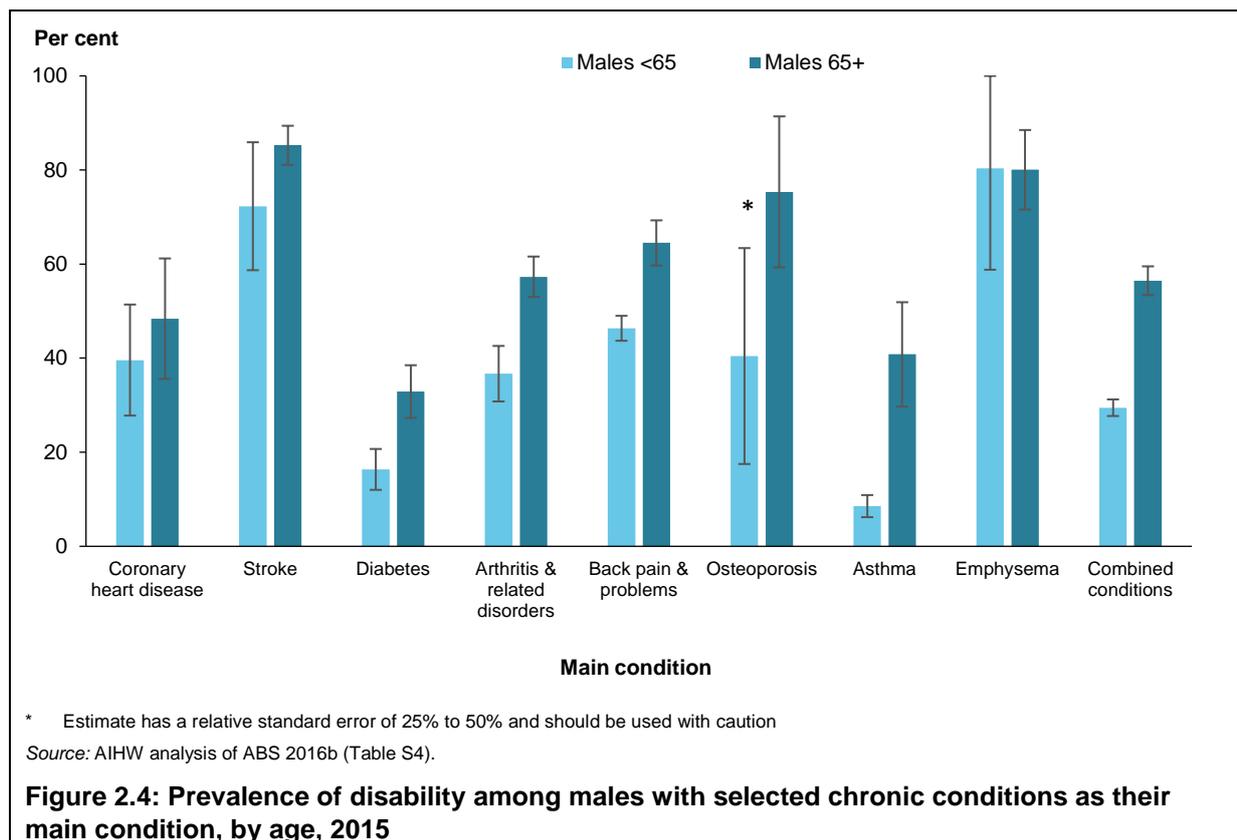
Emphysema was associated with high levels of disability for males and females in both age groups, ranging from 62% for females aged under 65 to 80% for males aged under 65 and 65 and over (figures 2.4, 2.5). Stroke was also associated with high levels of disability—85% of males and 76% of females 65 and over with stroke as their main condition also had disability.

In contrast, 9% of males and females aged under 65 with asthma also had disability.

The prevalence of disability for males and females was similar for most of the selected chronic conditions; however, there was some variation:

- males aged under 65 with stroke had a higher prevalence of disability than females the same age with stroke (72% and 42%, respectively)
- females aged under 65 with arthritis and related disorders had a higher prevalence of disability than males the same age (48% and 37%, respectively)
- males aged 65 and over with osteoporosis had a higher prevalence of disability than females the same age (75% and 49%, respectively).

The prevalence of disability for most of the selected chronic conditions increased with age, and was higher among those 65 and over. However, due to small sample sizes for some of the conditions, particularly among those aged under 65, confidence intervals are wide and where they overlap it is difficult to say with certainty that any apparent differences are statistically significant.



2.2 What is the severity of disability experienced by people with the selected chronic conditions?

The ABS defines the severity of disability according to the degree of assistance or supervision required in core activities. Core activities include communication, mobility and self-care. The SDAC provides information on 4 levels of severity, which are:

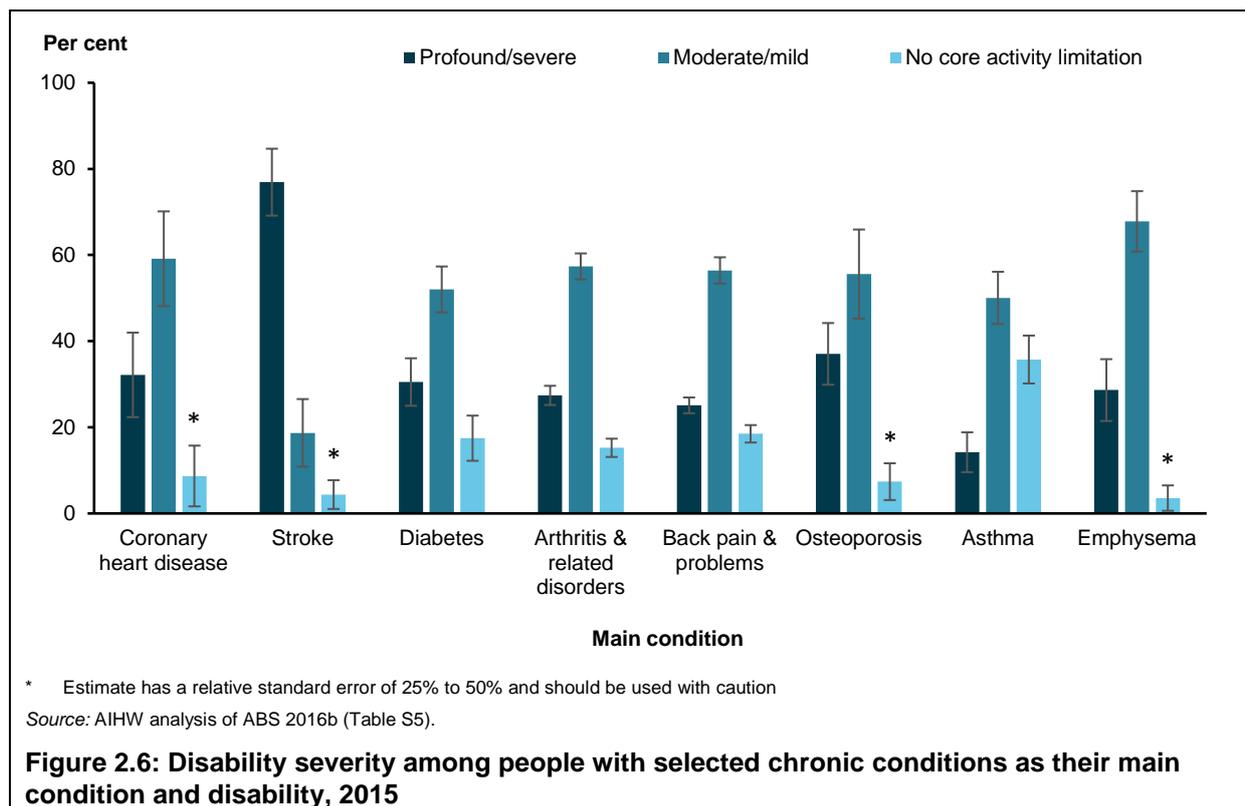
- profound limitation—people who are unable to do, or always need help with, a core activity
- severe limitation—people who sometimes need help with a core activity and/or have difficulty understanding or being understood by family or friends, or can communicate more easily using sign language or other non-spoken forms of communication
- moderate limitation—people who do not need help, but have difficulty with a core activity
- mild limitation—people who do not need help and do not have difficulty with any core activity, but use aids or equipment, or have 1 or more of the following limitations
 - cannot easily walk 200 metres
 - cannot walk up and down stairs without a handrail
 - cannot easily bend to pick up an object from the floor
 - cannot use public transport
 - can use public transport, but needs supervision
 - does not need help or supervision, but has difficulty using public transport (ABS 2016a).

Figure 2.6 shows the severity of disability experienced by people with each of the selected chronic conditions as their main condition, noting that it is not known if the main condition or another condition led to the limitation or vice versa. While a person can only have 1 main condition recorded in the SDAC, they may report up to 8 other long-term conditions (Box 1.1). Therefore, their disability severity may not directly relate to their main condition and may be the result of other conditions or the combination of conditions they have.

The majority of people with 1 of the selected chronic conditions as their main condition and disability had a moderate or mild core activity limitation, with between one-quarter and one-third having a profound or severe limitation. Those who had stroke as their main condition had the greatest need for assistance, with around three-quarters (77%) experiencing profound or severe limitation. Core activity limitations were least severe among those with asthma, where about one-third (36%) had no core activity limitation.

Females with stroke had lower rates of profound or severe limitation than males, but higher rates of profound or severe limitation with arthritis and related disorders and osteoporosis (Table S5).

The rates presented in Figure 2.6 are crude rates only, and do not take into consideration any differences in the age range of people with each selected chronic condition shown in Table S2 (see Appendix C for more details on methods and limitations). This is of relevance as the disabling impact of diseases increases with age (Klijs et al. 2011).



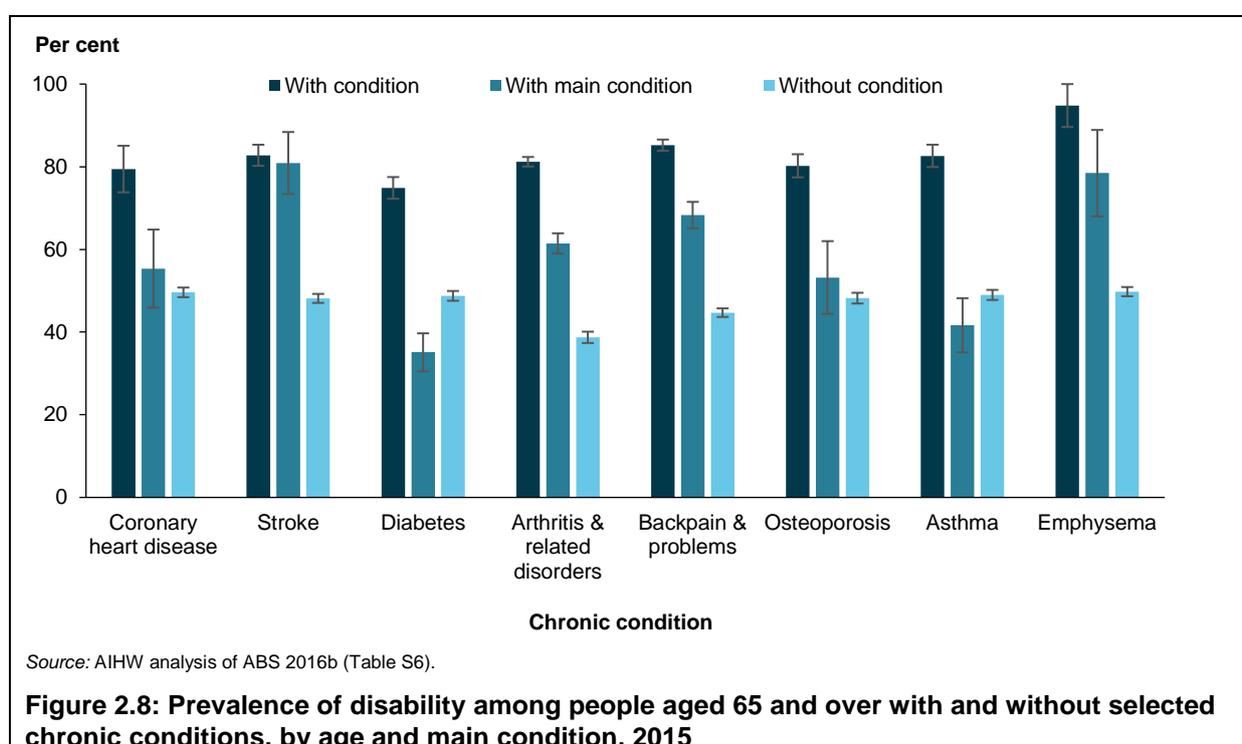
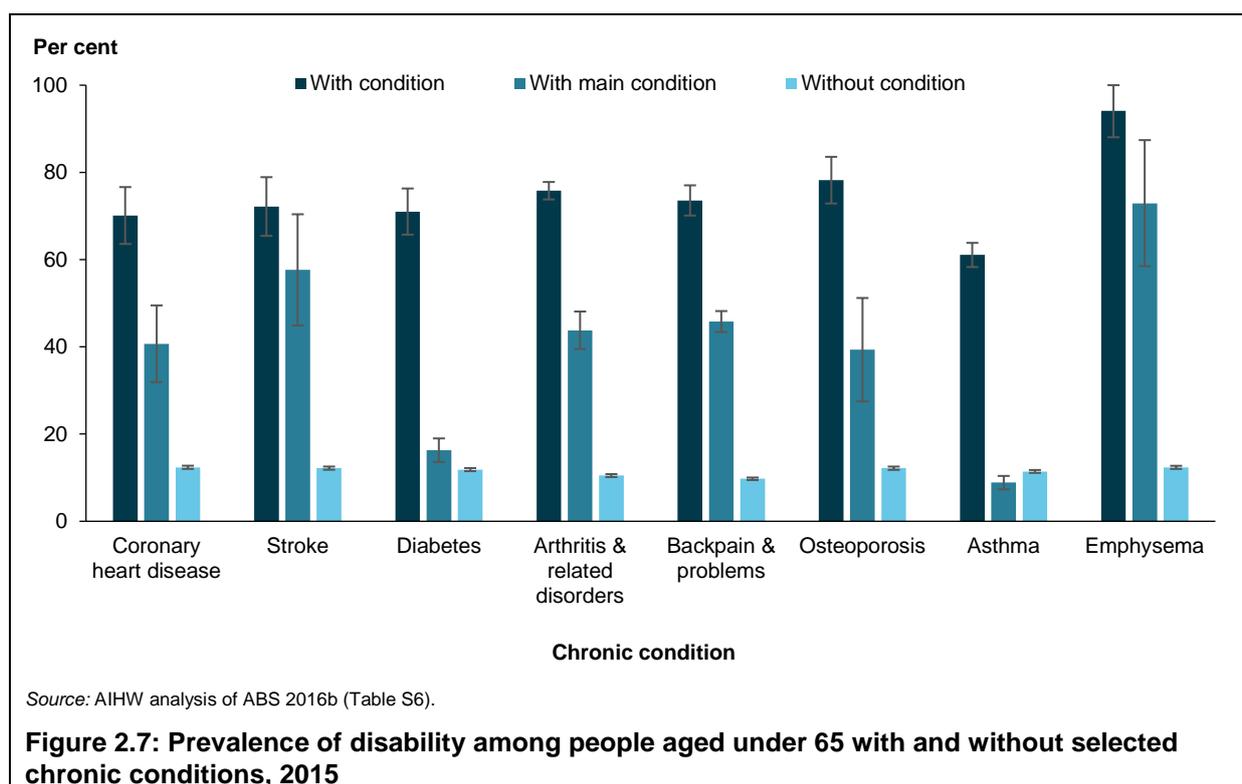
2.3 Do people with the selected chronic conditions and disability vary from other people with disability?

This section provides a comparison of disability prevalence between people with and without each of the selected chronic conditions. In Figure 2.7, people in the 'with condition' category have the condition but not as their main condition. Those in the 'with main condition' category have the condition as their main condition (or only condition). Those in the 'without condition' category have not reported having the selected condition but may have any of the other selected conditions and/or another condition.

For those aged under 65, there was a clear gradient for most conditions where people with the chronic condition had the highest prevalence of disability, followed by those with the condition as their main condition, while those without the condition had the lowest prevalence of disability (Figure 2.7). However, the prevalence of disability was lower for people with asthma as their main condition than for those without asthma.

For those aged 65 and over, this gradient was also present; however, less pronounced and less likely to be statistically significant (Figure 2.8). The prevalence of disability for people aged 65 and over with diabetes as a main condition was lower than for those without diabetes; and similar for those with CHD, asthma and osteoporosis. This may be partly explained by the higher prevalence of disability in this age group in general.

The higher prevalence of disability among people in the category 'with condition' in figures 2.7 and 2.8 can be partly explained by more comorbidity: each person in this category has 2 or more conditions (the selected condition and another 1 that is considered to be causing them more problems). In the 'with main condition' category, 13% of people have only 1 condition, however this percentage likely varies by condition.



2.4 What types of impairments, limitations and restrictions do people with the selected chronic conditions and disability experience?

Table 2.1 presents the prevalence of impairments, limitations and restrictions experienced by people with the selected chronic conditions as their main condition and disability, as well as the whole SDAC population. The dark shading indicates the limitation experienced by the greatest percentage of people with each condition; the medium shading indicates the next 4 most commonly experienced limitations; and the lightest shading indicates a greater percentage of people with the condition experienced that limitation than the general SDAC population.

While a person can only have 1 main condition recorded in the SDAC, they may report up to 8 other chronic conditions (Box 1.1). Therefore, the impairments, limitations and restrictions experienced may not directly relate to their main condition and may be the result of other chronic conditions, or the combination of conditions they have.

Restriction in physical activities or work, chronic or recurring pain or discomfort, difficulty gripping or holding things, and hearing loss were common across the conditions (Table 2.1). People with stroke had significantly higher prevalence of all limitations than the general SDAC population; while those with the other selected chronic conditions had a higher prevalence of many limitations than the general SDAC population.

As would be expected, breathing difficulties were the most commonly cited limitation experienced by people with emphysema (84%) and asthma (52%); and were also experienced by more than one-third (38%) of those with CHD.

Chronic or recurring pain or discomfort was the most commonly experienced limitation for people with back pain and problems (64%) and arthritis and related disorders (53%); and was also experienced by around one-third or more of those with osteoporosis (49%), stroke (35%), emphysema (35%) and CHD (31%).

Restriction in physical activities or work was the most commonly experienced limitation by people with stroke (80%), osteoporosis (53%) and CHD (49%); however, was also highly prevalent among those with emphysema (66%), back pain and problems (57%), arthritis and related disorders (47%) and diabetes (35%).

The rates presented in Table 2.1 are crude rates only, and do not take into consideration any differences in the age range of people with each condition (see Appendix C for more details on methods and limitations). It is possible that some of the limitations, restrictions and impairments reported relate to ageing rather than the condition.

Table 2.1: Prevalence of impairments, limitations and restrictions among people with selected chronic conditions as their main condition and disability, and the general SDAC population, 2015

Limitation	Coronary heart disease	Stroke	Diabetes	Arthritis and related disorders	Back pain and problems	Osteoporosis	Asthma	Emphysema	All SDAC population
	(%)								
Breathing difficulties	37.6	15.3	8.4	7.9	8.2	8.3*	52.1	83.8	2.0
Disfigurement or deformity	n.p.	14.6	6.0	3.4	3.3	7.4*	1.8*	0.6**	0.8
Nervous or emotional condition	3.3	12.8	5.7	5.2	8.4	4.8*	4.2*	14.4*	2.5
Blackout, seizures or loss of consciousness	2.7	9.9	9.4	1.9	2.6	4.3*	3.8*	3.6*	1.0
Chronic or recurring pain or discomfort	31.2	34.5	21.8	52.9	63.5	49.3	15.1	34.5	6.3
Difficulty gripping or holding things	14.9*	60.5	19.2	44.0	20.6	32.4	10.3	18.7	3.9
Difficulty learning or understanding things	1.5**	30.3	7.4	3.5	5.0	2.5*	6.7*	2.5*	2.9
Limited use of arms or fingers	11.2*	51.6	7.7	15.1	6.9	12.6	4.0*	7.5*	1.8
Limited use of legs or feet	7.4*	51.4	16.5	22.6	11.8	22.4	4.7*	8.9*	2.7
Hearing loss	37.6	29.6	39.6	30.5	26.3	37.7	19.8	43.0	6.9
Speech loss	2.1**	38.5	3.1	1.7	1.2	1.0	5.8*	0.2*	1.4
Social or behavioural difficulties	0.3*	12.9	4.5	2.2	2.7	1.9*	2.6*	4.2*	1.7
Memory problems or periods of confusion	8.4*	34.5	7.6	3.7	3.6	4.7*	2.4**	6.4*	1.8

(continued)

Table 2.1 (continued): Prevalence of impairments, limitations and restrictions among people with selected chronic conditions as their main condition and disability, and the general SDAC population, 2015

Restriction in physical activities or work	49.3	79.8	35.1	47.1	57.3	53.1	20.2	65.7	7.4
Mental illness	5.1**	13.4	5.6	1.9	2.5	2.4*	2.8*	3.4**	1.8
Loss of sight	8.5*	13.2	10.5	3.5	2.9	4.8*	2.5*	2.4**	1.1
Other restriction	28.1	17.2	15.9	17.5	24.3	30.1	12.8	16.1	3.1

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

** Estimate has a relative standard error of greater than 50% and is considered too unreliable for general use

n.p. Not published due to small numbers

 The limitation experienced by the greatest percentage of people with the condition.

 The 2nd to 5th most commonly experienced limitations.

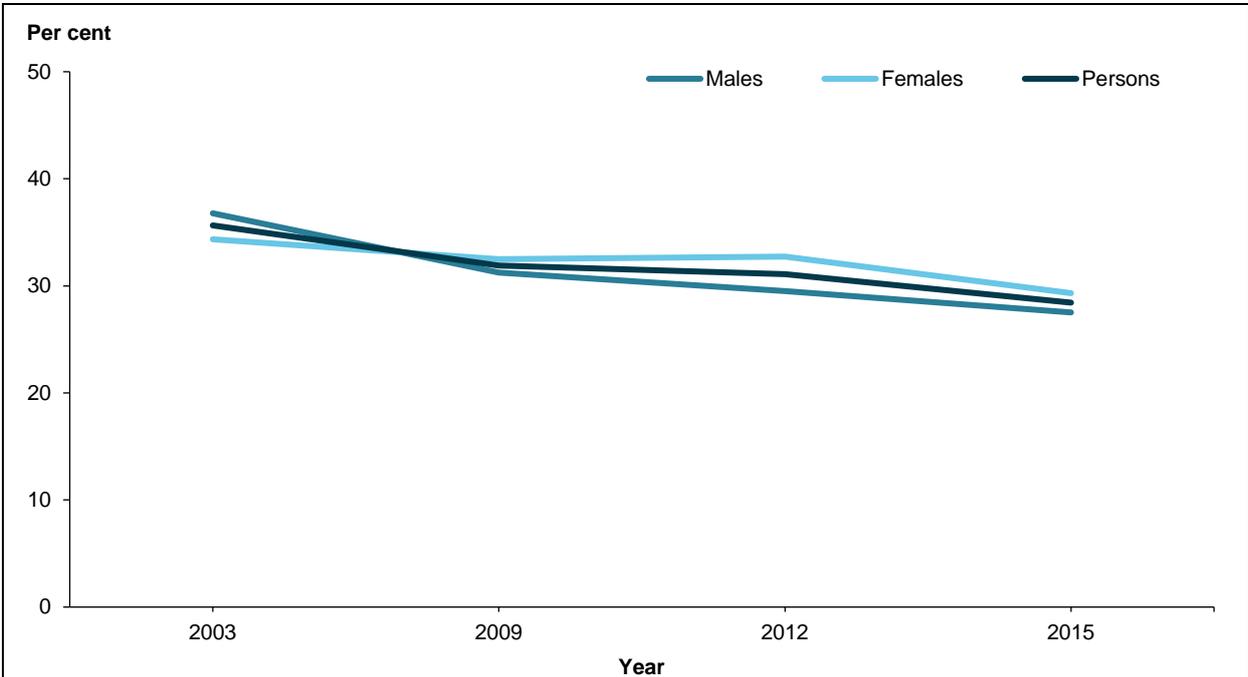
 A greater percentage of people with the condition experienced this limitation than the general SDAC population.

Source: AIHW analysis of ABS 2016b (tables S7–S15).

2.5 What is the change over time in the prevalence of disability among people with the selected chronic conditions?

This section provides a comparison of the prevalence of disability among people with the selected chronic conditions as their main condition between 2003 and 2015. Results are age-standardised to remove the influence of any changes to the age structure of the population over this period.

The prevalence of disability among people with the selected chronic conditions as their main condition decreased from 36% in 2003 to 28% in 2015 (Figure 2.9). The decrease over this period was significant for both males and females. The number of people with the selected chronic conditions as their main condition, and the selected chronic conditions and disability, remained stable between 2003 and 2015.



Source: AIHW analysis of ABS 2016b (Table S16).

Figure 2.9: Age-standardised prevalence of disability among people with 1 of the 8 selected conditions as their main condition, by sex, 2003–2015

3 Discussion

This report has explored the association between 8 selected chronic conditions and disability in Australia, based on the 2015 SDAC. The conditions explored were CHD, diabetes, stroke, emphysema, asthma, arthritis and related disorders, back pain and problems, and osteoporosis. These conditions are generally long term and persistent, and can lead to gradual deterioration of health and disability. This report examined disability prevalence and severity; and types of impairments, limitations and restrictions experienced by those with the selected conditions.

In 2015, it was estimated that more than 5.4 million Australians (23%) had at least 1 selected chronic condition, with 3.7 million (68%) of these reporting it was the condition causing them the most problems or their only condition (main condition). Conversely, 65% of the estimated 4.3 million Australians with disability reported having at least 1 of these conditions, and for 35% it was the condition causing the most problems (main condition). This highlights the complex relationship between disability and the selected chronic conditions.

Previous research has found people with disability have a higher prevalence of risk factors to health (AIHW 2010; Froehlich-Grobe et al. 2016) which may help to explain the higher prevalence of the selected chronic conditions among those with disability than for the overall SDAC population. The 'vicious cycle' relationship between chronic conditions and disability has been widely acknowledged (AIHW 2013; Froehlich-Grobe and Lollar 2011; Hung et al. 2012; Klijs et al. 2011). For example, people with physical or intellectual disability are more at risk of becoming overweight or obese, and therefore at greater risk for chronic conditions associated with excess body weight, such as diabetes or cardiovascular disease (Biswas et al. 2010; Dixon-Ibarra & Horner-Johnson 2014). This, in turn, can cause further limitation in daily functioning.

The prevalence of disability among people with the selected chronic conditions was high; with the exception of asthma, more than half of people with each condition had disability. Where the condition was the main condition, the prevalence of disability tended to be lower. This difference in disability prevalence is likely due to differences in the number and/or combination of conditions experienced between the 2 groups.

People who had a selected chronic condition as their main condition with disability tended to be older than those without disability, and report between 2 and 3 times as many long-term conditions. Rates of disability for all selected chronic conditions tended to be higher among those 65 and over; however, in some cases this difference was not statistically significant. This relationship between disability and age, and disability and number of conditions, is well established (Froehlich-Grobe et al. 2016; Gulley et al. 2018). International studies of the interaction between chronic conditions and disability have found that the highest burden of disability due to chronic conditions is among people aged 80 and over (Klijs et al. 2011). However, other international studies demonstrate the rising rate of disability in chronically ill people aged between 30 and 45 over time (Bhattacharya et al. 2005).

Emphysema and stroke were associated with the highest rates of disability for both those aged under 65, and 65 and over. Back pain and problems as the main condition was also associated with high rates of disability for those aged 65 and over. The prevalence of disability was lowest among people aged under 65 with asthma, and diabetes for those aged 65 and over.

This study found that rates of disability for males and females were similar across most conditions; however, differences were observed where the condition was reported as the main condition. Stroke and osteoporosis were associated with higher rates of disability in

males than females for those aged under 65; while arthritis and related disorders were associated with higher rates of disability in females than males aged under 65. The percentage of all males and females with a reported disability from the SDAC were also similar (18% and 19%, respectively) (ABS 2016a); however, other research has found females to have higher rates of disability than males (Whitson et al. 2010). International work has demonstrated that, while certain chronic conditions may be more common, other conditions may be more disabling depending on age and sex. For example, a Belgian study found that, while musculoskeletal diseases were the most prevalent chronic conditions for both males and females in all age groups, back pain and complications of cardiovascular disease were the most disabling in males, while arthritis and depression caused significantly more disability in women than in men (Klijs et al. 2011).

Restriction in physical activities or work, chronic or recurring pain or discomfort, difficulty gripping or holding things, and hearing loss were common for all conditions, and those with many of the conditions experienced significantly higher prevalence of limitations than the overall SDAC population. Generally, the more conditions a person had, the more likely they were to have more than 1 type of impairment (ABS 1999), and the vast majority of people from the current analyses reported multiple conditions. In some cases, the limitation, restriction or impairment reported may be related to ageing rather than the condition; however, this can be difficult to determine. Hearing loss, for example, can be age related, but is also associated with the regular use of pain relief (Curhan et al. 2012) and various medical conditions, including diabetes, cardiovascular disease and decreased bone mineral density (Huang & Tang 2010).

The majority of people with a selected chronic condition as their main condition and disability had a moderate or mild limitation and did not require assistance with core activities. For around one-quarter to one-third of those with most of the selected chronic conditions, however, help was sometimes or always required with a core activity. People with stroke experienced the highest need for assistance, and those with asthma the lowest. Wider research supports this finding. A number of studies demonstrate that stroke is often the most disabling of a range of chronic conditions, regardless of country of origin, sex, or age (Klijs et al. 2011; Yokota et al. 2015). This is primarily because stroke may cause a person to need a higher intensity of care with complex activities associated with daily life, as well as limitation of movement and difficulty understanding language. While conditions such as arthritis and heart disease may be less disabling—causing restrictions that require a lower intensity of assistance—they contribute much to the burden of disability due to their high prevalence (Hung et al. 2012; Klijs et al. 2011; Valderrama-Gama et al. 2002).

The prevalence of disability among people with a selected chronic condition as their main condition decreased from 36% in 2003 to 28% in 2015; however, the number of people reporting these conditions, or reporting these conditions and disability, has remained stable over the same period. Overall, disability prevalence across successive SDACs also decreased slightly between 2003 (20%) and 2015 (17%) (ABS 2016a). It is possible that changes to the management of certain chronic conditions over this period could have led to the overall decrease in disability prevalence. However, it is also likely that changes in disability prevalence over time varied by age and the selected chronic condition. A study of adults aged over 65 from the United States of America found that, between 1998 and 2008, the prevalence of selected chronic diseases increased, and diabetes and lung disease became more associated with disability, while hypertension became less (Hung et al. 2012). An earlier study found that disability prevalence was increasing in those aged under 60, and decreasing in those aged 60 and over (Bhattacharya et al. 2005). The 2 main causes of the increase in disability in the younger population were the rising prevalence of obesity and increases in disability prevalence among those with chronic disease (Bhattacharya et al. 2005).

Future work

This report explores the association between disability and the selected chronic conditions in the Australian population. The relationship between the selected chronic conditions and disability are multifactorial and extremely complex, further complicated by the interaction of an individual's health condition/s and environmental and personal factors. As such, establishing cause of disability from a cross-sectional, self-reported survey is not possible. A data collection that has sufficient sample numbers to compare those with and without disability and the selected chronic conditions, and which also captures management of their condition/s and access to services over time, could assist in establishing causality. In the absence of such a data collection, the association between disability and the selected chronic conditions can continue to be monitored using future SDACs.

This report did not explore whether certain sociodemographic characteristics contribute to the prevalence of disability among people with the selected chronic conditions, or the personal impact of disability on those with the selected chronic conditions. Additional, more detailed analyses of the selected conditions using this data source are possible and could extend our understanding in these areas.

This study did not include mental health disorders in the selected chronic conditions as these are not routinely monitored through the AIHW National Centre for Monitoring Chronic Conditions. However, depression, and phobic and anxiety disorders were the 3rd and 4th most commonly cited main conditions among those with disability in the 2015 SDAC. Research has also shown strong links between anxiety, depression and disability (Brenes et al. 2008; Garin et al. 2014).

Many of these conditions (including depression and anxiety) commonly coexist with, or are a complication of, other conditions. This research found that those with each selected chronic condition and disability, on average, reported more conditions than those with the condition without disability. Exploring the interaction between different combinations of the selected chronic conditions and disability could be an area of interest for future work.

People living with chronic conditions and disability are known to be at increased risk of poor health status and unhealthy behaviours (Froehlich-Grobe et al. 2016). The promotion of healthy behaviours can reduce the risk of developing chronic conditions for those with disability, reduce the risk of disability for those with chronic conditions, and improve the overall health and wellbeing of people living with chronic conditions and/or disability.

Appendix A: Survey of Disability, Ageing and Carers

The Australian Bureau of Statistics (ABS) Survey of Disability, Ageing and Carers (SDAC) is an Australia-wide household survey, and also covers certain institutionalised care settings. It collects information about the wellbeing, functioning and social and economic participation of all people in Australia, with detailed information collected on people with disability, people with care needs due to frailty, and the characteristics and experiences of carers.

The 2015 SDAC was the eighth national survey undertaken by the ABS to measure disability. Participants were interviewed about their restrictions or disabilities, long-term conditions, type and frequency of assistance received, and the providers of assistance.

The 2015 SDAC was conducted from May to December 2015. The scope of the survey was people living in private dwellings, self-care retirement villages and establishments providing long-term cared accommodation in urban and rural areas in all states and territories. People living in *Very remote* areas and discrete Aboriginal and Torres Strait Islander communities were excluded. The survey sample of 75,211 people was made up of 63,515 households and 11,696 from cared accommodation (ABS 2016a). The results from the SDAC are adjusted via weighting to produce estimates for the entire in-scope population.

In the SDAC, a person is considered to have disability if they have any limitation, restriction or impairment that restricts everyday activities or has lasted, or is likely to last, for at least 6 months. The severity of disability is further defined according to the degree of assistance or supervision required in core activities—self-care, mobility and communication—and grouped for mild, moderate, severe and profound limitation. Disabilities can be broadly grouped into sensory; intellectual; physical; psychosocial; head injury, stroke or acquired brain injury; or 'other' (Box A1).

The SDAC records conditions that are more likely to be associated with disability, and estimates of prevalence rates for long-term health conditions are generally lower than for the ABS health surveys. Some exceptions relevant to this report are stroke and heart diseases, which may be due in part to the exclusion of non-private dwellings in the health surveys (AIHW 2004). The 2015 SDAC does not contain specific data elements on chronic conditions—related disability; however, it is the best available resource for estimating the prevalence and impact of disability among people with chronic conditions.

The ABS also collects disability data in other surveys; however, the larger sample size and more comprehensive question set in the SDAC result in less bias and more detailed information about people with disability (ABS 2010).

Aboriginal and Torres Strait Islander people

Around 14% of the Aboriginal and Torres Strait Islander population are excluded from the SDAC due to living in *Very remote* areas of Australia or discrete Indigenous communities. As such, data from the SDAC are not considered representative of all Indigenous people (ABS 2016a).

The 2015 SDAC included around 1,700 respondents who identified as being of Indigenous descent. This is a large enough sample to produce broad estimates; however, too small for finer disaggregation such as by long-term condition. For this reason, no Indigenous analyses have been included in this report.

The 2014–15 National Aboriginal and Torres Strait Islander Social Survey (NATSISS) also collected information on disability and long-term health conditions of Indigenous people. Data from the SDAC and NATSISS are consistent in showing that Indigenous people generally have higher rates of disability compared with non-Indigenous people.

More information on the NATSISS can be found in Appendix B.

Box A1: Disability groups in the 2015 SDAC

Disabilities in the SDAC are grouped according to whether they relate to functioning of the mind or the senses, or to anatomy or physiology. Each disability group may refer to a single disability or be composed of a number of broadly similar disabilities. The groups based on the particular type of disability identified in the 2015 SDAC are:

Sensory

- loss of sight (not corrected by glasses or contact lenses)
- loss of hearing where communication is restricted, or an aid to assist with, or substitute for, hearing is used
- speech difficulties

Intellectual

- difficulty learning or understanding things

Physical

- shortness of breath or breathing difficulties that restrict everyday activities
- blackouts, seizures or loss of consciousness
- chronic or recurrent pain or discomfort that restricts everyday activities
- incomplete use of arms or fingers
- difficulty gripping or holding things
- incomplete use of feet or legs
- restriction in physical activities or in doing physical work
- disfigurement or deformity

Psychosocial

- nervous or emotional condition that restricts everyday activities
- mental illness or condition requiring help or supervision
- memory problems or periods of confusion that restrict everyday activities
- social or behavioural difficulties that restrict everyday activities

Head injury, stroke or acquired brain injury

- head injury, stroke or other acquired brain injury with long-term effects that restrict everyday activities

Other

- receiving treatment or medication for any other long-term conditions or ailments and still restricted in everyday activities
- any other long-term conditions resulting in a restriction in everyday activities.

Source: ABS 2016a.

Appendix B: Alternative data sources

Australian Longitudinal Study on Women's Health

The Australian Longitudinal Study on Women's Health (ALSWH) is a survey that provides data about the health of women across the life span, in order to inform Australian and state and territory government health policy. The ALSWH assesses women's physical and mental health, as well as psychosocial aspects of health (such as sociodemographic and lifestyle factors) and their use of health services.

Over 40,000 women participated in the baseline surveys in 1996. The 3 cohorts, aged 18–23 (born 1973–1978), 45–50 (born 1946–1951) and 70–75 (born 1921–1926), were selected from the Medicare database, which contains the name and address details of all Australian citizens and eligible residents enrolled with Medicare. In 2012–2013, more than 17,000 young women aged 18–23 (born 1989–1994) were recruited to form a new cohort.

From 1996 to 2011, each age cohort was surveyed about once every 3 years by postal survey. In 2011, the 1921–1926 cohort began receiving a shortened survey every 6 months. From 2012 onwards, the 1973–1978 and 1946–1951 cohorts have been offered the choice of completing the survey online. The 1989–1994 cohort have been surveyed annually using an online survey.

The study has been continuously funded by the Department of Health since 1995 and is conducted by the University of Newcastle and the University of Queensland.

The ALSWH collects data on the prevalence of self-reported, doctor-diagnosed chronic conditions. The specific conditions listed include type 1 and type 2 diabetes, heart disease, stroke, asthma, bronchitis/emphysema, osteoporosis and cancer, followed by 'other major illness', which participants are asked to specify. Separate questions are included on assistance in everyday activities (using an activities of daily living scale, which is used as an indication of disability), and whether help is needed with daily tasks due to long-term illness, disability or frailty. The question on disability is not associated with the impact of any stated chronic conditions (as is also the case in the SDAC).

In comparison with the SDAC, the classification/determination of people with disability in the ALSWH is not as robust; however, the longitudinal nature of the survey provides benefit not obtainable through the SDAC. Changes in women's health can be observed, which helps to clarify cause and effect relationships. With each new wave of data collection, the ALSWH has increasing opportunities to measure transitions; for example, the development and progression of chronic conditions, and any associations with disability.

45 and Up Study

The 45 and Up Study is the largest longitudinal study of healthy ageing in the Southern Hemisphere. The study aims to help manage and prevent illness through improved knowledge of chronic conditions and examine the factors associated with good or poor health as people age.

Potential participants from New South Wales were randomly sampled from the Medicare Australia database (approximately 50% of the New South Wales population aged 45 and over) and mailed a study questionnaire and information leaflet. Individuals from rural areas and those aged 80 and over were oversampled.

Recruitment began in February 2006, when more than 36,000 participants joined the study. The remainder of the cohort was recruited over the period 2007–2009, with the full cohort reached by December 2009. Over 260,000 men and women aged 45 and over across New South Wales were recruited for the baseline study (about 10% of this age group). The first follow-up survey was conducted in 2012–2015 and there are plans to conduct future waves.

Due to the low uptake of invited participants (18%), the survey sample is not representative of the New South Wales population. Therefore, prevalence estimates should not be generalised to the New South Wales population.

The study is funded predominately by the Sax Institute, which received core funding from the New South Wales Ministry of Health.

The study collects information about doctor-diagnosed asthma, breast cancer, prostate cancer, non-melanoma skin cancer, melanoma, stroke, heart disease, high blood pressure and diabetes with the addition of osteoarthritis in the follow-up questionnaire. Participants are able to nominate other important illnesses and answer questions on treatment, so other conditions may be noted. Data are also collected on long-term illness, disability and physical limitations; however, these questions are general and do not relate to any specific condition that the individual has reported.

As with the ALSWH, the longitudinal nature of the survey means that changes in health and outcomes can be measured over time.

ABS National Aboriginal and Torres Strait Islander Social Survey (NATSISS)

The NATSISS provides self-reported information on Aboriginal and Torres Strait Islander Australians covering a broad range of topics, including health and health risk factors, and provision of care for people with disability, a long-term health condition or old age. The NATSISS has been conducted 4 times—in 1994, 2002, 2008 and 2014–15—and results are available nationally, by state/territory and by remoteness.

The definition of disability and the disability types used in the NATSISS are largely the same as those used in the SDAC, the exception being the inclusion of social and behavioural difficulties, which was added to the SDAC in 2015.

Disability estimates vary between the SDAC and NATSISS for Aboriginal and Torres Strait Islander people due to differences in scope, methodology and the population benchmarks used to weight the disability estimates. The SDAC is able to provide greater detail about people with disability than the NATSISS; however, both the SDAC and NATSISS are consistent in showing that Aboriginal and Torres Strait Islander people generally have higher rates of disability compared with non-Indigenous people.

Appendix C: Methods and limitations

Crude prevalence estimates

Crude prevalence estimates are presented as percentages in this report. Crude prevalence, as a percentage, is defined as the number of people with a particular characteristic, divided by the number of people in the population of interest, multiplied by 100.

All crude prevalence estimates in this report are weighted estimates that use person weights allocated to each survey participant by the Australian Bureau of Statistics (ABS).

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 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. To provide an indication of whether 2 rates are statistically different, 95% confidence intervals have been calculated.

A 95% confidence interval describes a span of numbers around the estimate that has a 95% chance of including the true value. When comparing 2 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. Rates are reported as different if statistically significant, otherwise results are reported as similar.

Confidence intervals are presented throughout this report in order to indicate the span of numbers around an estimate that has a 95% chance of including the true value. Where confidence intervals overlap, it is impossible to say with certainty that the corresponding rates are statistically significantly different from each other. Where the sample size is small, as is the case for some analyses in this report, the confidence intervals may be wider.

Calculating standard errors, relative standard errors, and confidence intervals

For all survey data, the jack-knife weight replication method was used to derive the standard errors for each number estimate, using replicate weights provided by the ABS.

Once the standard error for the number estimates was produced, the standard error for the proportion was derived as follows:

$$SE\left(\frac{X}{Y}\right) = RSE\left(\frac{X}{Y}\right) \times \left(\frac{X}{Y}\right)$$

where $RSE\left(\frac{X}{Y}\right)$ is calculated as shown below.

The relative standard error of an estimate is a measure of the percentage errors likely to have occurred due to sampling. The relative standard error of an estimate is calculated as follows:

$$RSE\%(X) = \frac{SE}{estimate} \times 100$$

Caution should be used when a relative standard error is between 25% and 50% and estimates with a relative standard error greater than 50% are considered unreliable. These cases have been marked with a * or ** in the figures and supplementary data for this report.

The relative standard error for the proportion was derived from the standard error of both the estimate for the numerator (x) and the denominator (y) as follows:

$$RSE\left(\frac{X}{Y}\right) = \sqrt{RSE(X)^2 + RSE(Y)^2}$$

where x is a subset of y, and y is a survey estimate of the number of people in a group. The 95% confidence interval around the proportion estimates (P) was derived as follows:

$$LCL = P - 1.96 \times SE\left(\frac{X}{Y}\right)$$

$$UCL = P + 1.96 \times SE\left(\frac{X}{Y}\right)$$

where:

LCL = lower confidence limit

UCL = upper confidence limit.

Limitations

The estimates in this report are based on survey samples and are subject to sampling error, non-sampling error or both sampling and non-sampling error.

While the survey sample is large at over 75,000 people, the number of respondents in some categories was small (for example, 106 people with coronary heart disease and disability). A smaller survey sample will generally be less likely to find an observed difference to be statistically significant than a larger sample as the accuracy of estimates generally increases as sample size increases.

Small numbers also prevented the use of age-standardisation in some sections of this report, a technique that would usually be used where there are differences in population age structures (such as between diseases) in order to eliminate these differences and compare rates. For this reason, 2 age groups were used where possible, and crude rates presented where not. As some conditions and disabilities are more strongly related to age than others, this is likely to have had a confounding effect on some of the analyses in this report.

The survey uses largely self-reported information and relies on respondents to provide accurate information on the questions they are asked. Inaccurate information can be provided either accidentally or deliberately, and this can potentially have significant effects on the calculation of disease and disability prevalence rates. The methodology of the survey is such that the focus is on disability (impairments, activity limitations and restrictions) and the conditions associated with these. Some conditions may not be reported, undiagnosed conditions will not be reported, conditions may have been misdiagnosed, and some conditions may be deliberately misreported (that is, due to stigma or prejudice) and some accidentally unreported. The expectation is, therefore, that the SDAC is more reliable for identifying people with care needs than the prevalence of specific conditions.

Appendix D: Data Quality Statement

The primary data source for this report was the 2015 SDAC. Data presented in this report were extracted from the Detailed Microdata available in the ABS DataLab. Time trend data for 2012, 2009 and 2003 were extracted from the Basic confidentialised unit record file data sets available in the ABS DataLab.

The data quality declaration for the 2015 SDAC can be found in the ABS publication *Disability, Ageing and Carers, Australia: summary of findings, 2015* (ABS cat. no. 4430.0) <<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/4430.0Quality%20Declaration02015?opendocument&tabname=Notes&prodno=4430.0&issue=2015&num=&view=>>>.

Glossary

age-standardised rate: Age-standardisation is a technique used to eliminate the effect of differences in population age structures when comparing rates across different population groups.

cared accommodation: Defined by the ABS to include hospitals, aged care accommodation such as nursing homes and aged care hostels, cared components of retirement villages, and other 'homes' such as children's homes.

condition (health condition): A broad term that can be applied to any health problem, including symptoms, disease and various risk factors, such as high blood cholesterol.

confidence interval (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.

core activities: In the 2015 Survey of Disability, Ageing and Carers (SDAC), core activities are communication, mobility and self-care.

impairment: In the context of health experience, an impairment is defined by the International Classification of Functioning, Disability and Health (ICF) as a loss or abnormality in body structure or physiological function (including mental functions). Abnormality is used to refer to a significant variation from established statistical norms.

interquartile range: A measure of the spread of a data set. It is the difference between the 25th percentile and the 75th percentile and describes the middle 50% of values in a data set when ordered from lowest to highest.

limitation: A person has a limitation if they have difficulty doing a particular activity, need assistance from another person or use an aid to do a particular core activity.

long-term (health) condition: A term used in Australian Bureau of Statistics (ABS) surveys to describe a health condition that has lasted, or is expected to last, at least 6 months.

restriction: A person has a restriction if they have difficulty participating in life situations, need assistance from another person or use an aid.

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List of tables

Table 2.1: Prevalence of impairments, limitations and restrictions among people with selected chronic conditions as their main condition and disability, and the SDAC population, 201516

List of figures

Figure 2.1: Australian population estimates for people with selected chronic conditions and disability, based on self-reported data from the 2015 SDAC.....6

Figure 2.2: Prevalence of disability among males with selected chronic conditions, by age, 2015.....8

Figure 2.3: Prevalence of disability among females, with selected chronic conditions, by age, 2015...8

Figure 2.4: Prevalence of disability among males with selected chronic conditions as their main condition, by age, 2015.....10

Figure 2.5: Prevalence of disability among females with selected chronic conditions as their main condition, by age, 2015.....10

Figure 2.6: Disability severity among people with selected chronic conditions as their main condition and disability, 2015.....12

Figure 2.7: Prevalence of disability among people aged under 65 with and without selected chronic conditions, 201514

Figure 2.8: Prevalence of disability among people aged 65 and over with and without selected chronic conditions, by age and main condition, 201514

Figure 2.9: Age-standardised prevalence of disability among people with 1 of the 8 selected conditions as their main condition, by sex, 2003–201518



This report explores the association between 8 selected chronic conditions and disability in Australia: coronary heart disease, stroke, arthritis and related disorders, back pain and problems, osteoporosis, asthma and emphysema. These conditions are generally long term and persistent, and can lead to gradual deterioration of health, and disability. This report examines disability prevalence and severity; and the types of impairments, limitations and restrictions experienced by those with the selected conditions.

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