Australian Government
Australian Institute of Health and Welfare

A scoping study on data sources to assess the impact of chronic respiratory and musculoskeletal conditions on workplace productivity

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Contents

Summary

Chronic conditions are the leading cause of illness, disability and death in Australia and have lasting physical, psychological, social and financial impacts on individuals, communities and the health-care system. Productivity is a key area affected by chronic conditions—factors such as absenteeism, decreases in work performance due to illness, premature mortality, as well as the impact on study, recreation, and participation in and enjoyment of community life have been adversely linked to chronic conditions.

Respiratory and musculoskeletal conditions are 2 groups of chronic conditions associated with substantial productivity loss and activity impairment. This scoping study assesses the available data sources for monitoring the relationship between these chronic conditions and workforce productivity. Although many of the data sources identified were not primarily designed for monitoring these conditions, they do contain relevant data. The scoping study also discusses existing data deficiencies and gaps, and suggests future opportunities to fill these gaps.

Key findings

- Of the 39 data sources considered, 21 were determined to be in scope of this report and were examined in detail.
- Most data sources examined provide some measure of rate of musculoskeletal and/or respiratory conditions, either at a national, state or regional level.
- In terms of 'direct' measures of productivity, the data sources presented provide varying levels of information. Labour force status/participation was most commonly reported, along with time off work/time lost for work, and ability to participate in work.
- Individual impact of chronic musculoskeletal and respiratory conditions on productivity (such as pain, disability, functioning, social participation and death) is by far the most-reported priority area. Each data source included at least 1 measure of physical functioning, bodily pain and medication, as well as an individual's disability status and level/type of restrictions.
- Population impact was available through data sources such as the North West Adelaide Health Study and the Australian Longitudinal Study on Women's Health, which have records linked to the Medical Benefits Schedule and Pharmaceutical Benefits Schedule to provide information on health service utilisation.
- Data gaps that were identified include a lack of nationally representative data sources, the inability to ascertain the direct impact of a chronic condition on productivity, and a variety of measurement techniques used across data sources, which makes comparability and data linkage difficult.

This scoping study identifies opportunities for analysis and research that draw on the strengths of existing data sets, such as:

- baseline reporting of 1 or more existing data sources to look at the impact on productivity of chronic musculoskeletal and respiratory conditions at the national level
- investigating the economic costs of losses in productivity due to chronic conditions
- data linkage to bring together 2 or more existing data sources to look at topics such as the pathways through workforce participation, illness and injury, service use and health outcomes, and determining levels of absenteeism linked to chronic conditions

- developing new surveys, or modules to existing surveys, that look specifically at the direct and indirect relationship between chronic conditions and productivity.

Scope of this report

Table 1 presents a matrix summarising the 21 data sources examined in detail and their ability to provide information in each of the priority information areas. For a data source to be included in the scope of this report, it must include:

- information in the key priority areas of 'Presence of condition' and 'Demographics of the study sample'
- information in at least 1 of the other key priority areas 'Productivity', 'Individual impact' and/or 'Population impact'.

Data sources that have been investigated and considered out of scope are presented in 'Appendix A: Out-of-scope data sources'.

Table 1: Data source matrix

Type and name of data set	Some level of information available in priority information area				
	Presence of condition	Productivity	Individual impact	Population impact	Demographics of the study sample
Administrative					
Disability Support Pension (DSP)	✓	✓	✓	✓	✓
National Data Set for Compensation-based Statistics (NDS)	✓	✓		✓	✓
National Hospital Morbidity Database (NHMD)	✓	✓	✓		✓
National Mortality Database (NMD)	✓		✓		✓
Survey-based					
Burden of Obstructive Lung Disease Australia (BOLD)	✓		✓		✓
Australian Bureau of Statistics (ABS) National Health Survey (NHS)	✓	✓	✓		✓
Australian Bureau of Statistics (ABS) Work-Related Injuries Survey (WRIS)	✓	✓	✓		✓
The Survey of Disability, Ageing and Carers (SDAC)	✓	✓	✓	✓	✓
Voice of Arthritis Social Impact Study		✓	✓		✓
Longitudinal					
Household, Income and Labour Dynamics in Australia (HILDA) Survey	✓	✓	✓	✓	✓
North West Adelaide Health Study (NWAHS)	✓	✓	✓	✓	✓

Australian Longitudinal Study on Women's Health (ALSWH)	✓		✓	✓	✓
Concord Health and Ageing in Men Project (CHAMP)	✓		✓		✓
45 and Up Study	✓	✓	✓	✓	✓
Ten to Men Study	✓	✓	✓	✓	✓
Raine Study	✓	✓	✓	✓	✓
Busselton Health Study	✓		✓		✓
Registry					
Australian Rheumatology Association Database (ARAD)		✓	✓	✓	✓
Surveillance of Australian workplace Based Respiratory Events (SABRE)	✓		✓		✓
Derived					
Australian Burden of Disease Study 2011 (ABDS)	✓		✓	✓	✓
Arthritis and Disability Study	✓	✓	✓	✓	✓

1 Introduction

1.1 Purpose of this report

Chronic conditions (also known as 'non-communicable diseases' or 'long-term health conditions'), such as musculoskeletal and respiratory conditions, are leading contributors to ill health among the Australian population (AIHW 2014a). These conditions can result in functional limitation and disability and can affect an individual's ability to participate in the workforce (Musich et al. 2006; Popkin et al. 2006), which then adversely affects productivity in the workforce.

The purpose of this scoping paper is to describe currently available data sources and assess their use as sources of information on the relationship between chronic respiratory and musculoskeletal conditions and productivity. In addition to descriptive measures of the size, scope, methodology and purpose of the data source, this report focuses on 5 key priority information areas:

- presence of condition
- measure of productivity
- individual impact (quality of life and disability)
- population impact (expenditure, costs)
- demographics of the study sample.

Because monitoring of chronic respiratory and musculoskeletal conditions and associated productivity was not the primary purpose of many of these data sources, this paper does not make judgements on their broader value and application.

This scoping paper also provides a basis for future productivity studies for other chronic conditions. It could also inform future work on analysis of productivity to help build the evidence base consistent with the directions outlined in the National Strategic Framework for Chronic Conditions, particularly in relation to Objective 2: the provision of effective and appropriate care to support people with chronic conditions and optimise quality of life.

1.2 Structure of this report

The report has 5 chapters:

- Chapter 1 outlines the purpose and structure of the report.
- Chapter 2 outlines the purpose and scope of the report, and provides an introduction to chronic conditions (in particular, chronic respiratory and musculoskeletal conditions) and productivity.
- Chapter 3 details the approach taken in this report, including the modification and use of a framework to assess data sources for population health monitoring developed by the Australian Institute of Health and Welfare (AIHW) (AIHW 2014b).
- Chapter 4 provides an assessment of available data sources relevant for monitoring chronic respiratory and musculoskeletal conditions using the framework, broken down by type of data.
- Chapter 5 provides a discussion on the overall findings and provides ideas for future opportunities for data development and reporting on measures of productivity.

2 Chronic conditions and productivity

Chronic conditions are having an increasing negative impact on the Australian health-care system. The National Strategic Framework for Chronic Conditions defines chronic conditions as 'a broad range of chronic and complex health conditions across the spectrum of illness, including mental illness, trauma, disability and genetic disorders' (AHMAC 2017). Chronic conditions have complex causality, with multiple factors leading to their onset, a long development period (for which there may be no symptoms) and a prolonged course of illness, perhaps leading to other health complications.

Chronic conditions can have varying severity, ranging from mild to more significant conditions and can include:

- cardiovascular conditions (such as coronary heart disease and stroke)
- cancers (such as lung and colorectal cancer)
- mental disorders (such as depression)
- diabetes
- respiratory diseases (including asthma and chronic obstructive pulmonary disease)
- arthritis
- osteoporosis and other musculoskeletal conditions
- chronic kidney disease
- oral diseases (such as tooth decay and gum disease).

As the leading cause of illness, disability and death in Australia (AIHW 2014a), chronic conditions have physical, psychological, social and financial impacts on individuals, communities and the health-care system. For example, musculoskeletal conditions are a significant cause of disability and have a strong negative effect on a person's quality of life, affecting the ability to participate in self-care, work, family and social activities. In 2015, 31% of people with disability reported having a musculoskeletal condition (ABS 2015a). Similarly, asthma has varying degrees of impact on the physical, psychological and social wellbeing of people living with the condition, with those with severe or poorly controlled asthma most affected (ACAM 2011).

The impact of these conditions are increasing as Australia's population continues to age and as there is greater need for long-term management (AHMAC 2017; AIHW 2014a). This scoping study focuses on musculoskeletal and respiratory conditions, due to their prevalence among people of working age: in 2014–15, 57% of self-reported respiratory conditions and 61% of self-reported musculoskeletal conditions were among people aged 25–64 (ABS 2015b).

2.1 Chronic respiratory conditions

Chronic respiratory conditions affect around 7 million Australians, or 31% of the population (ABS 2015b). Of all chronic respiratory conditions, the most prevalent based on self-reported data are allergic rhinitis (hay fever), asthma and chronic sinusitis (Box 2.1). It is possible to have more than 1 chronic respiratory condition, and they can be long-lasting or short-term.

Box 2.1: Common chronic respiratory conditions

Asthma is a long-term disorder of the airways where people experience episodes of wheezing, breathlessness and chest tightness due to widespread narrowing of the airways. It is more common in children. In 2014–15, based on self-reported data, an estimated 2.5 million Australians (11% of the population) had the condition (ABS 2015b).

Chronic Obstructive Pulmonary Disease (COPD) is a general term for diseases in which airflow is limited and can lead to shortness of breath, including emphysema and chronic bronchitis. The condition develops over many years and therefore mainly affects middle-aged and older people. Self-reported data indicates that around 2.6% of the Australian population (or 600,000 people) in 2014–15 (ABS 2015b) reported having COPD as a long-term condition.

Hay fever is a term commonly used to describe *allergic rhinitis* caused by either seasonal exposure to pollen or other exposures. Characterised by a runny or blocked nose and/or sneezing and watery eyes (AIHW 2011), 4.5 million people (or 19% of the population) self-reported having hay fever/allergic rhinitis as a long-term condition in 2014–15 (ABS 2015b).

Chronic sinusitis is the inflammation of the lining of one or more of the sinuses. It occurs when the normal draining of the sinuses is obstructed by swelling of the nasal mucous membrane, excessive mucus production or an anatomical abnormality (Durand et al. 1998). Approximately 1.9 million people (or 8% of the population) self-reported having chronic sinusitis in 2014–15 (ABS 2015b).

Other chronic respiratory conditions include influenza and pneumonia, bronchiectasis, cystic fibrosis, occupational lung diseases, sleep apnoea and pulmonary fibrosis.

More information on chronic respiratory conditions in Australia can be found on the AIHW website, https://www.aihw.gov.au/reports-statistics/health-conditions-disability-deaths/asthma-other-chronic-respiratory-conditions/overview.

2.2 Chronic musculoskeletal conditions

Chronic musculoskeletal conditions affected around 1 in 3 Australians (30% or 6.9 million people) in 2014–15 (ABS 2015b). The most common conditions are back problems, osteoarthritis and osteoporosis (Box 2.2). Musculoskeletal conditions are strongly associated with increased disability and can have a negative, and often lifelong, effect on an individual (AIHW 2017a). Like chronic respiratory conditions, it is possible to have more than 1 chronic musculoskeletal condition.

Box 2.2: Common chronic musculoskeletal conditions

Back pain and problems are used to describe a range of conditions related to the bones, joints, connective tissue, muscles and nerves of the back. These conditions can affect the neck (cervical spine), upper back (thoracic spine) and lower back (lumbar spine) as well as the sacrum and tailbone (coccyx). The occurrence of back pain and problems have been associated with factors such as age, physical fitness, smoking, being overweight and type of occupation (for example, those requiring lifting, bending, twisting, pulling and pushing). About 3.7 million Australians (16% of the population) reported having back pain and problems in 2014–15 (ABS 2015b).

Osteoarthritis is a degenerative joint condition that mostly affects the hands, spine and joints (such as the hips, knees, ankles and feet). Its main feature is the breakdown of the cartilage that overlies the ends of the bones in the joints. Age is the strongest factor in the development and progression of osteoarthritis. About 2.1 million Australians (9% of the population) reported having osteoarthritis in 2014–15 (ABS 2015b).

Rheumatoid arthritis is a chronic autoimmune disease in which the immune system attacks the tissues lining the joints, causing inflammation, pain and stiffness. The hand joints are most commonly affected. This condition is progressive, causing irreversible joint damage and resulting in deformities and severe disability. The cause of rheumatoid arthritis is not well understood, although there is a strong genetic component. About 408,000 Australians (2% of the total population) reported having rheumatoid arthritis in 2014–15 (ABS 2015b).

Osteoporosis is a condition that causes bones to become thin, weak and fragile, such that even a minor bump or accident can cause a broken bone (known as a minimal trauma fracture). Older people and post-menopausal women are at the greatest risk. About 802,000 Australians (3.5% of the population) reported having osteoporosis in 2014–15 (ABS 2015b).

Juvenile arthritis is a general name for several different kinds of arthritis in children. Most forms are believed to be autoimmune disorders. Juvenile arthritis affects less than 1% children and is more common in girls than boys.

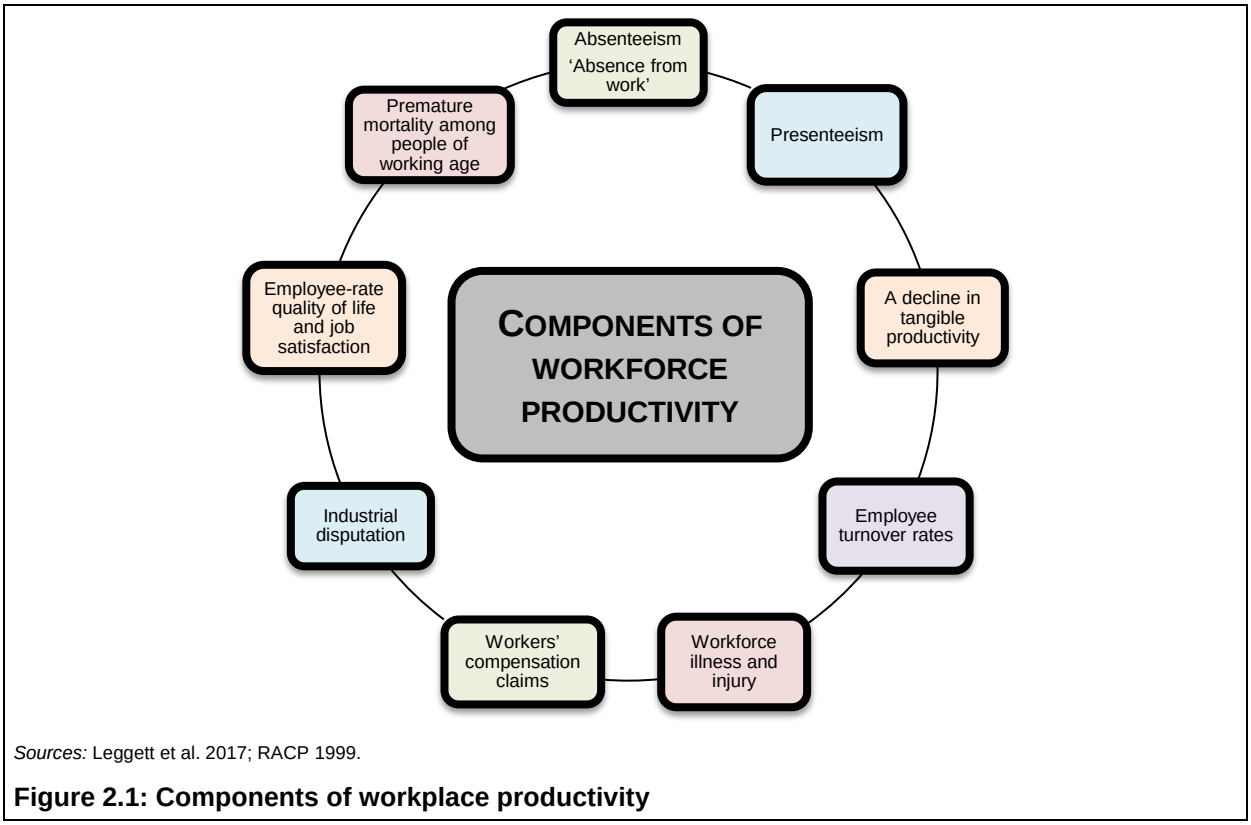
Gout is a form of inflammatory arthritis that develops when an excess of uric acid in the blood leads to deposits of uric acid crystals in 1 or more joints, causing inflammation. The most commonly affected joint is the big toe, however gout can also affect other joints in the arms (fingers, wrists, elbows) and legs (toes, ankles, knees). Around 192,000 Australians (0.8% of the population) reported having gout in 2014–15 (ABS 2015b).

More information on chronic musculoskeletal conditions in Australia can be found on the AIHW website, https://www.aihw.gov.au/reports-statistics/health-conditions-disability-deaths/arthritis-musculoskeletal-conditions/overview.

2.3 What is workforce productivity?

In general terms, productivity is a measure of efficiency of a person (that is, the ability to do a job or task successfully). In this report, the scope of productivity in relation to the impact of respiratory and musculoskeletal conditions has been limited to factors that affect 'workforce productivity'. This report focuses on paid employment, rather than the unpaid or voluntary labour sectors, or those that are informal carers.

Historically, workforce productivity has typically been measured using quantitative measures such as either absenteeism (days absent from work) and employee turnover rates. More recently, however, qualitative measures such as quality of life, job satisfaction and presenteeism (reduced work productivity while physically present at work) have come to the forefront of research into workforce productivity (Agaliotis et al. 2014). Studies considering presenteeism have found that it accounts for a greater proportion of the productivity loss than absenteeism (Holden et al. 2011). Figure 2.1 highlights the many different quantitative and qualitative measures of workforce productivity that are currently used in academic studies and government inquires. This scoping study examines available data sources for both quantitative and qualitative measures of workforce productivity (see 'Appendix B: Components of workforce productivity and their measurement' for more information on these measures).



Sources: Leggett et al. 2017; RACP 1999.

Figure 2.1: Components of workplace productivity

Another concept in worker health and productivity research is work ability. Work ability refers to the balance between a worker's resources (health, abilities, skills) and the demands of their work (Leijten et al. 2014). The concept of work ability ties in with workplace productivity so that if work ability decreases as a result of a decline in a worker's resources (for example, as a result of a chronic health condition), productivity would be impaired potentially due to an increase in absenteeism and/or presenteeism. Skill improvement is a component of work ability. The Treasury considers skill improvement one of the key public policy responses to

boost the labour force participation of older people and emphasises retaining and reskilling programs and enhanced assistance programs for these workers (Treasury 2015).

Boosting participation is also considered to enhance human capital, which refers to the economic value of labour, including knowledge and skills (Becher & Dollard, 2016).

The House of Representatives and House Standing Committee on Economics (2010) emphasises that human capital encapsulates the whole person—a person's health is a critical component in their personal and social wellbeing, as well as their productivity.

Good health is a form of capital that can enable individuals to increase their lifetime earnings (HR & HSCE 2010). More broadly, a healthier population leads to a better workforce, because more people can participate at higher intensity. This has significant implications for the level of productivity (HR & HSCE 2010). The Inquiry into raising the productivity growth rate in the Australian economy noted the importance of preventative health and improving the general wellbeing of the population to enhance human capital (HR & HSCE 2010).

For more information on the methodology used to measure aspects of productivity, see 'Appendix B: Components of workforce productivity and their measurement'.

2.4 Exploring the relationship between chronic conditions and workforce productivity

The changing structure of Australia's population (largely due to increased life expectancy and declining fertility rates) (Productivity Commission 2005) is likely to have flow-on effects for chronic conditions and workforce productivity. Between 1997 and 2017, the proportion of Australians aged 65 and over increased from 12.1% to 15.4%, while the proportion of people of working age (15–64) decreased slightly from 66.5% to 65.7% of the total population (ABS 2017).

Older Australians are expected to remain in work longer, in part due the rise of the qualifying age for the Age Pension (AHRC 2012). By 2050, the 45+ age range is projected to make up 40.2% of the workforce compared with the current proportion of 36.7% (Medibank Private & KPMG Econtech 2011). A greater proportion of older people working has both positive and negative consequences. Workforce engagement contributes to a sense of purpose, provides social connection and is associated with improved health outcomes and general wellbeing—all of which are important components of healthy ageing (AHRC 2015). However, older people are more likely to have chronic conditions and these have the potential to limit their productivity in the workplace, particularly when support is not provided.

Because chronic conditions are more prevalent among people in older age groups Australia's health-care systems will need to continue to adapt and provide ongoing support for the ageing population. A 2005 report by the Productivity Commission reported that people aged 65 and over spend around 4 times as much on health care as those aged under 65 (Productivity Commission 2005). A later report by the Productivity Commission (2013) identified future increased expenditure on health, aged care and the aged pension as a result of the ageing population, which will put pressure on government budgets. The Commission suggests reforms in the health-care sector may be necessary to improve efficiency, improve productivity and reduce fiscal pressures (Productivity Commission 2013). Medibank Private and KPMG Econtech (2011) proposed the new demographic of workforce brings with it a number of considerations, including a change in the types of health conditions affecting workers. By 2050, the most common types of illnesses are projected to be arthritis, heart disease, hypertension and back, neck or spinal problems (Medibank Private & KPMG Econtech 2011).

The cost of employees in poor health can be significant. Employers bear costs associated with poor health through increases in both absenteeism and presenteeism. The estimated cost of absenteeism to the Australian economy is $7 billion, while the cost of presenteeism is nearly 4 times more (Human Rights Commission 2016). An AIHW analysis of the Australian Bureau of Statistics (ABS) National Health Survey (NHS) 2004–05 reports that those with chronic conditions have 0.48 days off per fortnight due to sickness compared with 0.25 days for people without a chronic condition (AIHW 2009).

Academic studies on chronic conditions and productivity

In recent years, many academic studies have found a strong association between chronic conditions and productivity and quality of life, including decreases in work performance, decreased employment participation and premature mortality (for example, Access Economics 2008; Besen & Pransky 2014; Fletcher et al. 2010; Lee et al. 2013; RACP 1999; To et al. 2012). Some further examples of this research are presented in the next sections.

Case study #1

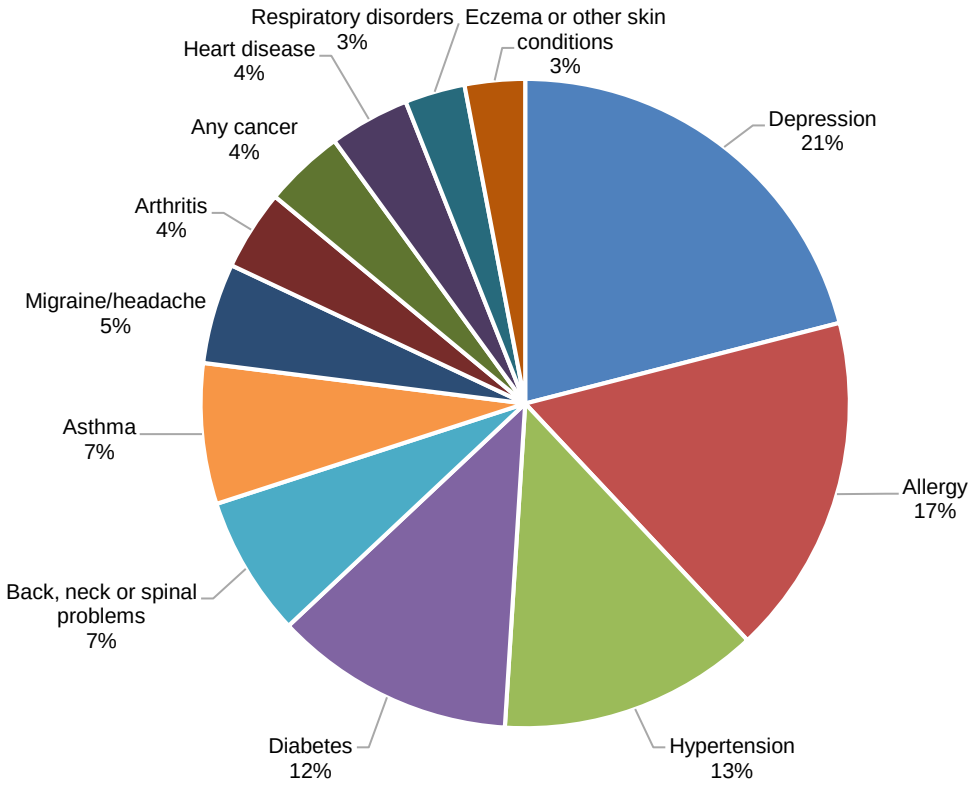
In the United States, Collins and colleagues (2005) investigated the prevalence and estimated the total health costs for chronic conditions for the Dow Chemical Company. They used the Stanford Presenteeism Scale to collect information from workers on work impairment and absenteeism based on self-reported chronic health conditions. Survey data were merged with a range of other data including medical and pharmaceutical claims, payroll records and job type. Results showed that:

- almost 65% of the workforce reported having a chronic health condition, with the most common primary conditions being allergies (19%), arthritis/joint or pain stiffness (9%), heart or circulatory problems and back or neck disorders (7% each)
- for workers reporting a chronic condition, absenteeism ranged from 0.9 hours to 5.9 hours in the previous 4 weeks, while work impairment ranged from an 18% to 36% decrement in ability to function
- the total cost of chronic conditions was estimated to be 10.7% of the total labour costs for the Dow company in 2002; 6.8% was attributable to work impairment (presenteeism) alone (Collins et al. 2005).

Case study #2

Medibank Private and KPMG Econtech (2011) estimated that the economic cost of presenteeism to the Australian economy in 2009–10 was $34.1 billion, which equated to a 3.7% decrease in the Gross Domestic Product (GDP). The study also considered the impact of 12 medical conditions (Figure 2.2), and found that:

- allergies were among the biggest contributors to overall productivity loss caused by presenteeism, accounting for 17% of overall productivity loss (second only to depression, which accounted for 21%)
- respiratory diseases accounted for an additional 10% of productivity loss
- musculoskeletal conditions accounted for about 11% of overall productivity loss.



Note: Percentages refer to the contribution that each medical condition makes to the overall productivity loss of 2.6% in 2009–10.

Source: Medibank Private & KPMG Econtech 2011.

Figure 2.2: Contribution of medical conditions to overall productivity loss

Case study #3

Holden and colleagues (2011) examined cross-sectional data from the Australian Work Outcomes Research Cost–Benefit study to explore the impacts of health conditions with and without comorbid psychological distress, compared with those with neither condition, in a sample of approximately 78,000 working Australians. Absenteeism and presenteeism were measured using the World Health Organization Health and Work Performance Questionnaire (HPQ), with the risk of productivity loss associated with health conditions derived. It was found that for both absenteeism and presenteeism:

- there was a greater risk of productivity loss associated when health conditions were comorbid with psychological distress
- for some conditions this risk was much greater for those with comorbid psychological distress compared with those without (Holden et al. 2011).

Case study #4

Leijten and colleagues (2014) investigated the influence of chronic health problems on work ability and productivity at work among 8,411 older employees in the Netherlands (aged 45–64, from the Longitudinal Study on Transitions in Employment, Ability and Motivation). Work ability refers to the balance between an individual's resources (health, functional abilities, competencies) and work demands (work environment, contents, demands). At the 1-year follow-up, it was found that all chronic health problems were associated with decreases in work ability and, to a much lesser extent, lower productivity at work.

Musculoskeletal and respiratory conditions and productivity

Both respiratory and musculoskeletal conditions are associated with substantial productivity loss and activity impairment. For example:

- Goetzel and colleagues (2004) conducted a large-scale study in the United States of America to synthesise evidence about the total cost of health, absence, short-term disability and productivity losses for 10 health conditions. Cost estimates from the Medstat MarketScan Health and Productivity Management database, which contains administrative person-level information on 374,799 employees over a 3-year period from 1997 to 1999, were combined with survey-based estimates of absenteeism and presenteeism from several productivity surveys. This study found allergy and arthritis were among the highest estimated annual employee costs of presenteeism in the overall population, at $224 and $252 per employee per annum, respectively. When examining the overall economic burden of conditions, arthritis was ranked 4th at $327 per employee per year.
- Loeppke and colleagues (2009) investigated health-related lost productivity among 10 American employers with a total of 51,648 respondents using the HPQ, and linked this information to medical and pharmacy claims.When medical and pharmacy costs were combined with the costs of absenteeism and presenteeism arthritis and back and neck pain ranked as the 3rd and 4th costliest chronic conditions, respectively (preceded by depression and obesity).
- A study in Sweden has linked COPD to higher levels of sick leave (particularly in the milder cases), while high rates of early retirement have been found in those suffering the most severe form of the condition (Jansson et al. 2013).
- Schofield and colleagues (2015) estimated that around 9% of the 347,000 productive life years lost in Australia in 2010 were due to chronic conditions, in particular back problems, arthritis and mental and behavioural problems.
- Knee pain and knee osteoarthritis have been strongly associated with absenteeism from the labour force (Agaliotis et al. 2014).
- A 2014 review of 42 published studies found lower back pain was associated with time off work, financial pressures, the need to modify work tasks and concerns about loss of employment (Froud et al. 2014).
- Kyaw-Myint and colleagues (2015) found that young Australian workers diagnosed with back or neck pain were estimated to have 73.4 hours of sickness absence per year on average while young workers without back or neck pain were estimated to have 41.6 hours of absence. The financial cost to the employer was $1168 per worker per year more for those with back or neck pain compared to those without due to extra hours lost from health-related absence.

Governments and businesses are increasingly recognising the contribution of a healthy workforce to economic development and continuing prosperity (Safe Work Australia 2015). Absenteeism, delays in work and a decline in productivity are often the first indications of issues in the workforce, and often occur before an injury or disease diagnosis (RACP 1999). Current health policies including the National Strategic Framework for Chronic Conditions incorporate a strong focus on effective prevention and management of chronic disease (particularly in the early stages), to lessen the growing impact of these conditions on Australia's population (AHMAC 2017).

3 Assessment approach

3.1 Types of data sources

A number of data sources provide health information in Australia. Based on the various methods of data collection of health information in Australia, the data sources in this report have been categorised into 1 of 5 categories:

- administrative data
- survey-based data
- longitudinal surveys
- registry data sources
- derived and other data.

The information in these data sources is obtained from individuals, government agencies and private and community organisations and health professionals. Information may also be collected continuously over many years to allow comprehensive analysis of chronic conditions or health service use over time, while once-off surveys provide a 'snapshot' at a particular point in time. A disease-monitoring system can include 1 or more of these data sources to inform the population health issue in question.

A description of each of these data sources, outlining their benefits and limitations, is provided at the beginning of each section in the report.

3.2 AIHW's framework for assessing data sources

This report uses a modified version of the template from the AIHW's framework for assessing data sources for population health monitoring (AIHW 2014b). Developed by the AIHW in 2014, the assessment framework is specifically tailored to assess population health data sources, and can be used by other organisations undertaking similar projects. With a little modification, the framework could be applied to other subject areas when researching data potential.

As part of the assessment process, the framework identifies 3 steps:

1. collecting information about the data source
2. identifying the potential to inform key monitoring areas (using the template in Table 3.1)
3. assessing the quality of the data, using a modified version of the ABS Data Quality Framework (ABS 2009), to determine its 'fitness-for-purpose' by establishing its utility, strengths and limitations.

Steps 1 and 2 are covered in Chapter 4 of this report, while a descriptive assessment of the data is provided in Chapter 5.

Table 3.1: Data source information template for assessing data sources for population health monitoring

Full name of the survey or data collection		
Type of data source		For example: survey type (registry or administrative) and scope (national, state or regional).
Brief description		Brief outline of data source.
Purpose(s)		Main stated purpose or purposes of the data source.
Collection methodology		Key features of the collection methodology (administrative or survey) and data collection method (computer-assisted telephone interview, self-completion, administrative).
Scope (theoretical coverage of relevant population) and coverage (actual)		Population that is potentially covered, and actual population covered (response rate).
Geographic coverage		National, state or other.
Frequency/timing		Year(s) in which data have been collected.
Basic collection count		For example: treatment episodes or separations.
Size		Sample size or number of records in most recent reference period.
Collection management organisation		The organisation chiefly responsible for collecting and managing the data.
Further information		Where to go for further information.
Priority information areas	Presence of condition	Prevalence and incidence of chronic condition (whether the data source contains information on health conditions).
	Productivity	Including absenteeism and presenteeism, working hours, ability to work, workforce illness and injury.
	Individual impact	Pain, disability, functioning, social participation and death.
	Population impact	Carer impacts, impact of disease and other measures of expenditure/costs.
	Demographics of the study sample	For example: age, sex, location (remoteness and socioeconomic status can be generated from location in some cases), Indigenous status, marital status.

Source: Modified from 'Data source template', in AIHW 2014c.

4 Assessment of available data sources

4.1 Administrative data sources

Administrative data sources contain information about the delivery of services, or a record of events, collected for historical or funding purposes (AIHW: Prescott et al. 2006).

These records are compiled into databases that are managed by various government agencies. The data may come from a large range of sources, such as deaths, hospital separations, Medicare payments or prescription pharmaceutical subsidy records. Although the primary purpose of administrative data collection is focused on various aspects of health-care service delivery, these data can be used for secondary purposes reporting on various projects in isolation or with other data sources to inform policy and quality of care.

Because administrative data can capture almost all of the activity of a service, they are considered to have good coverage of a person or services at the national, state and territory or regional level. They are also suitable for generating time series because they are generally collected on an ongoing basis and reported frequently. However, these data sources have some limitations, such as issues with consistency and scope.

Four administrative data sources are examined in this section:

1. Disability Support Pension (DSP)
2. National Data Set for Compensation-based Statistics (NDS)
3. National Hospital Morbidity Database (NHMD)
4. National Mortality Database (NMD).

Disability Support Pension (DSP)	
Type of data source	Administrative (national)
Brief description	The Disability Support Pension (DSP) is an income support payment provided by the Department of Social Services (DSS) to people with disability and carers. The DSP is payable to people who are aged between 16 and 64 and under Age Pension Age (when claiming) and are either permanently blind, or have a physical, intellectual or psychiatric disability causing functional incapacity. The person must also have Continuing Inability to Work (CITW) status—unable to work at least 15 hours per week independently of a Program of Support (POS) in the next 2 years, or be re-skilled for such work within the next 2 years, or are participating in the Supported Wage System. In order to claim the DSP, a person may be required to undergo an assessment such as an Employment Services Assessment, a Job Capacity Assessment or the Disability Medical Assessment.
Purpose	To help people with disability to work. Working even a few hours a week can provide opportunities and reduce barriers (such as, participation in work and assistance to improve current and future work capacity) for these people.
Collection methodology	The Priority Investment Approach (PIA) research data set specification (DSS) defines longitudinal social security information related to Centrelink recipients and their partners. The information defined includes information related to entitlements to benefits, payment information and demographic details. The data are collected from Department of Human Services (DHS) forms and online data systems and stored in the DHS Enterprise Data Warehouse (EDW) for analysis and reporting.
Scope and coverage	The PIA data set holds details of all DSP customers who were current or suspended at the end of every quarter from 1 September 2001 to 30 June 2017.
Geographic coverage	All states and territories, Australia
Frequency/timing	PIA is a one-off data extraction using DSS data sets. Data for a customer for each quarter is all ‘as known at’ the extraction date.
Basic collection count	There is 1 row per quarter for every customer who is receiving an income support payment at the end of the quarter. For DSP customers, this includes those with a benefit status of ‘suspended’, because DSP recipients can retain eligibility when they attempt a return to employment.
Size	Number of recipients 782,891 received DSP
Collection management organisation	Department of Social Services

Disability Support Pension (DSP) (continued)			
Further information			https://www.humanservices.gov.au/individuals/services/centrelink/disability-support-pension.
Priority information areas	Presence of condition	✓	From June 2006, the data item 'Primary Medical Condition' includes a value of 'Musculoskeletal conditions and connective tissue' and 'Respiratory System' and enabling identification of people who were granted DSP primarily because of these conditions. *Note:* the PIA data set cannot identify those customers where these conditions contributed to qualification for DSP but were not the main impairment.
	Productivity	✓	Hours worked, partial capacity to work
	Individual impact	✓	Impairments
	Population impact	✓	Benefits paid as part of support pension
	Demographics of the study sample	✓	Age, country of birth, citizenship, gender, Indigenous status, refugee status, preferred and spoken language, marital status

Disability Support Pension: data snapshot

Based on the latest available results from the DSP:

- there were 782,891 claims in 2017
- of these 22% were for musculoskeletal conditions and connective tissue as the primary medical condition. This is the second most common medical condition after psychological/psychiatric conditions (34%).

Source: Department of Human Services 2017.

National Data Set for Compensation-based Statistics	
Type of data source	Administrative (national)
Brief description	The National Data Set for Compensation-based statistics (NDS) compilation of a standard set of data items, concepts and definitions collected by workers' compensation schemes operating in Australia.
Purpose	To compile and maintain national and nationally comparable workers' compensation-based data to provide a national picture of work-related injuries and diseases, including time lost from work and compensation paid.
Collection methodology	Annual collection of worker's compensation claims made under the state, territory and Commonwealth Government workers' compensation Acts. Data is compiled by demographic information, type of industry of the claimant's employer, occupation of the claimant, and work-related injury and disease. Information about the occupation of the claimant is coded using the Australian and New Zealand Standard Classifications of Occupations, 2013, Version 1.2 (ABS 2013a). Information about industry of the claimant's employer is coded using the Australian and New Zealand Standard Classification (ANZSIC), 2006 (ABS 2013b). Information about injuries and diseases of claimants is coded using the Type of Occurrence Classification System, 3rd Edition, Revision 1 (2008). This classification is based on an aggregate version of the International Classification of Diseases (10th revision)—Australian Modification (ICD-10-AM) (National Centre for Classification in Health 1998). Work-related injury and disease is coded according to the: • nature of injury/disease (physical, mental illness) • bodily location • mechanism of incident (action, exposure or event that best describes the circumstances in which the specific injury/disease occurred) • breakdown agency (the breakdown event is defined as the point at which things started to go wrong, ultimately leading to the most serious injury or disease), and • agency of injury or disease (identifying the chemicals, products, processes or pieces of equipment involved).

National Data Set for Compensation-based Statistics (continued)			
Scope and coverage			The NDS is comprised of accepted worker's compensation claims. NDS 3 includes rejected and pending claims. The NDS does not cover all cases of work-related injuries, such as: • fatal cases and injuries involving temporary incapacity and requiring absence of work of less than a working week • claims arising from a journey to and from work or during recess period • claims lodged by police in Western Australia and Australian Defence Force personnel • self-employed workers • mesothelioma claims linked to work-related exposure to asbestos • diseases resulting from long-term exposure to agents or having long latency periods.
Geographic coverage			All states and territories, Australia
Frequency/timing			Financial year (1 July – 30 June)
Basic collection count			All new claims reported in the reference year, for which liability was either accepted or rejected, or a decision on liability was pending. Claims that were subsequently withdrawn by the claimant or disallowed on the basis of not being within the scope of the scheme were excluded.
Size			104,769 serious workers' compensation claims in 2015–16
Collection management organisation			Safe Work Australia (SWA). Each jurisdiction collects information and provides an extract of agreed data items to SWA.
Further information			https://www.safeworkaustralia.gov.au/doc/australian-workers-compensation-statistics
Priority information areas	Presence of condition	✓	Injury and musculoskeletal disorders Respiratory system diseases (asthma, chronic bronchitis, emphysema, pneumoconiosis due to coal dust, legionnaire's disease, allergic rhinitis, hay fever, upper respiratory tract infection, asbestosis, silicosis, other respiratory conditions due to substances, other diseases of the respiratory system and so forth)
	Productivity	✓	Time lost from work
	Individual impact		No data
	Population impact	✓	Compensation paid
	Demographics of the study sample	✓	Age, sex, occupation, industry, state/territory, remoteness

National Data Set for Compensation-based Statistics: data snapshot

Based on the latest available results from the National Data Set for Compensation-based Statistics:

- of all serious workers' compensation claims (104,769) in 2015–16, 87% were due to injury and musculoskeletal disorders, 0.2% due to respiratory system diseases
- the highest frequency rate of serious claims in 2015–16 were among employees aged 60–64 (7.6 serious claims per million hours worked). By contrast, employees aged 30–34 had the lowest frequency rate (4.4 serious claims per million hours worked)
- in 2015–16, areas of the body most affected were back (20%), hand (13%), and shoulder (10%) and knee (10%)
- the median time lost from work in 2014–15 was 5.1 working weeks for injury and musculoskeletal disorders and 5.0 for respiratory system diseases
- the median compensation paid in 2014–15 was $10,100 for injury and musculoskeletal disorders and $12,400 for respiratory system diseases.

Note: Statistics on median time lost and median compensation paid are available up to 2014–15. Preliminary data (2015–16) are excluded when reporting time lost and compensation paid because claims from the preliminary year are likely to be open and claimants may accrue more time lost or more compensation payments in subsequent years.

Source: Safe Work Australia 2017.

National Hospital Morbidity Database (NHMD)	
Type of data source	Administrative (national)
Brief description	The NHMD is a compilation of episode-level records from admitted patient morbidity data collection systems in Australian hospitals.
Purpose(s)	To provide information on admitted patient care, such as 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.
Collection methodology	The data supplied are based on the National Minimum Data Set for admitted patient care. Data are supplied to the AIHW by state and territory health authorities under the terms of the National Health Information Agreement.
Scope and coverage	The NHMD is a comprehensive data set that has records for all episodes of admitted patient care from essentially all public and private hospitals in Australia. For 2015–16, almost all public hospitals provided data for the NHMD (1,331 total hospitals, 701 public, 630 private).
Geographic coverage	All states and territories, Australia
Frequency/timing	Annually since 1993–94
Basic collection count	Number of separations (or hospitalisations) A separation 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 (for example, from acute to rehabilitation).
Size	There were 10.6 million separations recorded in the NHMD in 2015−16.
Collection management organisation	The NHMD is compiled by the AIHW from data supplied by the state and territory health authorities under the terms of the National Health Information Agreement.
Further information	http://meteor.aihw.gov.au/content/index.phtml/itemId/638202

National Hospital Morbidity Database (NHMD) (continued)			
Priority information areas	Presence of condition	✓	Not suitable for whole-of-population prevalence: it includes only those where the condition contributed to the hospitalisation, and it is 'event' based (it is not possible to identify multiple admissions for an individual). Diagnosis of musculoskeletal conditions and respiratory conditions available
	Productivity	✓	Injuries that occurred while at work
	Individual impact	✓	Can give information on the number of hospitalisations in the working age population and length of stay for those episodes.
	Population impact		No data
	Demographics of the study sample	✓	Sex, age, Indigenous status, area of usual residence (SA2 level)

National Hospital Morbidity Database: data snapshot

Based on the latest available results from the NHMD:

- in 2015–16, there were 763,000 hospitalisations with the principal diagnosis of musculoskeletal conditions. Of these, 267,000 were for the principal diagnosis of osteoarthritis, 88,000 for back/neck pain
- there were 468,000 hospitalisations for the principal diagnosis of respiratory conditions. Of these, 95,000 were for the principal diagnosis of pneumonia, 79,000 for COPD and 379,000 for asthma
- during the period 2006–07 to 2013–14, there were 234,104 hospitalisation for work-related injuries, requiring workers' compensation.

Sources: AIHW 2017b; AIHW: Henley & Harrison 2017.

National Mortality Database (NMD)	
Type of data source	Administrative (national)
Brief description	The NMD contains information pertaining to deaths registered in Australia since 1964. Information is provided on the underlying cause of death (the disease or condition leading directly to death). From 1997, data are available on the associated causes of death (diseases or conditions other than the underlying cause that contributed to the death).
Purpose(s)	The NMD is used by the AIHW to produce population-level analyses for: monitoring and surveillance of mortality due to specific chronic diseases (or all causes combined); burden of disease research; and to inform Closing the Gap and other COAG indicators. It is also used to fulfil data requests for external researchers.
Collection methodology	Deaths are registered by the registrars of Births, Deaths and Marriages in each state and territory. Death registration is compulsory. The cause of death is certified by the medical practitioner or the coroner and coded using the International Statistical Classification of Diseases and Related Health Problems (ICD). Demographic and administrative information about the deceased is collected on the Death Information Form, filled out by the deceased's next of kin in conjunction with the funeral director.
Scope (theoretical coverage of relevant population)	The Australian Bureau of Statistics (ABS) Death Registrations collection includes all deaths that occurred and were registered in Australia, including deaths of persons whose place of usual residence was overseas. Deaths of Australian residents that occurred outside Australia may be registered by individual registrars, but are not included in ABS death statistics.
Coverage (actual)	All deaths in Australia need to be registered, but there can be delays in the registration of deaths due to: lags in coronial processes; delays at the state and territory level; and data processing or data transfer lags between the state and territory registries and the ABS. This can result in some deaths occurring in a particular year not being registered until the following year or later.
Geographic coverage	Australia
Frequency/timing	The ABS issues summaries of cause of death annually and the AIHW updates the NMD once these data become available.
Basic collection count	Number of deaths
Size	There were 159,052 deaths registered in 2015.
Collection management organisation	The information is provided to the ABS for coding the cause of death and compiling into aggregate statistics. The AIHW manages the NMD.
Further information	http://www.abs.gov.au/Ausstats/abs@.nsf/0/D4A300EE1E04AA43CA2576E800156A24?OpenDocument

National Mortality Database (NMD) (continued)			
Priority information areas	Presence of condition	✓	Limited data: records only conditions that caused or contributed to the death
	Productivity		No data
	Individual impact	✓	Death
	Population impact		No data
	Demographics of the study sample	✓	Sex, age at death, remoteness of usual residence, Indigenous status, country of birth

National Mortality Database: data snapshot

Based on the latest available results from the NMD:

- in 2015, there were 159,052 deaths due to all causes
- there were 14,314 deaths due to all respiratory conditions, of which 7,174 deaths were due to COPD and 421 due to asthma
- all musculoskeletal conditions accounted for 1,302 deaths. Of these, 200 were due to osteoporosis, 187 due to rheumatoid arthritis, and 135 deaths were due to osteoarthritis.

Source: AIHW analysis of the National Mortality Database.

4.2 Survey-based data sources

Survey-based data sources collect health-related information through a population sample. Although some of the information collected can overlap with data obtained from administrative data sources, survey data include details relating to the experience of the individual (often through self-report methods) surveyed across a range of services and health conditions and can provide a greater depth of information than administrative data. Population surveys provide a valuable source of time series comparisons, provided the methodology, sampling and data quality are consistent for different survey periods.

Survey-based data sources, can have limitations. The quality of the data from these sources are dependent on the response (willingness to participate), recall (ability to remember accurately) and the quality of the questions asked. Additionally, the sampling method for most population surveys is not designed to produce reliable estimates at regional levels nor for small, but important, subpopulations.

Five survey-based data sources are examined in this section:

1. Burden of Obstructive Lung Disease Australia (BOLD)
2. Australian Bureau of Statistics National Health Survey (NHS)
3. Australian Bureau of Statistics Work-Related Injuries Survey (WRIS)
4. The Survey of Disability, Ageing and Carers (SDAC)
5. Voice of Arthritis Social Impact Study.

Burden of Obstructive Lung Disease Australia (BOLD)	
Type of data source	Survey (national)
Brief description	The BOLD Study is designed to obtain country-specific data on the prevalence, risk factors and social and economic burden of chronic obstructive pulmonary disease (COPD).
Purpose(s)	To measure the prevalence of COPD across the world using high quality spirometry, and to: • assess the main causes of the condition in different environments • assess the burden of COPD in relation to quality of life, respiratory symptoms and use of health services • provide information for input to an economic model of COPD • assess the appropriateness of care provided.
Collection methodology	Standardised questionnaires were administered by interview. The original BOLD study questionnaire was used in all study centres. A modified version was used for Aboriginal and Torres Strait Islander participants in Broome, whose first language was not English. Forced expiratory volume in 1 second (FEV_1) forced vital capacity (FVC), and the FEV_1/FVC ratio were measured by spirometry, before and after bronchodilator administration.
Scope and coverage	A representative sample of adults aged 40 and older, living in 6 locations around Australia. The study sample was selected from electoral rolls using a sex-stratified, simple random sample in all sites, except Broome and Busselton. In Broome, a household census was selected as the sampling frame, from which a stratified random sample of Indigenous and non-Indigenous people were selected. A two-stage sampling strategy was followed in Busselton, where a sample was recruited from the electoral roll for the Busselton Health Study (James et al. 2013a). The study participants for the BOLD study were selected using a sex-stratified random sampling from among those who participated in the Busselton Health Study. The study scope does not cover people in institutions. The study centres were not randomly selected. They were deliberately selected to provide adequate representation of the sociodemographic and geographic diversity of Australia.
Geographic coverage	The study covered 6 locations around Australia. The locations are: Busselton, Broome, Melbourne, rural New South Wales (NSW), and Sydney.
Frequency/timing	The study was conducted between 2006 and 2010.
Basic collection count	1 person

Burden of Obstructive Lung Disease Australia (BOLD) (continued)			
Size			3,357 people aged 40 and over, across 6 Australian regions
Collection management organisation			University of Sydney
Further information			http://www.boldstudy.org/
Priority information areas	Presence of condition	✓	Asthma, COPD (emphysema and chronic bronchitis), and information about respiratory symptoms such as cough, sputum, wheezing, and shortness of breath. Diagnosis of COPD was based on pre- and post-bronchodilator spirometry testing.
	Productivity		No data
	Individual impact	✓	Activity limitation, health status
	Population impact		No data
	Demographics of the study sample	✓	Age, sex, Indigenous status, educational level, occupation, socioeconomic status, area of remoteness

Burden of Obstructive Lung Disease Australia: data snapshot

Based on the latest available results from the BOLD Study:

- the prevalence of moderate airflow limitation (GOLD Stage II) or higher COPD (based on the Global Initiative for COPD criteria; GOLD 2006) was 7.5% among people aged ≥40, and 29% among those aged ≥75
- among people aged ≥40, in the past 12 months the prevalence of:
  - wheeze was 30%
  - shortness of breath when hurrying on the level or climbing a slight hill was 25%.

Source: Toelle et al. 2013.

Australian Bureau of Statistics (ABS) National Health Survey (NHS)	
Type of data source	Survey (national)
Brief description	The NHS is designed to obtain national information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle.
Purpose	To collect information about the health status of Australians, their use of health services and health risk factors.
Collection methodology	Information was collected by trained ABS interviewers, through computer-assisted personal interview. One adult (aged 18 and over) in each dwelling was selected and interviewed about their own health as well as information about the household (for example, income of other household members). An adult, nominated by the household, was interviewed about 1 child in the household. Some children aged 15–17 may have been personally interviewed with parental consent.
Scope and coverage	A representative sample of Australians. For the 2014–15 NHS, persons in scope of the survey were those identified by an adult within each sampled private dwelling as a usual resident of that dwelling. Private dwellings are houses, flats, home units, caravans, garages, tents and other structures being used as a place of residence at the time of the survey. *Very remote* areas and discrete Aboriginal and Torres Strait Islander communities were not covered, nor were non-private dwellings such as hotels, motels, hostels, hospitals, nursing homes and short-stay caravan parks. The survey scope does not cover hospitals, nursing homes or similar accommodation and so it is likely to under-represent those with more severe complications of chronic respiratory conditions, and the elderly. The sample was designed so that within each state or territory, each person had an equal chance of selection and reliable estimates could be produced for each state and territory.
Geographic coverage	All states and territories, Australia. *Very remote* areas and discrete Aboriginal and Torres Strait Islander communities were not included.
Frequency/timing	The 2014–15 NHS was collected from July 2014 to June 2015. Previous surveys were conducted in 1989–90, 1995, 2001, 2004–05, 2007–08 and 2011–12.
Basic collection count	Persons in approximately 14,700 private dwellings
Size	The 2014–15 NHS sample comprised 19,259 persons.
Collection organisation	ABS
Further information	http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/4363.0.55.001?OpenDocument

ABS National Health Survey (NHS) (continued)			
Priority information areas	Presence of condition	✓	Prevalence estimates for self-reported doctor-diagnosed: • Musculoskeletal conditions: osteoarthritis, rheumatoid arthritis, back problems, and osteoporosis • Respiratory conditions: asthma, allergic rhinitis and COPD.
	Productivity	✓	Participants aged 15 and over in the NHS were asked whether they had time off work due to illness/injury in the 2 weeks before the survey. Data was also collected on the number of days stayed away from work. Note these questions were not asked specifically in relation to a respiratory or musculoskeletal condition.
	Individual impact	✓	Disability status; schooling and employment restriction
	Population impact		No data
	Demographics of the study sample	✓	Age, sex, Indigenous status, place of usual residence, country of birth of respondent and year of arrival in Australia, country of birth of parents, main language spoken at home, proficiency in spoken English, educational qualification, occupation, marital status, household composition

ABS National Health Survey: data snapshot

Based on the latest available results from the 2014–15 NHS:

Prevalence

- Musculoskeletal conditions: back problems: 3.7 million (16%), arthritis: 3.5 million (15%); osteoporosis: 720,000 (3.5%)
- Respiratory conditions: hay fever an allergic rhinitis: 4.5 million (19%); asthma: 2.5 million (11%); COPD: 600,300 (2.6%)

Workforce participation (not in the labour force—persons aged 15 or older)

- Arthritis 59%, back problems 38%, COPD 56%, asthma 28%

Core-activity limitations (profound/severe)

- Arthritis 11%, back problems 9%, COPD 18%, asthma 8%.

Source: ABS 2015b.

Australian Bureau of Statistics (ABS) Work-Related Injuries Survey (WRIS)	
Type of data source	Survey (national)
Brief description	The Work-Related Injuries Survey is a module of the 2013–14 Multipurpose Household Survey (MPHS) conducted in Australia as supplement to the monthly Labour Force Survey (LFS). The MPHS was designed to provide statistics annually for a small number of labour, social and economic topics.
Purpose	To provide information on the extent of work-related injuries or illness in the previous 12 months.
Collection methodology	Information was collected by trained ABS interviewers, through computer-assisted telephone or personal interviews. Households selected for the LFS are interviewed each month for 8 months, with one-eighth of the sample being replaced each month. The first interview is generally conducted face-to-face. Subsequent interviews are conducted by telephone (if acceptable to the respondent).
Scope and coverage	A representative sample of Australians. The survey is conducted as part of the LFS. The survey includes all persons aged 15 and over except members of the permanent defence forces, certain diplomatic personnel of overseas governments customarily excluded from census and estimated population counts, overseas residents in Australia, and members of non-Australian defence forces (and their dependants) stationed in Australia.
Geographic coverage	All states and territories, Australia
Frequency/timing	Financial year (1 July – 30 June)
Basic collection count	Persons in multi-stage area sample of private dwellings (currently approximately 26,000 houses, flats, and so forth), and a list sample of non-private dwellings (hotels, motels, and so forth), covering approximately 0.32% of the civilian population of Australia aged 15 and over.
Size	Approximately 15,000 annually
Collection management organisation	ABS
Further information	http://www.abs.gov.au/ausstats/abs@.nsf/mf/6324.0

Australian Bureau of Statistics (ABS) Work-Related Injuries Survey (WRIS)			
Priority information areas	Presence of condition	✓	Long-term health conditions Musculoskeletal conditions: arthritis or osteoporosis Respiratory conditions: asthma
	Productivity	✓	Participants aged 15 and over were asked whether they had experienced a work-related injury or illness in the last 12 months. Data was also collected on the number of days stayed away from work due to work-related injury or illness. Note these questions were not asked specifically in relation to a respiratory or musculoskeletal condition.
	Individual impact	✓	Health status
	Population impact		Sources of financial assistance for medical expenses or income loss
	Demographics of the study sample	✓	Age, sex, state or territory of usual residence, area of usual residence, remoteness areas, country of birth, year of arrival in Australia, educational qualification, occupation, industry of current main job, employment status including duration and type of job, job details for work-related injuries (hours/days of the week/shifts worked, marital status, relationship in household

Work-Related Injuries Survey: Data snapshot

Based on the latest available results from the WRIS:

- in 2013–14, 4.3% of the 12.5 million working people experienced a work-related injury or illness in the last 12 months. Work-related injuries were experienced more by males (61%) than by females (39%)
- the highest rates of work-related injuries were experienced by people aged 50–54, followed by those aged 15–19 (52 and 50 per 1,000 persons who had worked at some time in the last 12 months). People aged 65 experienced the lowest rate (25 per 1,000 persons)
- the most common types of injuries or illnesses sustained were sprain/strain (33%) followed by chronic joint or muscle conditions (21%), and cut/open wound (14%).

Source: ABS 2014.

The Survey of Disability, Ageing and Carers (SDAC)	
Type of data source	Survey (national)
Brief description	The SDAC is the most detailed and comprehensive source of Australian population disability data. The survey collects national information on people with disabilities, older people (aged 65 and over) and their carers. The SDAC collects data on prevalence of disability, long-term health conditions, main disabling conditions (the conditions causing the most problems), type of impairments and activity limitations, participation restrictions in schooling and employment, level of participation in social and community activities, need for and receipt of assistance, and the need for and use of aids and equipment due to disability. In the SDAC, disability is defined as any limitation, restriction or impairment that restricts everyday activities and has lasted or is likely to last for at least 6 months.
Purpose(s)	To measure the prevalence of disability in the Australian population and the need for support of older people and people with disability. To describe a demographic and social economic profile of the population with disability, older people and people providing care for them.
Collection methodology	Multi-stage sampling techniques are used to select the sample for the survey. The SDAC is conducted in 2 separate parts—the household component and the cared-accommodation component—using different data collection methods. Data for the household component are collected by trained interviewers who conduct computer-assisted personal interviews. A series of screening questions are asked of a responsible adult in the selected household about whether the household includes people with a disability, people aged 65 and older, and potential primary carers (and primary carers were also identified through information provided by recipients of care during their interview). Where possible, personal interviews are then conducted with people identified in any of the above populations. Personal interviews are also conducted with people identified as primary carers of people with a disability.

The Survey of Disability, Ageing and Carers (SDAC) (continued)	
Collection methodology *(continued)*	Proxy interviews are conducted for people with a disability that prevented them from having a personal interview, children aged under 15, and those aged 15–17 whose parents do not permit them to be personally interviewed. Data for the cared-accommodation component are collected using a mail-based methodology directed to administrators of the selected establishments. This collection identifies disability status and assistance needs. The questions asked are similar to those included in the household component of the survey but the range of data collected in the cared accommodation is smaller than in the household component, because some topics are not suitable for completion by the administrator (for example, responses based on self-perception) or are not relevant to people living in cared accommodation.
Scope and coverage	The survey covers people in private and non-private dwellings, including people in cared accommodation establishments. The scope excludes: people living in *Very remote* areas, discrete Indigenous communities, people whose usual residence is outside Australia, non-Australian diplomatic personnel and members of non-Australian defence forces (and their dependents) stationed in Australia. Population groups that are not enumerated for operational reasons include people in: boarding schools, and gaols or correctional institutions.
Geographic coverage	All states and territories, Australia. Excludes *Very remote* areas
Frequency/timing	The survey has been conducted 8 times: in 1981, 1988, 1993, 1998, 2003, 2009, 2012 and 2015. The 2018 survey is expected to finish fieldwork in March 2019.
Basic collection count	Households, family, income unit, person, long-term health condition, specific activities, restrictions, providers of assistance, recipients of assistance
Size	The final sample size of the 2015 SDAC was 75,211 people, comprising 63,515 persons for the household component and 11,696 persons for the cared accommodation component.
Further information	http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/4430.0Main%20Features152015?opendocument&tabname=Summary&prodno=4430.0&issue=2015&num=&view=

The Survey of Disability, Ageing and Carers (SDAC) (continued)			
Priority information areas	Presence of condition	✓	Self-reported long-term condition and main condition. Musculoskeletal conditions: arthritis and related disorders, back problems, osteoporosis. Respiratory conditions: asthma, emphysema, and other respiratory conditions.
	Productivity	✓	Labour force status Information is provided about employment restrictions of people with disability and carers.
	Individual impact	✓	Disability status, core-activity restrictions (self-care, mobility and communication), schooling and employment limitations, difficulty and need for assistance with specific activities, difficulty and need for assistance with broad activities, ability to participate in social and community activities. Data is also collected on self-perception of health and wellbeing.
	Population impact	✓	Impact of the caring role on carers and their self-perception of health and wellbeing, and the effect of the caring role on carers' financial situation.
	Demographics of the study sample	✓	Age, sex, country of birth, year of arrival in Australia, main language spoken at home, proficiency in spoken English, state/territory of usual residence, area of remoteness, household and family structure, income, educational attendance and attainment, housing tenure type, living arrangements and marital status.

The Survey of Disability, Ageing and Carers: data snapshot

Based on the latest available results from the 2015 SDAC:

- 4.3 million people had a disability
- Back problems (14% of all people with a disability), arthritis (13%), and asthma (2.2%)

Activity limitation

- Profound/severe core-activity limitations: arthritis (28%), back problems (25%), asthma (14%)
- Schooling/employment: arthritis (32%), back problems (56%), asthma (31%).

Source: ABS 2015a.

Voice of Arthritis Social Impact Study	
Type of data source	Survey (national)
Brief description	This research study explored how arthritis (osteoarthritis and rheumatoid arthritis) affects the individual, their family or carer and their workplace. Information is gathered relating to respondents' satisfaction with health services, the support they receive from family or carers, and their ability to participate in work and other activities.
Purpose	To establish and confirm Arthritis Australia's understanding of all aspects of arthritis and how it affects sufferers, their families/carers and their workplaces, enabling Arthritis Australia to prioritise effort and investment in raising awareness of arthritis throughout Australia.
Collection methodology	The survey was a paper-based self-completion questionnaire mailed in March 2004 to 3000 people with arthritis by each state Arthritis office from their database (2004). The second survey was also a questionnaire, devised after consultation, focus groups and pilot testing (2010–11).
Scope and coverage	The scope included 3,000 people on state Arthritis foundation databases (all were members of Arthritis Australia) (2004), and 1,100 people (geographically spread) who had been diagnosed with arthritis (2010–11). The actual coverage included 1,016 people responded before the survey's closing date, representing a response rate of 34% (2004), and 1,029 people responded, representing a response rate of 94% (2010–11).
Geographic coverage	Australia
Frequency/timing	2004, 2010–11
Basic collection count	Persons
Size	1,029 (2011)
Collection management organisation	The Leadership Factor, an international research agency, on behalf of Arthritis Australia (2004) Two Blind Mice, on behalf of Arthritis Australia (2010–11)
Further information	http://www.arthritisaustralia.com.au/images/stories/documents/reports/2011_updates/the%20voice%20of%20arthritis%202011.pdf

Voice of Arthritis Social Impact Study (continued)			
Priority information areas	Presence of condition		No data
	Productivity	✓	Ability to participate in paid work
	Individual impact	✓	Respondents rated the level of impact of their arthritis on their financial position, and rated the impact of factors such as medication costs and the effect of lost wages.
	Population impact		No data
	Demographics of the study sample	✓	Age, sex

Voice of Arthritis Social Impact Study: data snapshot

Based on the latest available results from the Voice of Arthritis Social Impact Study:

- of those in the most affected group, 60% were forced to stop or reduce work because of their arthritis, compared with 36% of those doing fairly badly and 28% of those doing fairly well
- 64% of those most affected felt that arthritis had put a strain on their finances compared with 25% of those least affected.

Source: Arthritis Australia 2011.

4.3 Longitudinal surveys

Longitudinal surveys involve repeated observations of the same sample over long periods of time. The length of the study may vary, with some longitudinal studies running for decades. Longitudinal studies are useful because they provide important data about changes experienced by individuals over time and allow for flexibility in the data collected at each time point. Another benefit of longitudinal data is that each variable does not need to be measured in each wave of the survey, because information about the individual is linked between waves—although this means that the variable will apply only in the waves it was collected. Longitudinal studies are also time consuming and can be very expensive.

Eight longitudinal survey data sources are examined in this section:

1. Household, Income and Labour Dynamics in Australia (HILDA) Survey
2. North West Adelaide Health Study (NWAHS)
3. Australian Longitudinal Study on Women's Health (ALSWH)
4. Concord Health and Ageing in Men Project (CHAMP)
5. 45 and Up Study
6. Ten to Men Study
7. Raine Study
8. Busselton Health Study.

Household, Income and Labour Dynamics in Australia (HILDA) Survey	
Type of data source	Longitudinal household-based panel study (national)
Brief description	The HILDA Survey is Australia's first nationally representative[(a)] household-based longitudinal survey focusing on social and economic information, particularly regarding family, household formation, income and work. The survey was initiated in 2001 (Wave 1) and is conducted annually by the Melbourne Institute of Applied Economic and Social Research at the University of Melbourne on behalf of the Department of Social Services. Data are available for waves 1 to 16 of the HILDA Survey. Most questions are repeated every year, but each wave of the survey has different add-in modules that are conducted on a 4-year rotation. Waves 9 and 13 of the survey included detailed questions on 'serious illness conditions' (such as chronic diseases) and resultant medical treatment, which is of particular interest for the purposes of this scoping paper. Wave 3 also collected information on 'serious health conditions' (such as chronic diseases). This information, in combination with other variables in the HILDA Survey (such as risk factors, employment, general health and wellbeing, social interaction), indicates the HILDA Survey has the potential to contribute to the AIHW's chronic disease monitoring activities.
Purpose(s)	The HILDA Survey aims to provide longitudinal data on the lives of Australian residents and to see how their lives are changing over time. The primary objective of the HILDA Survey is to support research within 3 broad inter-related areas: 1. Income dynamics—focusing on how households respond to policy changes aimed at improving financial incentives, and interactions between changes in family status and poverty. 2. Labour market dynamics—focusing on low-to-middle income households, female participation and work-to-retirement transitions. 3. Family dynamics—focusing on family formation, wellbeing and separation, along with post-separation arrangements for children, and on links between income support and family formation and breakdown.

Household, Income and Labour Dynamics in Australia (HILDA) Survey (continued)	
Collection methodology	The HILDA Survey began with a large national probability sample of Australian households occupying private dwellings. The households were selected using a multi-staged approach. First, a sample of 488 Census Collection Districts (CDs) were selected from across Australia (each of which consists of approximately 200 to 250 households). Second, within each of these CDs, a sample of 22 to 34 dwellings was selected, depending on the expected response and occupancy rates of the area. Finally, within each dwelling, up to 3 households were selected to be part of the sample[(b)]. Four main instruments are used to collect information from the HILDA Survey sample: • the household form—used to record basic information about household composition immediately after making contact • the household questionnaire—administered to 1 household member to collect information about the household, including housing, household spending and child care arrangements • the person questionnaire—administered to every household member aged 15 and over to collect individual household member information, including country of birth, education, employment, income, health and life satisfaction • the self-completion questionnaire—completed by persons completing a person questionnaire to cover topics respondents may feel uncomfortable answering face-to-face, including general health and wellbeing, attitudes and values, and sex and age. Although all members of the selected households are defined as members of the sample, individual interviews are conducted only with those aged 15 and over on 30 June in the year of the survey. Some information about people under 15 is collected from an adult member of the household (Summerfield et al. 2016).

Household, Income and Labour Dynamics in Australia (HILDA) Survey (continued)	
Scope and coverage	For the purposes of this table, 'coverage' is defined by the AIHW as the set of units about which information can be obtained or inferred. The coverage of the HILDA Survey is all members of private dwellings in Australia, with the exception of: • certain diplomatic personnel of overseas governments • overseas residents living in Australia (that is, persons who had stayed or intended to stay in Australia less than 1 year) • members of non-Australian defence forces (and their dependents) stationed in Australia • residents of institutions (such as hospitals and other health care institutions, military and police installations, correctional and penal institutions, convents and monasteries) and other non-private dwellings (such as hotels and motels) • people living in remote and sparsely populated areas (less than 1000 residents).
Geographic coverage	People living in non-remote areas, Australia
Frequency/timing	Annual survey
Basic collection count	Household, persons
Size	HILDA covers the lives of more than 17,000 Australians every year. The sample of the main Wave is: Wave 1 data—7,682 households (13,969 individuals) Wave 11 data—a sample top-up of 2,153 households (4,009 individuals) following the same methodology as the original sample Wave 15—13,753 people interviewed (main sample plus top-up sample of 3,853 individuals) (Summerfield et al. 2016).
Collection management organisation	The HILDA Survey was initiated, and is funded, by the Australian Government through the Department of Social Services. Responsibility for the design and management of the survey rests with the Melbourne Institute of Applied Economic and Social Research (University of Melbourne). Data collection for waves 9 to 16 is being undertaken by Roy Morgan Research, a private market research company. The Nielsen Company collected waves 1 to 8.
Further information	https://www.melbourneinstitute.com/hilda/

Household, Income and Labour Dynamics in Australia (HILDA) Survey (continued)			
Priority information areas	Presence of condition	✓	Musculoskeletal conditions: arthritis and osteoporosis Respiratory conditions: asthma, COPD (chronic bronchitis or emphysema).
	Productivity	✓	Labour force participation, wages, productivity
	Individual impact	✓	General health and wellbeing, disability, activity restriction, social interaction, community participation
	Population impact	✓	Possession of concession card, private health insurance, medical practitioner and hospital visits
	Demographics of the study sample	✓	Age, sex, country of birth, education, income, employment status, remoteness, socioeconomic disadvantage, Indigenous status

(a) Although the HILDA is reported to be nationally representative, the actual coverage of the survey means it is representative of Australians residing in non-remote private dwellings.

(b) Household is broadly defined as 'a group of people who usually reside and eat together'. A household may be a 1-person household (defined as 'a person who makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household') or a multi-person household (defined as 'a group of two or more persons, living within the same dwelling, who make common provision for food or other essentials for living'). Of the dwellings contacted for Wave 1 of the HILDA Survey, there were only 10 dwellings where there were more than 3 separate households within the same dwelling (Watson & Wooden 2002).

Household, Income and Labour Dynamics in Australia Survey: data snapshot

Based on the latest available results from the HILDA Survey:

- almost half of respondents in Wave 7 reported having at least 1 of the 10 long-term conditions
- of the long-term conditions, 20% reported arthritis, 14% asthma, and 2.8% chronic bronchitis emphysema
- some of the conditions restricting everyday activities were: limited use of feet or legs (4.8%), shortness of breath or difficulty breathing (3.5%), limited use of arms or fingers (2.9%), and difficulty gripping things (2.6%).

Source: Wilkins et al. 2010.

North West Adelaide Health Study (NWAHS)	
Type of data source	Longitudinal survey (regional)
Brief description	The NWAHS is a longitudinal cohort study investigating chronic disease and health-related risk factors, from both self-reported and biomedically measured information for people living in the north-western region of Adelaide. Information about the prevalence of arthritis (osteoarthritis, rheumatoid arthritis or other arthritis), osteoporosis and musculoskeletal pain and stiffness was gathered in the second and third stages of the study and a self-complete postal survey. Information about prevalence of gout was gathered in the third stage and the postal survey. In the second stage of the study, participants aged 50 and over were offered a dual-energy X-ray absorptiometry scan to measure their bone density.
Purpose	To make a comprehensive health assessment of the community of north-west Adelaide in order to inform health policy.
Collection methodology	Telephone and self-complete questionnaires and biomedical measurements. Consent was obtained from participants to link to Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) records and with state-based hospital and registry data.
Scope and coverage	Households in north-west Adelaide were chosen at random from the electronic White Pages. One member of each household over the age of 18 was chosen at random.
Geographic coverage	The north-western region of Adelaide, stretching from the suburbs Glenelg to Gawler
Frequency/timing	Stage 1 was run between 1999 and 2003, Stage 2 between 2004 and 2006 and Stage 3 between 2008 and 2010. Additional telephone surveys were run in 2002 and 2007. A self-complete postal survey was conducted in 2015–2016.
Basic collection count	Persons
Size	The original cohort was 4,056 people; 2,487 of these participated in the most recent clinic visit, between June 2008 and August 2010.
Collection management organisation	The NWAHS is led by the University of Adelaide in collaboration with the University of South Australia, SA Health, the Institute of Medical and Veterinary Science, The Queen Elizabeth Hospital and the Lyell McEwin Hospital.
Further information	http://www.nwadelaidehealthstudy.org/project_overview.asp http://health.adelaide.edu.au/pros/data/nwahs/

North West Adelaide Health Study (NWAHS) (continued)			
Priority information areas	Presence of condition	✓	Prevalence of self-reported doctor-diagnosed arthritis, osteoporosis and gout. Prevalence of self-reported musculoskeletal pain and stiffness. Self-reported occurrence of minimal trauma fracture. Prevalence of osteoporosis and osteopenia, derived from bone density measurements for participants aged over 50. Measures of severity: grip strength, level of pain, level of stiffness and ache in joints, level of activity limitation due to joint problems, occupation related pain.
	Productivity	✓	Ability to participate in work and social activities (Short Form (36) Health Survey; SF-36)
	Individual impact	✓	General quality of life, perception of general health, physical functioning, bodily pain (SF-36). Hip and knee replacement. Use of health services and prescription medication from the linked MBS and PBS databases. Self-reported use of specialist and allied health services for arthritis and musculoskeletal pain. Data linkage to National Death Index and state-based death data.
	Population impact	✓	MBS and PBS costs, state-based hospital costs
	Demographics of the study sample	✓	Age, sex, postcode, country of birth, Indigenous status, living arrangement, marital status, number of children, occupation, income, education level

North West Adelaide Health Study: data snapshot

Based on the North West Adelaide Health Study:

- almost 1 in 5 participants (18.8%) had a self-reported doctor diagnosis of either diabetes, asthma, COPD, heart attack, stroke and/or angina
- around 1 in 20 (5.8%) had no risk factors for chronic disease and almost 3 out of 4 people (71.5%) did not have any of the chronic conditions studied but had at least 1 risk factor that may lead to 1 or more of these conditions developing.

Source: Grant et al. 2006.

Australian Longitudinal Study on Women's Health (ALSWH)	
Type of data source	Longitudinal survey (national)
Brief description	The ALSWH assesses women's physical and mental health, as well as psychosocial aspects of health (such as socio-demographic and lifestyle factors) and their use of health services.
Purpose	To provide data about the health of women across the life span, in order to inform federal and state government health policy.
Collection methodology	In April 1996, women in 3 birth cohorts (1973–78, 1946–51 and 1921–26) were selected from the Medicare database, which contains the name and address details of all Australian citizens and permanent residents. More than 40,000 agreed to take part in the project for at least 20 years. From 1996 to 2011, each age cohort was surveyed about once every 3 years by postal surveys. In 2011, the 1921–26 cohort began receiving a shortened survey every 6 months. In 2012–13 the ALSWH has recruited a new cohort of young women, born 1989–94 (aged 18–23 at the time of completing the survey). Sampling from the population was random within each age group. Women from rural and remote areas were sampled at twice the rate of women in urban areas so that the numbers of women living outside major urban areas were large enough to allow statistical comparisons with women living in major urban areas. In addition to the main surveys, a variety of substudies are conducted targeting particular areas of health. These substudy data include additional questionnaires and assess extra variables. The ALSWH has approval to access and link data to a number of de-identified national and state-based external data sets, including: • Medical Benefit Schedule (MBS) • Pharmaceutical Benefits Scheme (PBS) • National Death Index • Perinatal data collections • Cancer registries • Admitted patients data collections.
Scope and coverage	Australian women on the Medicare database aged 18–23, 45–50, 70–75 in 1996, and from 2013, women aged 18–23
Geographic coverage	40,394 women in the original sample in 1996, which is broadly representative of the Australian female population. A new cohort of at least 14,000 women aged 18–23 is being recruited in 2012 and 2013.
Frequency/timing	Began in 1996 and to continue until at least 2019
Basic collection count	Female persons

4.3.3 Australian Longitudinal Study on Women's Health (ALSWH) (continued)			
Size			The most recent surveys had the following survey sizes: • 1973–78 cohort in 2015: 7,186 • 1946–51 cohort in 2013: 9,151 • 1921–26 cohort in 2011: 4,055 • from November 2011, the 1921–26 cohort has undertaken 6-monthly surveys.
Collection management organisation			The University of Newcastle and the University of Queensland, funded by the Department of Health
Further information			https://www.alswh.org.au/
Priority information areas	Presence of condition	✓	Self-reported doctor-diagnosed prevalence Musculoskeletal conditions: arthritis (osteoarthritis, rheumatoid arthritis), osteoporosis Respiratory conditions: asthma, bronchitis/emphysema (COPD).
	Productivity		No data
	Individual impact	✓	Activity of daily living, difficulty with activities and need for assistance, physical functioning, social functioning, self-reported wellbeing using the SF-36
	Population impact	✓	Linked data from the Medicare (MBS and PBS) databases
	Demographics of the study sample	✓	Age, sex, country of birth, language spoken at home, education, employment, family composition, area of residence, state of residence, socioeconomic status, remoteness, income, how women manage on their available income, time use (including paid and unpaid work and family roles) and life stages and key events (such as childbirth, divorce, death of a spouse). Linked data from the perinatal data collections.

Australian Longitudinal Study on Women's Health: data snapshot

Based on the latest available results from ALSWH:

- the highest prevalence of arthritis was among women in the 1946–51 cohort; 20% of women in this cohort reported arthritis when aged 50–55, increasing to 51% of this cohort when aged 62–67
- arthritis was strongly associated with reduced physical function scores, and with poorer mental health
- the highest prevalence of asthma was in the younger cohorts, around 25% of young women aged 18–23 experienced asthma in the 1973–78 and 1989–95 cohorts. The prevalence of asthma was also found to increase with age in all of the cohorts
- asthma was associated with difficulty managing on income, and may affect workforce participation.

Source: Byles et al. 2015.

Concord Health and Ageing in Men Project (CHAMP)	
Type of data source	Longitudinal (regional)
Brief description	CHAMP is a longitudinal study of ageing in men. Doctor-diagnosed osteoporosis is one of the focuses, as is the measurement of bone mineral density (BMD). The researchers note that men in this study are representative of the age and ethnicity of men in the area (inner west Sydney) and have similar health characteristics to older men in the nationally representative MATeS study. It is likely that frailer men in poor health are less likely to have participated in the study, resulting in an underestimation of the prevalence of fractures and of low BMD.
Purpose(s)	To examine chronic disease and ageing among older males, focusing on: cognitive impairment and dementia; falls, fractures and osteoporosis; and urinary problems.
Collection methodology	Names were selected from the NSW electoral roll. Men living in residential aged care facilities were excluded. Self-completed questionnaire and clinical assessments were made of physical performance measures, neuropsychological testing and medication inventory. Following initial baseline assessment, the men were contacted by telephone at 4-monthly intervals to update data on falls, fractures hospitalisation and institutionalisation.
Scope and coverage	Men aged 70 or over living in 3 local government areas (Burwood, Canada Bay and Strathfield) in inner west Sydney.
Geographic coverage	Three local government areas in inner west Sydney: Burwood, Canada Bay and Strathfield.
Frequency/timing	Recruitment and clinical assessments between 2005 and 2007 with follow-up phone interviews every 4 months. Five-year follow-up examinations were completed in 2013. Funding for a 7-year follow-up has been obtained.
Basic collection count	Male persons
Size	1,705 men recruited in the first stage, with data for 1,367 and 955 men at the 2- and 5-year follow-ups respectively.
Collection management organisation	Concord Clinical School, the University of Sydney.
Further information	http://sydney.edu.au/research/opportunities/opportunities/48

Concord Health and Ageing in Men Project (CHAMP) (continued)			
Priority information areas	Presence of condition	✓	Prevalence of osteoporosis and osteopenia based on BMD of the hip and spine, measured by dual X-ray absorptiometry, self-reported minimal trauma fractures over the previous 10 years. New fractures are identified during 4-monthly phone calls.
	Productivity		No data
	Individual impact	✓	Self-rated health status. Ability to undertake everyday activities. Presence of chronic pain (not specific to a musculoskeletal condition) and about knee, hip and back pain
	Population impact		No data
	Demographics of the study sample	✓	Age, marital status, living arrangements, country of birth, age at leaving school, main lifetime occupation (managers and professionals versus other), source of income (government pension only versus other) and house ownership

Concord Health and Ageing in Men Project (CHAMP)

Based on the latest available results from the CHAMP:

- 1,626 (95%) of men completed all bone mineral density tests
- of these 25% (401) were eligible for subsidised treatment under the Pharmaceutical Benefits Scheme (PBS)
- the treatment consisted of use of calcium supplements (14%), bisphosphonates (10%), and vitamin D supplements (7%).

Source: Bleicher et al. 2010.

45 and Up Study	
Type of data source	Longitudinal survey (state)
Brief description	The 45 and Up Study is a longitudinal cohort study of people from New South Wales (NSW). It follows the health of participants to examine which factors are associated with good or poor health as people age. Survey responses are linked to other health databases, allowing a broad view of health service use and outcomes. 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 on 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.
Purpose	To develop a research resource to boost understanding of how Australians are ageing. This will answer important health and quality-of-life questions and help manage and prevent illness through improved knowledge of health.
Collection methodology	Potential participants were randomly sampled from the Medicare Australia database (approximately 50% of the NSW population) and mailed a study questionnaire and information leaflet. Individuals from rural areas and those aged 80 and over were oversampled. Recruitment commenced in February 2006, when more than 36,000 participants joined the Study. The remainder of the cohort was recruited over the period 2007–09, with the full cohort reached by December 2009. Information available through data linkage includes: health service use from the MBS and PBS databases, hospitalisation data from the NSW Admitted Patients Data Collection (APDC) (with details of patterns of care), the NSW Emergency Department Data Collection, aged care and mortality data.
Scope and coverage	The NSW population aged 45 or over, with a higher likelihood of selection for those in rural areas and those aged 80 and over. The study recruited more than 260,000 men and women aged 45 or over from the NSW general population. Of those, approximately 18% responded.
Geographic coverage	NSW
Frequency/timing	2006–2009 for the baseline survey, and 2012–15 for the first follow-up survey, with planning to conduct future waves. Data linkage began in 2008 and includes data before the survey period.
Basic collection count	Persons

45 and Up Study			
Size			267,153 people completed baseline as at 31 December 2014
Collection management organisation			The Sax Institute
Further information			https://www.saxinstitute.org.au/our-work/45-up-study/for-researchers/
Priority information areas	Presence of condition	✓	Due to the low uptake of invited participants (18%) the survey sample is not representative of the NSW population. It is not recommended that prevalence or incidence estimates be generalised to the NSW or national population. A comparison between the 45 and Up Study and the NSW Population Health Survey using weighting to the NSW population showed that differences occurred in prevalence of key health variables between the 2 studies (Mealing et al. 2010).
	Productivity	✓	Employment status
	Individual impact	✓	Self-rated quality of life, functional capacity, level of psychological distress. No data are available on the type of disability
	Population impact	✓	Cost data are available from the linked data sources: the MBS, PBS, NSW APDC and NSW Emergency Department Data Collection data sets.
	Demographics of the study sample	✓	Age, postcode, education level, ancestry, country of birth, year of arrival in Australia, language spoken at home, Indigenous status, housing type, relationship status, household income, employment, social capital and private health insurance

45 and Up Study: data snapshot

Based on the latest available results from the 45 and Up Study:

- 18% of participants reported having osteoarthritis, 17% hay fever and 13% asthma
- of people reporting a long-term condition, 9.3% were treated in the last month for osteoarthritis and 5.1% for asthma.

Source: Sax Institute 2014.

Ten to Men—The Australian Longitudinal Study on Male Health (ALSMH)	
Type of data source	Longitudinal study
Brief description	In response to the National Male Health Policy (2010), the ALSMH was commissioned to identify current issues associated with male health in Australia to inform policy and program development.
Purpose(s)	The overarching aim is to examine the health and lifestyles of Australian males aged between 10 and 55, to investigate the reasons as to why males have generally poorer health than females, and why certain groups of males have poorer health compared with 'males in general'. Three objectives are listed as part of the study—to examine male health and its determinants, to address research gaps about male health, and to identify policy opportunities to support the health and wellbeing of males.
Collection methodology	Randomly selected participants from across Australia took part in both surveys and interviews. There were 4 survey cohorts in 2013–14 (Wave 1): • boys (aged 10–14)—face-to-face interview • parents of boys—self-complete paper form • adolescents (aged 15–17)—self-complete paper form • adult males (aged 18–55)—self-complete paper form. In 2016 (Wave 2), participants were surveyed using either online methods, mail or face-to-face interviews.
Scope (theoretical coverage of relevant population) and coverage (actual)	Participants were selected at random and invited to participate: 15,988 males elected to participate in Wave 1, of these 2,000 were adolescents and boys (aged 10–17). Parents were also invited to participate in the study.
Geographic coverage	National (all Australian states and territories are represented)
Frequency/timing	Wave 1 was conducted in 2013–14, Wave 2 was completed in 2016.
Basic collection count	Male persons
Size	15,988 males (Wave 1), 12,218 males (Wave 2), representing a 76% retention rate
Collection management organisation	Melbourne School of Population and Global Health, funded by the Australian Government Department of Health
Further information	http://www.tentomen.org.au/

Ten to Men—The Australian Longitudinal Study on Male Health (ALSMH) (continued)			
Priority information areas	Presence of condition	✓	Self-reported health condition (both 'ever told' and 'treated for or had symptoms in the past 12 months') including asthma, COPD, chronic bronchitis and arthritis. Information also provided about back pain, wheezy breathing and persistent coughing.
	Productivity	✓	Work and life satisfaction
	Individual impact	✓	Self-assessed health status, pain interfering with work (both inside and outside the home), mental health, health impacting on social activities, over-the-counter medication consumption and disability status
	Population impact	✓	Use of health services (past 12 months), private health insurance, access to and satisfaction with health services Data was also linked to both the MBS and PBS.
	Demographics of the study sample	✓	Including: age, country of birth, country of parental birth, language, indigenous status, marital status, height and weight, dependents, household status, income, employment, education.

Ten to Men—The Australian Longitudinal Study on Male Health: data snapshot

Based on the latest available results from the ALSMH:

- asthma was reported as a 'lifetime prevalence condition' by 26% of males, while 47% reported having experienced back pain, chronic back pain or sciatica during their lifetime.

Source: Currier et al. 2016.

Western Australian Pregnancy Cohort (Raine) Study	
Type of data source	Longitudinal study
Brief description	The Raine Study is a longitudinal study designed to collect information on the health of women and their partners during pregnancy, and similar information from the children resulting from those pregnancies.
Purpose(s)	The purpose of the Raine Study is to examine factors that may contribute to the link between the health of the mother and father during a pregnancy, and the subsequent health of their children, to gain a picture of health and disease across the life stages.
Collection methodology	Data are collected through questionnaires, clinical assessment information and biological samples (including antenatal blood, cord blood, placenta, milk teeth, blood, saliva, urine and DNA). Collection methodology and the information collected varied between study years, meaning that information is not available for every variable for every year. A comprehensive list of all variables is available at https://www.rainestudy.org.au/index.php/for-researchers/cohort-follow-ups/
Scope and coverage	The study recruited 2,900 pregnant women at King Edward Memorial Hospital, having either attended a public antenatal clinic there or a nearby private clinic (Straker et al. 2017). These participants (and their partners) provided a comprehensive picture of their health status during their pregnancy. Over time, their children and grandchildren have participated in the study.
Geographic coverage	Western Australia
Frequency/timing	The Raine Study was first conducted in May 1989 – November 1991. Since then, cohort follow-ups were conducted when the children were aged 1, 2, 3, 5, 8, 10, 14, 17, 18, 20, 22 and 27. Grandchildren of original cohort have recently started participating in the study.
Basic collection count	Persons
Size	During the recruitment phase, 2,900 pregnant women were included, and of these, there were 2,868 live births. Over time, the participation rates of the children have varied: from 2,446 at age 1 (representing an 87% retention rate from eligible participants) to 1,234 at age 22 (55% retention rate from eligible participants).

Western Australian Pregnancy Cohort (Raine) Study (continued)			
Collection management organisation			The University of Western Australia
Further information			https://www.rainestudy.org.au/
Priority information areas	Presence of condition	✓	Medical history, including injury, chronic respiratory problems, arthritis and joint problems, back pain. Asthma was a particular focus—as well as presence of condition, participants were surveyed about medication use, coughs and colds, wheezing, allergic nose, asthma severity and lung function. Clinical assessments included: back muscle endurance, blood pressure, dexterity and cardiovascular endurance.
	Productivity	✓	Employment, occupation, income, job satisfaction, work absenteeism and presenteeism because of physical or mental health (including back pain).
	Individual impact	✓	Hospital admissions, prescription medications, mental health, health impacting on social activities
	Population impact	✓	Social benefits, use of medical services
	Demographics of the study sample	✓	Comprehensive list including: age, sex, living arrangements, family structure, marital status, height and weight, dependents

Raine Study: data snapshot

Based on the latest available results from the Raine Study:

- spinal pain was reported as a significant issue contributing towards work absenteeism—a study by Kyaw-Myint et al. (2015) reported that 20% of Raine study participants reported current neck or back pain
- young workers with diagnosed neck or back pain had an average of 73.4 hours of sickness per year, compared with 41.6% of those without diagnosed neck or back pain.

Source: Kyaw-Myint et al. 2015.

Busselton Health Studies	
Type of data source	Series of longitudinal studies
Brief description	Since 1966, the Shire of Busselton in Western Australia has undertaken a number of cross-sectional population surveys. These have been grouped together as the 'Busselton Health Studies'.
Purpose(s)	The Busselton Health Studies provide a comprehensive picture of the health of the population in Busselton. Cross-sectional surveys, run over many years, examine topics such as alcohol consumption, blood pressure, diet, history of disease, injury, medication use and occupational history. A number of more specific studies have been conducted, which focus on particular areas of interest such as diabetes, lung disease and asthma and COPD.
Collection methodology	Collection methodology and variables collected varied depending on the survey, and included questionnaires, physical assessments, vision testing, and biomedical testing.
Scope and coverage	The scope and coverage varied depending on the survey being conducted.
Geographic coverage	Shire of Busselton, Western Australia
Frequency/timing	2016–2020: The Busselton Baby Boomer Study. Phase 2 underway 2010–2015: The Busselton Healthy Ageing Study. Phase 1 recently completed 2008–10: The Busselton Diabetes Study 2007–2008: Burden of Lung Disease Study (further information is provided on this study in Section 4.2.1) 2007–ongoing: The Prevalence of Sleep Disordered Breathing Study 2005–2008: The Changing Prevalence of Asthma and COPD Study 1966, 1969, 1972, 1975, 1978, 1981: Cross-sectional comprehensive surveys 1967, 1970, 1973, 1977 (secondary school only), 1983: comprehensive survey of all school children 1987: Cross-sectional survey of adults aged 65 and over 1990: Cross-sectional respiratory survey 1992: Asthma families' survey 1994–95: Follow-up survey of 1966–1983 cross-sectional participants.
Basic collection count	Persons/families

Busselton Health Studies (continued)			
Size			The scope and coverage varied depending on the survey being conducted. • Busselton Diabetes Study: >200 participants • Burden of Lung Disease Study: >600 participants • Prevalence of Sleep Disordered Breathing Study: 397–400 adults in 1990 • Changing Prevalence of Asthma and COPD Study: >2900 adults and 1500 children • Cross-sectional comprehensive surveys: 3,400 in 1966 to 4,000 in 1978 and 1981 • School surveys: ~1,600 per survey (556 in 1977) • Adults aged 65 and over survey: 1,120 participants • Respiratory survey: 3,880 participants • Asthma survey: 250 families • Follow-up survey: 5,715 participants.
Collection management organisation			The Busselton Population Medical Research Institute
Further information			http://bpmri.org.au/
Priority information areas	Presence of condition	✓	Respiratory conditions including asthma, COPD, hay fever and anaphylaxis. Information about recurrent respiratory infections, wheezing and family history of respiratory illness. Musculoskeletal conditions including arthritis and gout.
	Productivity		No data
	Individual impact	✓	Quality of life, medication use, injury, activities of daily living
	Population impact		No data
	Demographics of the study sample	✓	Age, sex, marital status, ethnicity, education, occupational history (including exposure to dust), household income, dwelling type

Busselton Health Studies: data snapshot

Based on the latest available and relevant results from the Busselton Health Studies:

- an increase in non-allergic environmental exposures may account for an increase in doctor-reported cough, phlegm and possibly asthma.

Source: James et al. 2013b.

4.4 Registry data sources

Registries systematically collect detailed information on persons with a certain disease or receiving a particular treatment. The data can be used to determine the incidence of an event or a disease, and the nature of an intervention or procedure. However, the data are specific to these events and usually do not include information from the general population.

It is difficult to generalise the results from registries to the population as a whole. Further, findings derived from registry data may be limited in instances where full coverage of the relevant disease or treatment population is not obtained. For example, unless registries are supported by business processes, audits, mandatory data entry or by-product information from other technology, their complete coverage cannot be guaranteed.

Two registry data sources are examined in this section:

1. Australian Rheumatology Association Database (ARAD)
2. Surveillance of Australian workplace Based Respiratory Events (SABRE).

Australian Rheumatology Association Database (ARAD)	
Type of data source	Registry (national)
Brief description	The Australian Rheumatology Association Database (ARAD) is a national database developed to follow patients with inflammatory arthritis commencing treatment with biological disease modifying anti-rheumatic drugs (bDMARDs) following consultation with a rheumatologist. Included in the database are patients with rheumatoid arthritis, juvenile idiopathic arthritis, ankylosing spondylitis and psoriatic arthritis who started treatment with bDMARDs. The database contains information on participants' location, arthritis history, health status (including quality of life and other health conditions), and treatment history (including adverse reactions to medication). For some participants the database also contains information about arthritis status (including tender and swollen joint count) and markers of inflammation (including erythrocyte sedimentation rate and C-reactive protein and rheumatoid factor status).
Purpose	The aim of the ARAD is to determine effectiveness and safety of new biological drugs used to treat inflammatory arthritis.
Collection methodology	The ARAD collects information from patients every 6 months by questionnaires for the first 2 years. Information is then collected annually. Permission is sought to collect information from state and national rheumatology registries.
Scope and coverage	Patients of participating rheumatologists. The study focuses on patients with inflammatory arthritis commencing treatment with bDMARDs, but also includes patients with inflammatory arthritis not taking this class of drugs, included as a control group. Out of 409 rheumatologists that are ARA members, 301 are participating in the ARAD (approximately 75%).
Geographic coverage	National
Frequency/timing	2002–present
Basic collection count	Persons
Size	5,000 participants and >44,000 completed surveys (July 2017). As at July 2017: • 3,352 participants are currently completing questionnaires and a further 2,531 have agreed to track via health records • about 16% of participants (534 people) have not been exposed to bDMARDs and serve as a control group.

Australian Rheumatology Association Database (continued)			
Collection management organisation			Australian Rheumatology Association, with support from Monash University and Cabrini Health
Further information			http://www.arad.org.au/
Priority information areas	Presence of condition		Particular forms of arthritis only
	Productivity	✓	Occupation history and pension status
	Individual impact	✓	Full data on over-the-counter and complementary medicine use. Comprehensive data on self-assessed quality of life using several standard instruments including a utility instrument: • Health Assessment Questionnaire • Assessment of Quality of Life • Health Survey (SF-36) • European Quality of Life Survey. Comprehensive data on disability burden via self-assessed disability tools. Death available by data linkage and carer reports.
	Population impact	✓	Some data on over-the-counter and complementary medicine use. It is also possible to link to the PBS regarding drug utilisation, and to the MBS regarding health services utilisation.
	Demographics of the study sample	✓	Patient location, education, social factors, age and sex

Australian Rheumatology Association Database: data snapshot

Based on the latest available results from the ARAD:

- 1,801 ARAD participants with rheumatoid arthritis were on first-line anti-TNF therapy
- at baseline (6 months before starting therapy) the Health Related Quality of Life (HRQoL) of participants were significantly lower than the Australian population norm
- within 6 months of initiating therapy, the HRQoL scores improved significantly.

Source: Staples et al. 2011.

Surveillance of Australian workplace Based Respiratory Events (SABRE)	
Type of data source	Occupational respiratory disease registry
Brief description	A registry of physician notifications of new diagnoses of occupational respiratory disease.
Purpose	Collection of notifications of occupational respiratory disease incident cases by occupational and/or respiratory physicians (Tasmania and Victoria).
Collection methodology	Physicians provided voluntary notifications of newly diagnosed cases on monthly or quarterly basis since 1997 of allergic alveolitis, asthma, bronchitis, inhalation, injury, lung cancer, mesothelioma, pneumoconiosis, non-malignant pleural disease—predominantly plaque, non-malignant pleural disease—predominantly diffuse, infectious disease, other diseases. Notifications also asked physicians to identify the 'likelihood of diagnosis' (high/moderate/low), presumed agent/s, occupation, industry and recommended interventions, including medication, protective equipment, engineering changes, change of tasks, change of jobs and cessation of employment.
Scope and coverage	Most of the relevant Victorian and Tasmanian physicians were recruited initially (n=47 in 1997), however denominator data are unavailable to determine proportion of occupational respiratory disease cases that were missed.
Geographic coverage	Tasmania and Victoria
Frequency/timing	Notifications requested of physicians monthly or quarterly (at physician's preference)
Basic collection count	Diagnoses and individuals
Size	1,168 diagnoses (1,040 individuals, some of whom have more than 1 diagnosis)
Collection management organisation	Forms sent to participating physicians until around 2012 (the most recent cases in the database appear to have been notified in 2012)
Further information	https://www.monash.edu/medicine/sphpm/coeh/researchprogram/sabre

Surveillance of Australian workplace Based Respiratory Events (SABRE) (continued)			
Priority information areas	Presence of condition	✓	Disease cases by diagnostic category
	Productivity		See 'Individual impact'.
	Individual impact	✓	Protective equipment, engineering changes or task changes imply continuation or return to current job and also potentially some workplace costs, while change of job implies a recommendation to look for a different job (less exposed to the agent in question) and ceasing work has direct implications for productivity. The current database does not include queries to easily interrogate the 'recommended interventions' data. Would require descriptive analysis of the raw data.
	Population impact		No data
	Demographics of the study sample	✓	Sex, smoking status, date of birth

Surveillance of Australian workplace Based Respiratory Events: data snapshot

Based on the latest available results from SABRE:

- there are currently almost 644 cases of occupational respiratory disease in Victoria and Tasmania reported to SABRE as at September 2017—of these, 203 were for asthma, 51 for mesothelioma and 41 for bronchitis.

Source: Monash University 2017.

4.5 Derived data sources

Derived data sources use information from other data sources to produce new measures. Some examples are to derive summary measures or monetary costs of a disease or condition. The accuracy and validity of the data are dependent on the quality of the underlying data, the methods used to calculate the derived data and any assumptions made. Derived data can be a powerful way of summarising information from a range of sources and can allow comparisons across variables or factors (for example, disease types, risk factors and type of health service).

Two derived and other data sources are examined in this section:

1. Australian Burden of Disease Study 2011
2. Arthritis and Disability study.

Australian Burden of Disease Study 2011	
Type of data source	Derived study (national)
Brief description	The Australian Burden of Disease Study (ABDS) 2011 provides Australian-specific burden of disease estimates best matched to the Australian context for the total population (including subnational estimates) and the Aboriginal and Torres Strait Islander population for 2011 and 2003. ABDS 2011 used Australian data sources and adapts the methods of global studies. Burden of disease studies provide a comprehensive assessment of the health of Australians by quantifying the fatal and non-fatal impacts of different diseases and injuries on a population.
Purpose	To assess and compare the relative impact of different diseases and injuries in a population.
Collection methodology	Prevalence, incidence, duration and severity by disease or injury are estimated based on any available information, such as survey, registry and administrative data. Mortality data are drawn from vital registrations. Burden of disease studies use a metric called the disability-adjusted life year (known as a DALY) to quantify years of life lost (YLL) due to premature death, as well as years of life lived with disability (YLD) from disease and injury. This burden can then be attributed to risk factors selected for inclusion in that part of the analysis.
Scope and coverage	All Australians. Burden of disease estimates are based on models of disease and risk factor epidemiology applied to existing sources of data of varying completeness and quality.
Geographic coverage	Australia
Frequency/timing	Three Australian studies have been published to date, in 1999, 2007, and 2016 (with 2011 as the reference period). The AIHW is currently updating burden of disease estimates for the total Australian population to the 2015 reference year (results expected to be released in early 2019).
Basic collection count	DALY, YLL, YLD
Size	Not applicable
Collection management organisation	AIHW
Further information	Australian Burden of Disease Study: http://www.aihw.gov.au/burden-of-disease/

Australian Burden of Disease Study 2011 (continued)			
Priority information areas	Presence of condition	✓	No data
	Productivity		No data
	Individual impact	✓	Years of life lost due to premature death (YLL), as well as years of life lived (YLD) with disability from disease and injury. Specifically includes burden of disease data for: • Musculoskeletal conditions (specifically back pain and problems, osteoarthritis, rheumatoid arthritis, gout and other musculoskeletal conditions) • Respiratory conditions (specifically COPD, asthma, upper respiratory conditions, and less common conditions such as sarcoidosis, pneumoconiosis, interstitial lung disease and other respiratory diseases).
	Population impact	✓	Costs associated with burden of disease due to asthma were calculated in 2005 (ACAM 2005). The AIHW is currently undertaking work to update Australia's disease expenditure database and align to burden of disease groupings, alongside updated burden of disease estimates for 2015. This work is expected to be completed in early 2019.
	Demographics of the study sample	✓	Australian Burden of Disease Study 2011: Results presented by age, sex, socioeconomic status, remoteness, state or territory of residence, Indigenous status

Australian Burden of Disease Study 2011: data snapshot

Based on the latest available results from the ABDS 2011:

- Respiratory conditions as a group contributed 8% of the total burden of disease and injury in Australia in 2011, a total of 374,985 disability-adjusted life years (DALYs), and were ranked as the sixth leading contributor to total burden
- COPD contributed the highest percentage (43%) of the total burden of all respiratory conditions, followed by asthma (29%) and upper respiratory conditions (20%). Sarcoidosis, pneumoconiosis, interstitial lung disease and other respiratory diseases accounted for the remaining 8% of the burden
- Musculoskeletal conditions contributed 12% of the total burden of disease and injury in Australia in 2011, a total of 521,286 DALYs, and were the leading cause of non-fatal burden in 2011 (23%)
- Back pain and problems contributed just under one-third (31%) of the total burden of all musculoskeletal conditions, followed by osteoarthritis (17%), rheumatoid arthritis (16%) and gout (0.8%).

Sources: AIHW 2017a; 2017c.

Arthritis and disability (Arthritis Australia)			
Type of data source			Study (national)
Brief description			This research study explored how people with arthritis and a disability are affected by their condition, how they cope and what support services are available.
Purpose			To establish and confirm Arthritis Australia's understanding of the relationship between arthritis and disability, to align with the roll out of the National Disability Insurance Scheme (NDIS).
Collection methodology			The study was conducted through a consumer group, interviews and an online survey. The survey was widely distributed through the networks of Arthritis Australia, and was open to anyone with arthritis or a carer for 3 weeks. The aim was to collaborate as many responses as possible received in that time.
Scope and coverage			Interviewees were selected to represent different types of arthritis and a wide geographic coverage.
Geographic coverage			Australia
Frequency/timing			2014
Basic collection count			Persons
Size			819 people including: 13 people via a consumer group, 28 people via telephone interviews) and 778 people via an online survey
Collection management organisation			Social Policy Research Centre, UNSW on behalf of Arthritis Australia
Further information			https://arthritisaustralia.com.au/programs-research/advocacy-policy/reports/arthritis-and-disability-report/
Priority information areas	Presence of condition	✓	Prevalence of arthritis by type and condition onset
	Productivity	✓	Impact on study and work (capacity, level attained, full time/part time status, unemployment)
	Individual impact	✓	Self-reported quality of life (Personal Wellbeing Index) Personal wellbeing and satisfaction with formal support Effect of arthritis on ability to undertake daily activities Effect of arthritis on carers.
	Population impact	✓	Financial impact of medical care, medication costs, aids/equipment, home, personal care, transport
	Demographics of the study sample	✓	Age, sex, location (state and remoteness area), employment status, ethnicity

Arthritis and disability: data snapshot

Based on the latest available results from the Arthritis and disability report:

- 37% of participants reported that their arthritis constantly affected their ability to participate in everyday activities
- people with arthritis scored wellbeing lower than the general Australian population (average of 64.0, compared with 74.6)
- 44% of participants participated in the workforce, compared with 65% nationally
- 67% of participants reported that arthritis affected their work or study at some point, while almost a quarter (23%) reported that they were permanently unable to work or study because of their condition.

Source: Bates et al. 2014.

5 Discussion

This scoping paper assesses the utility of a range of currently available data sources in reporting on the relationships between chronic respiratory and musculoskeletal conditions and workforce productivity in Australia. This chapter explores key areas of interest such as prevalence of the chronic conditions of interest and a range of measures of participation and quality of life.

5.1 What data are available?

Presence of condition

Most of the data sources presented in this scoping study provide some measure of prevalence and/or incidence of musculoskeletal and/or respiratory conditions, either at a national, state or regional level.

Administrative data sources such as the Disability Support Pension and the National Data Set for Compensation-based Statistics provide self-reported information for respiratory and musculoskeletal conditions at the national level, as do many of the survey-based sources, such as the ABS National Health Survey and the Household, Income and Labour Dynamics in Australia Survey. However, some of these data sources are restricted to conditions relevant to the purpose and scope of the collection and do not provide representative estimates of the population. Some data sources in this report contain disease estimates based on measured data. These included the Burden of Obstructive Lung Disease Australia, the North West Adelaide Health Study Measures of productivity and the Australian Rheumatology Association Database.

The data sources presented in this report provide varying levels of information on ‘direct’ measures of productivity such as absenteeism, presenteeism and workforce illness and injury. Labour force status/participation was most commonly reported, along with time off work/time lost for work, and ability to participate in work:

- The most fit-for-purpose stand-alone data set appears to be the Household, Income and Labour Dynamics in Australia Survey, which collects detailed information on income labour force participation, wages and productivity.
- Information about the numbers of people on the Disability Support Pension provides some information about the outcomes of musculoskeletal related injuries on the numbers of people unable to work due to these conditions and eligible for government income support (hours worked, partial capacity to work).
- The National Data Set for Compensation-based statistics provides high-level information, such as time lost from work, about occupational injury related to back problems and respiratory conditions for which compensation was sought.

Other data sources including national and state-based surveys, some of which are ongoing data collections, also provide suitable data on productivity, such as the National Health Survey, the Work-related Injuries Survey and the Survey of Disability, Ageing and Carers.

Individual impact

The individual burden of chronic musculoskeletal and respiratory conditions is the most-reported priority area, with at least 1 or more occurring in each data source. In terms of the physical impact on people with chronic musculoskeletal and respiratory conditions:

- measures of physical functioning, bodily pain and medication use are in scope in a number of the data sources
- disability status and restrictions are also covered in several data sources, including the Burden of Obstructive Lung Disease Study, National Health Survey, Survey of Disability, Ageing and Carers, and the Household, Income and Labour Dynamics in Australia Survey. More than a third (37%) of participants in the Arthritis and disability study reported their arthritis constantly affected their ability to participate in everyday activities, while the SDAC reported 32% of people with arthritis and 31% of people with asthma stated their condition impacted their schooling and employment
- general health and wellbeing and quality of life are 2 measures that are common among several data sources, including the Household, Income and Labour Dynamics in Australia Survey, NWAHS, ALSWH and the SDAC. The Arthritis and Disability Study reported people with arthritis scored wellbeing lower than the Australian average (64, compared with 74.6).
- the Voice of Arthritis study allowed respondents to rate the level of impact of their arthritis on their financial position, and the impact of factors such as medication costs and reduced income.

Population impact

There are various measures for ‘population burden’ used in the data sources presented. For example:

- population impacts such as the impact on carers and their financial situation are covered in the SDAC, while the DSP and NDS provide information on the benefits paid as part of a support pension
- the NWAHS and ALSWH have linked records to the Medical Benefits Schedule (MBS) and Pharmaceutical Benefits Schedule (PBS), which can provide information on health service utilisation and state-based hospital costs
- the 45 and Up Study link to the NSW APDC and NSW Emergency Department Data Collection data sets can provide information about emergency care and hospital admissions.

5.2 Data deficiencies and gaps

Geographic coverage

Few data sources presented in this report are nationally representative. This can become problematic when trying to determine the true extent of the impact of respiratory or musculoskeletal conditions on workplace productivity in Australia. For example, the NWAHS provides information only on people residing in the north-west region of Adelaide, yet its coverage of measures of productivity, individual and population burden, and potential for data linkage are extensive.

Fitness for purpose

Although these data sources contain relevant data to measure the level of ill health in a population as well as death, disability, quality of life and expenditure, none of those presented in this report were specifically designed to monitor the impact (either indirect or direct) of chronic conditions on productivity. For example, although the ABS NHS includes data on days of work lost/days of school or study lost in the last 2 weeks due to illness or injury, these days missed cannot be directly attributable to the specific health condition. This is similar for the ABS SDAC. Although information is collected on disability, activity limitation, work participation and restrictions, it is not possible to determine if the disability and activity limitation is directly caused by the health condition. A proxy measure could be to compare the number of days of work lost between those self-reporting a diagnosis of a respiratory or musculoskeletal condition and those not reporting 1 or more of these conditions.

Measurement tools

The measurement tools used in these data sources vary greatly, which makes measuring the impact of chronic conditions on productivity difficult, and presents challenges should data linkage be considered in the future.

The majority of sources presented self-reported data, which comes with known limitations in terms of an accurate estimate of disease prevalence (or incidence)—primarily an undercount of chronic conditions due to either an incorrect recollection during a doctor visit, or a person being unaware of their medical condition. In addition, self-reported data is generally not routinely validated to ensure its reliability. Combined, these factors mean it is difficult to attribute losses in productivity to specific chronic conditions accurately or completely.

The data sources varied in their use of either self-reported tools or quantitative measurement tools (such as established diagnostic criteria or clinical assessment tools). For example, the BOLD Study uses pre- and post-bronchodilator spirometry testing to determine a diagnosis of COPD, whereas the ABS NHS relies on self-reported data to determine the condition. Some of the data sources also measure the same element of productivity, but using different tools. For example, the ALSWH and the NWAHS both use the Short Form (36) Health Survey (SF-36) to determine health status, including quality of life, whereas the Arthritis and Disability Study uses the Personal Wellbeing Index (PWI) to measure quality of life.

Data gaps

When examining the effect of chronic musculoskeletal and respiratory conditions on productivity, a number of data gaps become apparent, including the ability to determine causality and information on indirect expenditure.

Analysis of the available data sources examined in this study may allow for associations, but not definitive conclusions, to be drawn on the effect of chronic musculoskeletal and respiratory conditions on diminished productivity. Causative analysis would require either a specifically designed survey or modifications to existing surveys or data sets—ideas discussed further in Section 5.4.

It is not currently possible to get information on indirect expenditure associated with chronic respiratory and musculoskeletal conditions, such as the cost of days lost from work and money spent travelling to medical appointments. These indirect costs may contribute substantially to overall expenditure on chronic respiratory and musculoskeletal conditions, particularly out-of-pocket expenses borne by people with the conditions and their families. Although indirect costs are not assessed in the data sources mentioned in this report, other areas do look at

these costs: for example, *The rising cost of musculoskeletal conditions in Australia* (Arthritis and Osteoporosis Victoria 2013), *Osteoporosis costing all Australians: a new burden of disease analysis—2012 to 2022* (Watts et al. 2013), *Painful realities: the economic impact of arthritis in Australia in 2007* (Access Economics 2007), *The Hidden cost of asthma* (Deloitte Access Economics 2015), and *The cost of work-related injury and illness for Australian employers, workers and the community: 2012–13* (Safe Work Australia 2015).

None of the data sources assessed in this study contain estimates of presenteeism. As stated in the Introduction, presenteeism is an important component of lost productivity and often outweighs costs associated with absenteeism in terms of overall productivity costs. Section 5.4 suggests ways in which estimates of presenteeism could be obtained.

5.3 Further considerations

The effect of Australia's ageing population

Australian Government reports by the Productivity Commission and Treasury highlight that in the next 40 or so years, Australia's population will grow and age, affecting labour supply, economic output, infrastructure requirements and budgets (Productivity Commission 2005, 2013) because there will be fewer people of traditional working age compared with the very young and elderly (Treasury 2015). Both the Productivity Commission (2013) and Treasury (2015) emphasise continued participation in the labour force as important for productivity and economic growth in Australia. Encouraging and valuing greater workforce participation (particularly among older age groups) presents an opportunity to further lift GDP growth per person. Deloitte Access Economics (2012) estimated that achieving the changes in mature-age participation assumed in the 2010 Intergenerational Report would result in a $55 billion or 2.7% increase in national income by 2024–25.

However, Treasury (2015) stated Australian's live longer and do so in better health. Due to improvements in health, the elderly can remain active for longer, meaning more Australians will continue to lead an active lifestyle and participate in the workforce after they reach traditional retirement age (Leijten et al. 2014; Productivity Commission 2013).

The need for a high-quality health-care system

A high-quality health-care system can provide improved participation rates, because a person's health affects their capacity to work (HR & HSCE 2010). This may be achieved through health-care-sector reforms, as suggested by the Productivity Commission (2013).

Flexible working arrangements

Flexibility in workforce arrangements can allow continued participation for groups in the community who might otherwise leave the workforce (HR & HSCE 2010). Flexible arrangements include part-time work, working from home and job-sharing and particularly apply to older workers who wish to have a 'staged retirement'. They also contribute to workplace morale, which lifts productivity by improving work intensity when on the job (HR & HSCE 2010). It may be important to track absenteeism and presenteeism due to chronic conditions as workers age to ensure that government policies with regard to the ageing workforce are having the desired effect.

5.4 Future opportunities

In view of the gaps and deficiencies on information related to productivity and chronic respiratory and musculoskeletal conditions identified in this report, the following opportunities for analysis and research have been identified:

- Baseline reporting could be carried out, involving analysis of 1 or more of the data sources listed in this report, to look at the impact of these conditions on productivity at a national level. A report such as this could profile the current information available and be used to facilitate further work in this area.
- The economic costs of losses in productivity due to chronic conditions could be investigated.
- Consistency and comparability of data from different sources could be improved by encouraging the development and implementation of information standards, primarily through data custodian and other relevant stakeholder consultation. Implementation of standards that focus on consistent data items, operational definitions and methods of reporting would improve the quality of available information.

Data linkage

Data linkage to bring together 2 or more existing data sources to determine any direct associations between chronic respiratory and musculoskeletal conditions and productivity would be a valuable process. Several studies referenced in the introduction section of this report used data linkage techniques to link productivity measures to data sources such as medical and pharmaceutical expenditure and employment records (for example, Collins et al. 2005; Goetzel et al. 2004). In recent years, as an Integrating Authority, the AIHW has established well-developed methods of data linkage. Data linkage would provide insight into the 'patient pathway' and the individual impact of chronic conditions on their productivity. Linkage would be dependent on the ability to create common identifiers in each of the data sets. Note that surveys and longitudinal studies cannot be linked to other surveys or longitudinal studies because the likelihood of participants being selected in multiple studies is very low. Potential research involving data linkage could include:

- the pathways through workforce participation, compensated work-related injury or illness absences, service use and health outcomes could be investigated by linking the DSP and NDS to hospital and mortality data
- the impact of chronic conditions on productivity for those who have been hospitalised as a result of their condition (as an index of seriousness of the illness) could be investigated by linking the NHMD and the DSP and possibly either the LFS or NHS.

Modifications to existing studies

Not all potential future opportunities for research and analysis into this domain require data linkage. Opportunities for research and analysis not requiring data linkage include:

- investigating the impact of chronic conditions on employment and productivity within clinical populations. This could be achieved by engaging chronic disease registries to invite their members to complete survey instruments to measure workforce productivity, such as the HPQ, and extrapolate to the broader population of individuals with these conditions
- determining whether the levels of absenteeism that are associated with chronic health conditions increase over time, and identifying any health and employment outcomes for

employees. This could be investigated by examining participants in the HILDA survey that have previously identified as having a chronic illness to future waves of the survey to track their pathways through employment and whether absences from work increase over time. This patterns could be compared with those without a chronic illness

- enhancing the current lack of data in many areas, including chronic conditions, productivity and indirect health expenditure; for example, designing a new survey, modifying an existing survey (such as, a new module for the NHS or SDAC), or using the skills of an economist to provide estimates given the available data
- investigating presenteeism: this could be achieved by incorporating existing productivity measures such as the HPQ into existing surveys such as the NHS or WRIS
- researching the effect on the productivity of those in caring roles for those with chronic respiratory and musculoskeletal conditions
- monitoring chronic conditions, productivity and older workers: Medibank Private and KPMG Econtech (2011) predict that as a result of the ageing workforce, the most common chronic conditions will be arthritis, heart disease, hypertension and back, neck or spinal problems. It would be prudent to monitor the prevalence of these conditions in older working Australians and assess any impact on workforce productivity.

Next steps

The next steps in determining the impact of chronic musculoskeletal and respiratory conditions on productivity could to be to update previous work by the AIHW investigating the impact of chronic diseases on workforce participation. The report *Chronic disease and participation in work* estimated the annual costs to the Australian economy in terms of decreased participation in full-time and part-time employment, and lost participation due to absenteeism for persons who reported having a chronic disease, and loss to the labour force due to death from chronic disease using the NHS and NMD (AIHW 2009).

New analysis needs to be carried out including interrogating the Work-related Injuries Survey to assess the impact of work-related musculoskeletal and respiratory conditions on duration of absence from work. However, only work-related injuries would be covered by this analysis. Given that there is no data source that can provide complete information on chronic disease and productivity, data linkage opportunities should be explored further with projects scoped and assessed for inclusion on the AIHW's future work plan for chronic disease.

Appendix A: Out-of-scope data sources

Table A1: Data sources investigated and determined to be out-of-scope for the purposes of this scoping paper

Type and name of data set	Some level of information available in priority information area					Reason for exclusion
	Presence of condition	Productivity	Individual impact	Population impact	Demographics of the study sample	
Administrative						
AIHW Disease Expenditure Database	For some data sources					Collection is about expenditure on health care not potential earnings lost through ill health.
Australian Orthopaedic Association National Joint Replacement Registry	✓		Effectiveness of prosthesis		✓	No information on productivity impacts.
Medicare Benefits Schedule					✓	No information on productivity impacts.
Pharmaceutical Benefits Schedule	Medication as proxy					No information on productivity impacts.
National Non-Admitted Patient Emergency Department Care Database	If relevant				✓	No information on productivity impacts.
National Hospital Cost data collection	Limited					No information on productivity impacts.
Survey-based						
The Bettering the Evaluation and Care of Health Survey of General Practice	✓		If relevant		✓	No information on productivity impacts.
Household Income Expenditure Survey					✓	No information on chronic conditions or their workplace impacts.
Australian Work Exposures Study					✓	Measures potential exposure to carcinogens at work, not chronic conditions or productivity.
National Drug Strategy Household Survey	Asthma only	Absenteeism only			✓	Most chronic conditions not asked, no connection between absenteeism and chronic conditions.

Return to Work Survey	Where cause of case	Absenteeism, stigma in workplace	✓		✓	Is a subset of National Data Set for Compensation-based Statistics. Questions are more focused of the impact of having taking workers' compensation than the disease itself.
Longitudinal						
Australian Longitudinal Studies of Ageing	✓		✓		✓	No information on productivity impacts.
Florey Adelaide Male Ageing Study	✓		✓		✓	No information on productivity impacts.
Footprints in time: The Longitudinal Study of Indigenous Children	Limited				✓	Little information on chronic conditions. No information on productivity impacts. Oldest study participants were 14 in 2017. Most not in labour force.
Growing up in Australia: The Longitudinal Study of Australian Children	Limited				✓	Little information on chronic conditions. No information on productivity impacts. Oldest study participants were 17 in latest wave. Most not in labour force.
The Tasmanian Older Adult Cohort	✓				✓	No information on productivity impacts.
Dubbo Osteoporosis Epidemiology Study	Focuses osteoporosis and related conditions		✓		✓	No information on productivity impacts.
Derived						
Willing to Work National Inquiry into Employment Discrimination Against Older Australians and Australians with Disability		✓	✓	✓	✓	Secondary data only. Better to use the primary data sources, which have been examine separately in this report.

Appendix B: Components of workforce productivity and their measurement

Absenteeism is the absence of an individual from work (Kyaw-Myint et al. 2015). It is the commonly used measure of the quantity of productive time lost (Box B1). Absenteeism in a productivity sense refers to productivity loss from absenteeism due to health reasons or due to any other reason (including annual leave).

Box B1: Measurement of absenteeism

Absenteeism is measured by asking respondents how much time they missed from work because of ill health (Mattke et al. 2007). Because such self-reported data have been found to be reliable and valid when the recall periods are short, they can serve as a reasonable substitute for lost time data (Mattke et al. 2007). Measures include: work days missed due to illness (sick days); vacation days taken because of illness; part days/hours missed due to illness; change in number of hours worked per week; temporary work cessation (work disability/sick leave); and permanent work cessation due to illness (Beaton et al. 2009). Absenteeism can also be measured through recorded periods of absence from employment records, workers' compensation claims and, to some extent, hospitalisations data.

RACP (1999) detail 3 measures of sickness absence: total days lost (defined as normal working time after deducting annual leave and overtime); total time lost per hours of planned work (by shift/part shift/ hours); and severity rate:

Working days lost/working days total X 100

Working days lost/days available for work* X 100

Working hours lost/hours available for work* X 100.

The severity rate is widely used in industry and can indicate the percentage lost time attributable to sickness absence and is usually expressed as a percentage of potential normal working hours, excluding overtime.

The study by Kyaw-Myint and colleagues (2015) used the Western Australian Pregnancy Cohort (Raine) Study to assess productivity loss in young workers. To measure work productivity loss, the World Health Organization's recommended Health and Work Performance Questionnaire (HPQ) was used. The HPQ provides separate estimates of absenteeism and presenteeism over the previous 4 weeks. Kyaw-Myint and colleagues (2015) calculated absenteeism estimates by combining full days and part days self-reported absences over 4 weeks before the Raine Study Survey. Part days were treated as 0.5 days. Absenteeism estimates collected as days lost in the past 4 weeks were expressed as hours lost per year by:

- Step 1: calculating average hours per day that individuals were at work, which was derived by dividing the estimated hours worked over the past 7 days by the number of days at work over the past 7 days
- Step 2: multiplying the days lost over the last 4 weeks by the average hours per day individuals were expected to work on the absent days to get hours lost over 4 weeks
- Step 3: multiplying hours lost over the last 4 weeks by 12 to obtain an estimate for 48 working weeks per year.

The costs of productivity loss from absenteeism was then estimated using their hourly salary rate.

Presenteeism is defined as the productivity that is lost when employees come to work but, as a consequence of illness or other medical conditions, are not fully productive (Medibank Private & KPMG Econtech 2011). Employees who work when ill are more prone to injury and, if contagious, increase the risk of passing on an illness to other employees. Illness has a direct effect on both the quality and quantity of work undertaken by employees (Medibank Private & KPMG Econtech 2011).

Presenteeism has been assessed using work audits, supervisor ratings, peer ratings and self-report (Box B2). Presenteeism is increasingly being recognised as a critical component in productivity loss because it deals with the quality of productive time. Studies that have considered presenteeism have found that it accounts for a greater proportion of the productivity loss than absenteeism (Holden et al. 2011).

Box B2: Measurement of presenteeism

Measuring presenteeism is complex. Instruments have been developed that can be used to estimate presenteeism that conceive presenteeism in 3 ways (Mattke et al. 2007):

Assessment of perceived impairment

This is the most common approach to measuring presenteeism. This approach asks employees how much their illnesses hinder them in performing common mental, physical, and interpersonal activities and in meeting job demands (Mattke et al. 2007). The HPQ is an example of a measurement tool that uses this approach.

Comparative productivity, performance and efficiency (with those of others and with one's norm

This method seeks to understand how an employee's performance differs from that of others or from their usual performance. Measures using this method attempt to provide a reference against which loss can be measured. There is also the potential to validate employee's self-reported performance evaluation by comparing them with supervisors' assessments (Mattke et al. 2007).

Estimation of unproductive time at work

This approach asks employees to estimate unproductive time, as is done for absenteeism (Mattke et al. 2007). This method is used only by a small number of instruments.

Kyaw-Myint et al. (2015) used the World Health Organization's HPQ to assess presenteeism. Presenteeism was calculated as the reverse score of participants' rating of their work performance over the past 4 weeks where 1 was the worst performance and 10 was the top performance. Presenteeism in annualised hours lost was calculated by multiplying respondents' presenteeism scores with 48 times the average work hours per week. Costs were then estimated using participants' hourly salary rate.

Employee turnover rates show that the links between absenteeism and retention are strong. The intent to leave, reflecting the interaction between intent to stay with job mobility, workplace factors, career and personal development opportunities, affects absenteeism rates (RACP 1999). Employee replacement costs are also considered a key measure of health-related productivity loss (Kyaw-Myint et al. 2015).

A decline in tangible productivity or **work productivity** is a decline in the ratio of production output per labour hours (Kyaw-Myint et al. 2015).

Workforce injury and illness or **Health-related productivity** is typically captured as sickness absence or work-related injury absence data (Kyaw-Myint et al. 2015). The ABS WRIS provides national estimates of the number of Australian workers who have been injured at work over the 12 months before the survey. The survey provides information on the type of injury or illness and how the injury or illness occurred.

Workers' compensation claims are collected in the NDS. The NDS does not capture all health-related productivity loss because its purpose is to compile data on workers' compensation claims and absenteeism associated with these claims. In addition, not all injuries are claimed in the NDS because they may be considered 'too minor' by employees, or employees may not be aware that they have access to compensation. Workers' compensation claims include only those injuries and illness that have been caused directly by working or through their work, which means that chronic conditions developing in other ways are not captured. The study by Kyaw-Myint and colleagues (2015) indicated that national workers' compensation data may be of limited use for estimating health related productivity loss.

Employee rated quality of life and job satisfaction is a key variable in psychological models of worker absence through which a number of other factors exert an indirect effect (RACP 1999). These issues can lead to serious mental health problems and thus influence absenteeism and presenteeism.

Premature mortality among people of working age with chronic health conditions is associated with costs, including hiring and replacement costs, as well as potentially the reskilling of workers (RACP 1999).

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Abbreviations

ABS	Australian Bureau of Statistics
ABDS	Australian Burden of Disease Study
ACAM	Australian Centre for Asthma Monitoring
AIHW	Australian Institute of Health and Welfare
ALSMH	Australian Longitudinal Study on Male Health
ALSWH	Australian Longitudinal Study on Women's Health
ANZSIC	Australian and New Zealand Standard Classification
APDC	Admitted Patients Data Collection
ARAD	Australian Rheumatology Association Database
bDMARDS	biologic disease-modifying anti-rheumatic drugs
BDS	Busselton Diabetes Study
BMD	bone mineral density
BOLD	Burden of Obstructive Lung Disease (study)
CDs	census collection districts
CHAMP	Concord Health and Ageing in Men Project
CITW	Continuing Inability to Work
COPD	Chronic obstructive pulmonary disease
DALY	disability-adjusted life year
DHS	Department of Human Services
DSP	Disability Support Pension
DSS	Department of Social Services
EDW	Enterprise Data Warehouse
FEV_1	forced expiratory volume in 1 second
FVC	forced vital capacity
GDP	gross domestic product
HILDA	Household, Income and Labour Dynamics in Australia Survey
HPQ	Health and Work Performance Questionnaire
HRQoL	health related quality of life
ICD-10	International Statistical Classification of Diseases and Related Health Problems, tenth revision
ICD-AM	International Classification of Diseases and Related Health Problems, Australian Modification
LFS	Labour Force Survey
MPHS	Multipurpose Household Survey

NDIS	National Disability Insurance Scheme
NDS	National Data Set for Compensation-based statistics
NHMD	National Hospital Morbidity Database
NHS	National Health Survey
NMD	National Mortality Database
NSW	New South Wales
NWAHS	North West Adelaide Health Study
MBS	Medicare Benefits Schedule
PBS	Pharmaceutical Benefits Scheme
PIA	Priority Investment Approach
POS	Program of Support
SABRE	Surveillance of Australian workplace Based Respiratory Events
SDAC	Survey of Disability, Ageing and Carers
SWA	Safe Work Australia
WRIS	Work-related Injuries Survey
YLD	years lived with disability or years of life lived with disability
YLL	years of life lost due to premature death

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Chronic conditions are the leading cause of illness, disability and death in Australia and have lasting physical, psychological, social and financial impacts on individuals, communities and the healthcare system. Respiratory and musculoskeletal conditions are two groups of chronic conditions associated with substantial productivity loss and activity impairment. This scoping study assesses the available data sources for monitoring the relationship between these chronic conditions and workforce productivity.

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