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Safer, healthier, wealthier: The economic value of reducing work-related injuries and illnesses
Technical report

Safe Work Australia

October 2022

Deloitte Access Economics

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Glossary

Acronym	Full name
ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ANZSIC	Australia New Zealand Standard Industrial Classification
ANZSCO	Australia New Zealand Standard Classification of Occupations
CES	Constant Elasticity of Substitution
CDE	Constant Differences of Elasticities
CGE	Computable General Equilibrium
CRESH	Constant Ratios of Elasticities Substitution, Homothetic
DAE-RGEM	Deloitte Access Economics’ Regional General Equilibrium Model
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GNI	Gross National Income
GRP	Gross Regional Product
GTAP	Global Trade and Analysis Project
HSE	Health and Safety Executive
NDS	National Dataset for Compensation-Based Statistics
SWA	Safe Work Australia
WHO	World Health Organisation
WHS	Work Health and Safety
WRI	Work-Related Injury

1 Introduction

1.1 Background

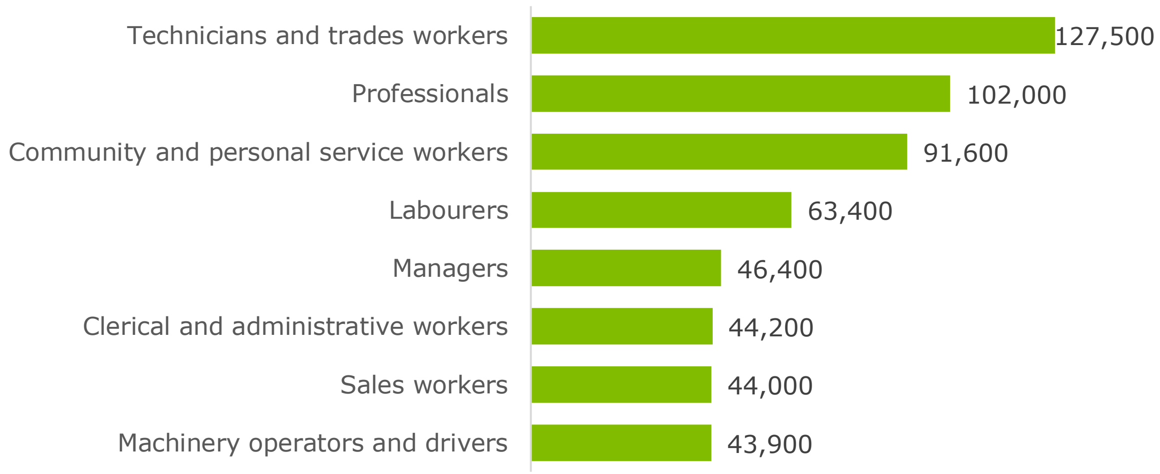
A work-related injury is one that happened at or because of work.[1] It is more formally defined by the Australian Bureau of Statistics (ABS) as "illnesses or injuries sustained as a result of work activities, on a journey to or from work, or the aggravation of pre-existing conditions where employment was a contributory factor".[2]

1.1.1 Australian workers face risks

In 2017-18, 563,600 people, or 4.2 per cent of working people in Australia, suffered a work-related injury or illness.[3] Of these incidents, 60 per cent resulted in the worker taking some time off work. Twenty-seven per cent received workers' compensation for the injury or illness.[4]

Every industry, occupation and sector in Australia is impacted by work-related injury and illness. While the risks differ by industry and occupation, the prospect of becoming injured or unwell because of work has the potential to impact the people in every job in Australia (Chart 1.1 and 1.2).

Chart 1.1 : Number of work-related injuries and illnesses in Australia by occupation (2017-18)



Source: Australian Bureau of Statistics (2018).

Note: Figures have been rounded.

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[1] Safe Work Australia, *Work-related injuries*, <https://www.safeworkaustralia.gov.au/data-and-research/work-related-injuries>

[2] Australian Bureau of Statistics, *Labour Statistics: Concepts, Sources and Methods*,15 February 2022)

[3] Australian Bureau of Statistics, *Work-related injuries*, (July 2017 – June 2018), (Catalogue No 6324.0, 30 October 2018)

[4] Ibid.

Chart 1.2 : Number of work-related injuries and illnesses in Australia by industry (2017-18)

Source: Australian Bureau of Statistics (2018).

Note: Figures have been rounded.

There are many types of work-related injuries and illnesses, including psychological injury, occupation-related diseases and even death. More than two thirds of all work-related injuries and illnesses are injuries, with the remainder representing illnesses.[5] The five most commonly observed work-related injuries and illnesses across 2019-20 were:

- Traumatic joint and muscle injury (38 per cent of total)
- Musculoskeletal disorders (18 per cent of total)
- Wounds and cuts (16 per cent of total)
- Fractures (11 per cent of total)
- Mental illnesses (9 per cent of total).[6]

This data is drawn from Safe Work Australia's National dataset for compensation-based statistics (SWA NDS), and represents injuries and illnesses related to accepted workers' compensation claims only. It may not be representative of all work-related injuries and illnesses. For example, the ABS WRIS shows that of the 563,000 persons who experienced a work-related injury in 2017-18, 53% received some sort of financial assistance, and within this cohort, 52% received worker's compensation, 45% did not apply for worker's compensation, and 3% applied for and did not receive worker's compensation.

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[5] Safe Work Australia, *Key work health and safety statistics: Australia 2021*, (2021) < https://www.safeworkaustralia.gov.au/resources-and-publications/statistical-reports/key-work-health-and-safety-statistics-australia-2021>

[6] Ibid.

1.1.1.2 Safe Work Australia's role in the WHS landscape

Work-related fatalities, injuries and illnesses impose a devastating personal and social impact on workers and their families. They also exact a significant burden on workers' colleagues, their employers, and, more broadly, the communities of which they are a part.

SWA is an Australian government statutory agency tasked with developing national policy to improve WHS and workers' compensation arrangements across Australia. The agency works to:

- Develop and evaluate national WHS and workers' compensation policy and strategies
- Develop and evaluate the model WHS legislative framework
- Undertake research
- Collect, analyse and report data.[7]

1.2 Purpose and scope of the report

SWA has engaged Deloitte Access Economics (DAE) to investigate the potential economic impact of work-related injury and illness in Australia using a computable general equilibrium (CGE) model, following the World Health Organization (WHO) guidelines.[8] These guidelines outline how the economic consequences of disease and injury should be measured and recommends a CGE approach when analysing the macroeconomic consequences of disease and injury. The CGE model is used to help answer the question: 'what is the economic impact of removing all work-related injury and illness for a period of time?'.

The report estimates the incidence of work-related injury and illness and quantifies the productivity losses, associated costs to the health system and other financial costs. The annual costs of work-related injury and illness are estimated at an aggregated level, with breakdowns by occupation, industry and region. While it is acknowledged that the incidence of work-related injury and illness may vary across population groups, demographic breakdowns are not a focus of this report.

These costs are then extended to consider how the Australian economy would react if there had been no work-related injuries or illnesses between 2008 and 2018, focusing on the influence on GDP, employment and industry output. This presents a novel and ground-breaking approach to quantifying the economic consequences associated with work-related injuries and illnesses both within Australia and, more broadly, the world.

1.2.1 Comparison to literature

Across the literature there exists a plethora of studies into the cost of work-related injuries and illnesses utilising cost of illness frameworks. A cost of illness framework is an economic study measuring the costs of a particular disease or condition (in this case work-related injury or illness) [9]. A cost of illness framework typically measures the financial costs of a condition such as healthcare expenses or productivity losses as well as the intangible costs incurred by the individual due to a loss of wellbeing from the condition. This framework has been criticised as the economic impact of disease or injury is hard to be interpreted in meaningful ways, regardless of how large the final estimate is.[10]

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[7] Safe Work Australia, *Who we are and what we do*, <https://www.safeworkaustralia.gov.au/about-us/who-we-are-and-what-we-do>

[8] World Health Organisation, WHO guide to identifying the economic consequences of disease and injury (2009).

[9] Byford S, Torgerson DJ, Raftery J. Economic note: cost of illness studies. BMJ. 2000 May 13;320(7245):1335. doi: 10.1136/bmj.320.7245.1335. PMID: 10807635; PMCID: PMC1127320.

[10] Chisholm, D., Stanciole, A.E., Edejer, T.T.T. and Evans, D.B., 2010. *Economic impact of disease and injury: counting what matters. Bmj,* 340.

This report is an innovative extension upon previous work, combining two methods: cost of illness and CGE modelling. Using CGE modelling analysis to estimate the economic consequences of disease and injury has been advocated for by the WHO.[11] CGE models are uniquely positioned to quantify how the entire economy may react over time to potential changes in policy, technology, or other external factors – such as the removal of work-related injuries and illnesses. The resultant outputs are in terms of both GDP and employment, measures which can be easily used to understand the magnitude of the impact of work-related injury and illness. **Therefore, the study presented here, including the model and assumptions, are not comparable to previous estimates of work-related injury and illness. The results and any conclusions should be treated as unique and separate from previous cost of illness studies into work-related injuries and illnesses.**

1.3 Structure of this report

This report is structured the following way:

- **Chapter 2 – Methodology overview** provides an overview of the methodology used to estimate the economic impact of work-related injury and illness in Australia, including an overview of the data sources used.
- **Chapter 3 – Distributional impact of work-related injuries and illnesses** summarises estimates of the incidence of work-related injury and illness in Australia, presenting estimates by age, sex and severity, along with disaggregating results by jurisdiction.
- **Chapter 4 – Cost of work-related injuries and illnesses in Australia** estimates the productivity losses, health system costs and other financial costs of work-related injury and illness in Australia over 2008-2018.
- **Chapter 5 – Impact on the Australian economy** estimates the broader economic impact of work-related injury and illness on GDP, employment and industry output.
- **Chapter 6 – Summary** details the total economic cost of work-related injury and illness in Australia, compares the estimates of this report to other published work, discusses uncertainty in the modelling and provides an overall conclusion of the key findings in this report.

[11] World Health Organisation, *WHO guide to identifying the economic consequences of disease and injury* (2009).

2 Methodology overview

This chapter provides an overview of the methodology adopted in this report to quantify the economic impacts of work-related injury and illness in Australia.

2.1 Overview

This report estimates the impacts of work-related injury and illness in Australia. The methodology combines two approaches: cost of illness methods to determine the relevant impacts of work-related injury and illness, and computable general equilibrium (CGE) modelling to estimate the potential economic value of removing work-related injury and illness.

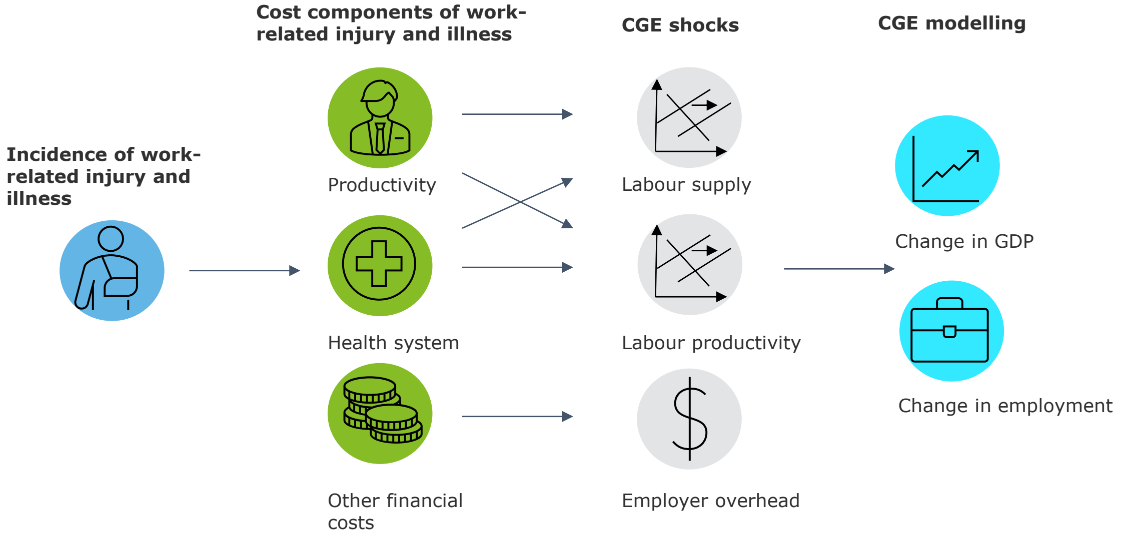
CGE models are a class of economic models that use actual economic data to estimate how an economy might react to changes in policy, technology or other external factors. CGE frameworks are the preferred approach for modelling counterfactual questions because they explicitly account for behavioural response of consumers, firms, governments and foreigners while evaluating the impacts of a given policy change. At the same time, they also capture resource constraints, meaning that the estimated economic impacts account for competition for scarce resources.

This analysis presents a significant extension upon previous economic studies completed by SWA that focused on the economic burden of work-related injuries and illnesses. Previous estimates of the economic impact of work-related illnesses and injuries were based upon a cost of illness framework. These frameworks reflect the costs borne by individuals and sectors that are directly impacted by work-related injuries and illnesses, but have been criticised as the economic impact of the disease or injury is hard to be interpreted, and they do not reflect the broader impact of work-related injuries and illnesses on the economy as a whole.

The present analysis poses a different question – how much value could be created within the Australian economy in the absence of work-related injuries and illnesses? The CGE model answers this question from the perspective of a change in GDP and changes in employment. These estimates allow for a meaningful interpretation of the scale of impact that work-related injuries and illnesses have on the Australian economy. It also provides insights into how work-related injuries and illnesses impact everyone in Australia, not just those who were directly impacted and suffered from work-related injuries and illnesses. **While the approach taken here has its roots in a cost of illness framework, the use of CGE modelling mean the results and conclusions should be treated as unique and separate from previous studies on work-related injuries and illnesses.**

This chapter will begin with an overview of the approach taken to measure the number of work-related injuries and illnesses. Then, the cost components of work-related injuries and illnesses are discussed and the process for translating these into CGE shocks is detailed. A summary of the overarching methodology framework is provided in Figure 2.1.

Figure 2.1 : Methodology framework



Source: Deloitte Access Economics (2022).

2.2 Cost of Injury and Illness

The costs of work-related injury and illness in Australia were estimated over a ten-year period from 2008-09 to 2018-19 ('the reference period') using an incidence approach. For presentation and discussion purposes, this time period is referred to from here on as 2008-18.

Costs have been estimated over a ten-year period (2008 to 2018), as this allowed for an estimate of costs in the absence of the impacts of the COVID-19 pandemic (Box 1) and the time period allows for the capture of three ABS work-related injuries (WRI) datasets, as this survey is performed quadrennially.

Box 1 : Impact of COVID-19 on work-related injuries and illnesses

COVID-19 has served as a catalyst for change in the way Australians live and work. The reference period for this analysis concludes at 2018 and, by design, omits the unprecedented impact of COVID-19 on work. This is because in part the preceding period can be categorised as relatively stable. The extent of impact that COVID-19 continues to have within the workplace and the evolution of future work environments post COVID-19 remains relatively uncertain.

It is recognised that COVID-19 itself can be a work-related illness (where it can be demonstrated that it was transmitted in the workplace), or indeed that COVID-19 could be the cause of a work-related injury (for example, mental stress or anxiety caused by work due to the uncertainty of COVID-19). These additional impacts are not included within the scope of this analysis.

For some industries, such as Construction, Agriculture and Health services, COVID-19 did not require a shift in place of work and is not assessed as having materially changed the risk environment for work-related injuries and illnesses.[12] But for many other industries, COVID-19 resulted in an array of changes including accelerated adoption of hybrid working environments – where only part of the work week is spent at a place of work.[13]

A repeat of cost of injury modelling once more data is available for the period covering the COVID-19 pandemic may demonstrate these effects in the future.

2.2.1 Estimating incidence

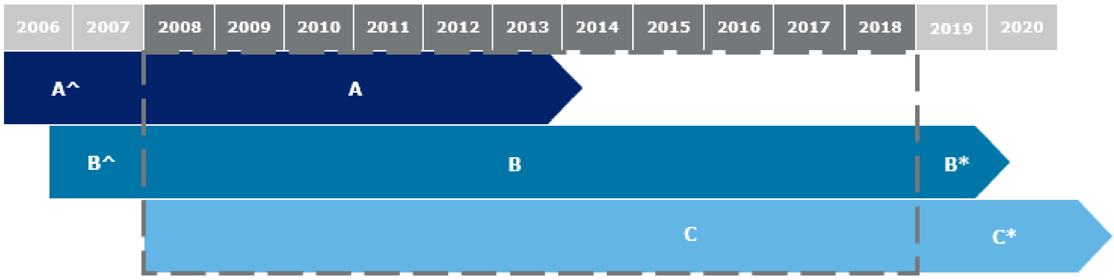
The report utilises an incidence (lifetime costs) approach to estimate the cost of work-related injury and illness. The alternative approach is the prevalence (annual cost) approach. The difference between incidence and prevalence approaches is illustrated in Figure 2.2. Figure 2.2 describes three different cases of people with a work-related injury or illness:

A. represents a case of work-related injury or illness with impacts in the past and up to the years in question, where the associated lifetime costs (or costs over a defined time-horizon) include A^ + A.
B. represents a case of work-related injury or illness with impacts in the reference period, in the past and in future years, with associated lifetime costs (or costs over a defined time-horizon) of B^ + B + B*.
C. represents a case of work-related injury or illness with impacts in the reference period and in future years, with lifetime costs (or costs over a defined time-horizon) of C + C*.

Under an incidence approach, only cases like 'C' would be included over the ten-year period. This approach would capture any ongoing future costs beyond the base year for cases of work-related injury and illness and its sequelae which occurred in that year.

[12] Deloitte Access Economics, *The decentralisation of work in the Illawarra*, (report commissioned by Business Illawarra, April 2021)
[13] Deloitte Access Economics, *Busting the productivity myth: Hybrid working in Australia*, (report commissioned by Telstra, 2021)

Figure 2.2 : Incidence and prevalence approaches to measurement of costs



Source: Deloitte Access Economics (2022).

Under a prevalence approach, cases 'A', 'B' and 'C' would be captured, excluding costs in all other years. While the prevalence approach to cost of illness studies is generally preferred, it requires a cross-sectional study to capture the population that is currently affected by work-related injury and illness at a point in time. Importantly too, this approach would not be able to capture any work-related fatalities which occur in the years prior to the period of measurement of the cross-sectional study, who otherwise may have survived in the absence of work-related injuries and illnesses. For example, a cross-sectional dataset of 2008 is unlikely to include death cases from 2005, who may have survived until 2008 without work-related injuries and illnesses. Considering the absence of this data in an Australian context, and limitations of the prevalence approach, this study instead adopts an incidence approach.

2.2.2 Estimating cost components

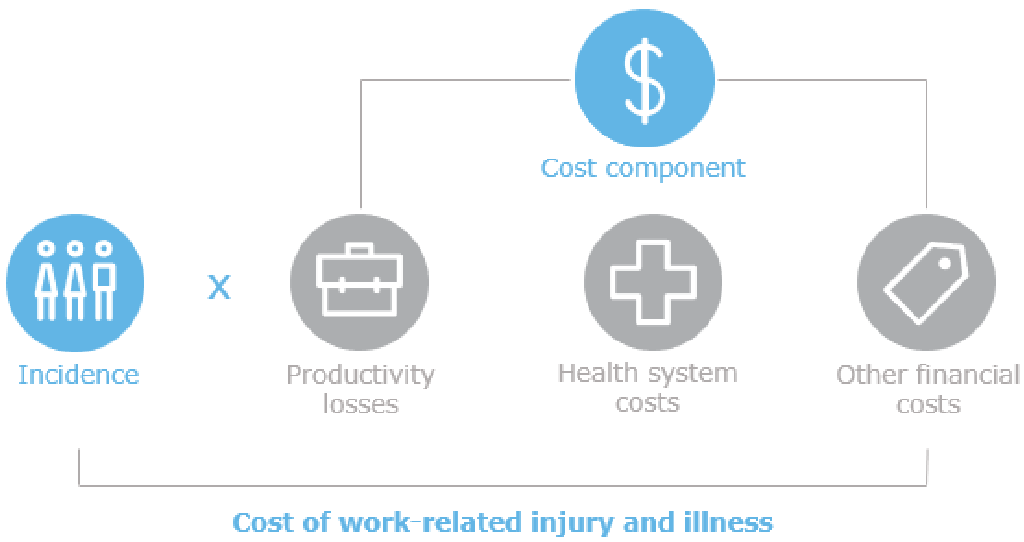
Previous reports estimating the cost of work-related injury and illness have estimated cost components in line with a cost of illness framework. Cost of illness frameworks measure the burden of a condition (in this case work-related injury and illness) on an economy, typically presented as a total cost. The Deloitte Access Economics framework for cost of illness modelling typically captures the epidemiological profile (the number of people living with the condition by age and gender), the economic burden (such as health system costs and productivity losses) and the loss of wellbeing (which attempts to capture the non-financial burden of the condition).

The analysis featured in this study makes several key deviations from a traditional cost of illness framework in order to shift towards a CGE modelling approach. These changes include:

- Removal of loss of wellbeing. Loss of wellbeing refers to the burden of the condition on the individual. It is typically measured as the combination of years of health life loss to morbidity and premature death. Cost of illness modelling places a dollar value on this component using the value of a statistical life year. While the impacts to wellbeing on the worker are undoubtedly important, this analysis examines the impact of work-related injury and illness from an economy-wide perspective. As wellbeing costs cannot be converted into a shock in the CGE model, this component does not align with the CGE modelling framework.
- Removal of so-called deadweight losses. These are defined as efficiency losses that occur when equilibrium is not achieved in a market. In the case of work-related injury and illness, this arises due to the government's need to collect additional tax revenue to fund costs that would otherwise not have been incurred. Under a CGE framework, market equilibriums are achieved in each period, by construction. In this modelling exercise, public savings in healthcare expenditure are captured through an exogenous shock to labour productivity in the broader population, as a result of more resources being made available for other healthcare needs. Government transfers such as unemployment and other costs are determined endogenously by the model in response to movements in other economic variables.

After removing these components, a simplified conceptual framework for quantifying the costs of work-related injury and illness is provided in Figure 2.3.

Figure 2.3 : Conceptual framework for quantifying costs of work-related injury and illness



Source: Deloitte Access Economics (2022).

As noted in Figure 2.3, the cost of work-related injury and illness is comprised of three components:

- **Health system costs** that represent the cost of providing health services to people with a work-related injury or illness. A top-down approach is used for this report to estimate average health system costs per injury/illness case. Due to data limitations, the health system costs are presented as a 'total cost per case' and not disaggregated further. However, implicitly, this cost includes components such as hospitalisation, visits to general practitioners and specialists, rehabilitations, diagnostics, the cost of pharmaceuticals and other health system expenditures.
- **Productivity costs** due to work-related injury and illness. Productivity losses include absenteeism[14], presenteeism[15] and loss of labour supply due to premature death or permanent inability to work. There are additional productivity losses captured relating to the value of time that families and friends spend caring for a person with a work-related injury or illness, described in this report as informal care.
- **Other economic and financial costs** associated with expenditure made by individuals with a work-related injury or illness and their families. This is estimated through the total payments made by employers, including compensation payments to the employee, payments for goods and services (such as equipment and modifications to accommodate the injury), legal fees and other non-compensation payments. Other costs to employers include the cost of training and hiring new staff when an injured worker is unable to return to employment.

[14] Absenteeism includes the additional days off of work a person may take due to their work-related injury or illness.
[15] Presenteeism captures the loss in productivity due to the ongoing impact of the worker's injury or illness upon returning to the workforce.

Where costs were available for previous years, they have been updated using appropriate inflators (e.g. health inflation index or ABS Wage Price Index) and further adjusted for demographic changes. All figures are reported in 2022 dollars.

To the extent allowed by data availability, cost estimates are disaggregated by occupation, industry and region (State/Territory). The breakdown of occupations and industries used in the present analysis is outlined in section 2.3.3.

Table 2.2 outlines the conceptual framework for estimating the cost of work-related injury and illness in this report. The following sections discuss how each of the cost components have been converted into inputs for the CGE modelling, and the subsequent CGE shocks used to interpret these inputs.

Table 2.1: Conceptual framework for costs associated with work-related injury and illness

Cost component	Inputs for CGE	CGE shock	Overview of approach
Health system costs	• Total health system costs (implicitly including hospitalisation, general practitioner and specialist costs, rehabilitation, diagnostics and pharmaceuticals)	• Total Health system costs	• Estimation of total annual health system expenditure per injury type was based on disease expenditure data from the Australian Institute of Health and Welfare (AIHW). Prevalence by injury type was estimated using the AIHW hospitalised injuries dataset and literature to inform estimates of injuries not hospitalised. Prevalence by illness type was estimated using the ABS National Health Survey (NHS). Total health expenditure divided by prevalence was used to estimate the average cost per injury or illness type.
Productivity costs	• Absenteeism • Presenteeism • Reduced employment participation • Premature mortality • Informal care	• Labour supply • Labour productivity	• Productivity losses for absenteeism and reduced employment were converted into estimated losses of FTEs – a measure of the total reduction in the labour supply. • Premature mortality costs were estimated based on the total remaining years the worker would have remained in the labour force if the injury or illness had not occurred. • Presenteeism costs were converted to a percentage reduction in the overall productivity of the labour force. • Informal care costs were estimated as a loss of FTEs, as the informal carer is assumed to take additional time off of work to care for the injured worker.
Other economic and financial costs	• Total efficiency costs (comprising legal costs, investigation costs, travel costs, aids, equipment, and home modifications, staff turnover, retraining and hiring costs)	• Efficiency loss borne by employers	• Other financial costs were estimated based on SWA NDS data on compensation payments. All payment types were included, such as compensation payments, payments for goods and services, and other non-compensation payments. • Staff turnover and retraining costs were based on the average cost to hire and train a new worker and applied to work-related injuries[16] where the worker was unable to return to work due to permanent disability or death.

[16] ELMO Software AU, *2021 HR Industry Benchmark Report*, (2022) <https://elmosoftware.com.au/resources/research-reports/hr-industry-benchmark-survey-report-2021/>.

2.3 Computable General Equilibrium (CGE) Model

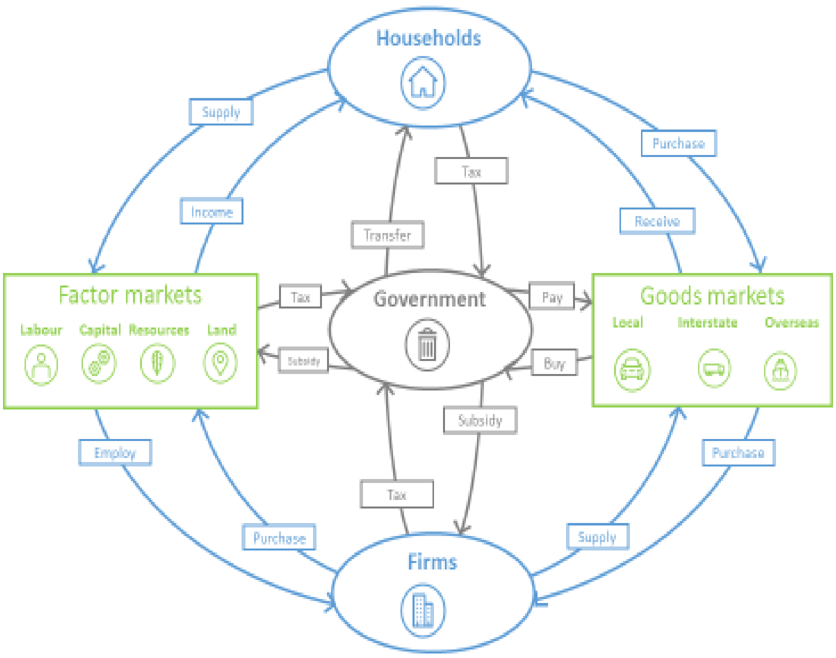
This section provides an overview of the approach to CGE modelling, including the scenarios being examined, and the approach to setting up the database, the policy shocks and closures.

2.3.1 CGE Model

The project utilises the Deloitte Access Economics' Regional General Equilibrium Model (DAE RGEM). DAE-RGEM is a large scale, dynamic, multi-region, multi-commodity CGE model of the world economy with bottom-up modelling of Australian regions. DAE-RGEM encompasses all economic activity in an economy – including production, consumption, employment, taxes and trade – and the interlinkages between them. For this project, the model has captured the broader economic impacts of an increase in effective labour supply in Australia. At the sectoral level, detailed results such as economic activity, employment, sectoral output by industry are also produced.

Figure 2.4 gives a stylised representation of DAE-RGEM, specifically a system of interconnected markets with appropriate specifications of demand, supply and the market clearing conditions that determine the equilibrium prices and quantity produced, consumed and traded.

Figure 2.4 : The components of DAE-RGEM and their relationships



Source: Deloitte Access Economics.

The model rests on the following key assumptions:

- All markets are competitive, and all agents are price takers
- All markets clear, regardless of the size of the shock, within the year.
- It takes one year to build the capital stock from investment and investors take future prices to be the same as present ones as they cannot see the future perfectly.
- Supply of land and skills are exogenous. In the business as usual case, supply of natural resources adjusts to keep its price unchanged; productivity of land adjusts to keep the land rental constant at the base year level.
- All factors sluggishly move across sectors. Land moves within agricultural sectors; natural resource is specific to the resource using sector. Labour and capital move imperfectly across sectors in response to the differences in factor returns. Inter-sectoral factor movement is

controlled by overall return maximizing behaviour subject to a Constant Elasticity of Transformation (CET) function. By raising the size of the elasticity of transformation to a large number we can mimic the perfect mobility of a factor across sectors, and by setting the number close to zero we can make the factor sector specific. This formulation allows the model to acknowledge the sector specificity of part of the capital stock used by each sector and also the sector specific skills acquired by labour while remaining in the industry for a long time. Any movement of such labour to another sector will mean a reduction in the efficiency of labour, as a part of the skills embodied will not be used in the new industry of employment.

DAE-RGEM is based on a substantial body of accepted microeconomic theory. Key features of the model are:

- The model contains a 'regional household' that receives all income from factor ownerships (labour, capital, land and natural resources), tax revenues and net income from foreign asset holdings. In other words, the regional household receives the gross national income (GNI) as its income.
- The regional household allocates its income across private consumption, government consumption and savings so as to maximise a Cobb-Douglas utility function. This optimisation process determines national savings, private and government consumption expenditure levels.
- Given the budget levels, household demand for a source-generic composite goods are determined by minimising a CDE (Constant Differences of Elasticities) expenditure function. For most regions, households can source consumption goods only from domestic and foreign sources. In the Australian regions, however, households can also source goods from interstate. In all cases, the choice of sources of each commodity are determined by minimising the cost using a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function defined over the sources of the commodity (using the Armington assumption).
- Government demand for source-generic composite goods, and goods from different sources (domestic, imported and interstate), is determined by maximising utility via Cobb-Douglas utility functions in two stages.
- All savings generated in each region are used to purchase bonds from the global market, whose price movements reflect movements in the price of creating capital across all regions.
- Financial investments across the world follow higher rates of return with some allowance for country specific risk differences, captured by the differences in rates of return in the base year data. A conceptual global financial market (or a global bank) facilitates the sale of the bond and finance investments in all countries/regions. The global saving-investment market is cleared by a flexible interest rate.
- Once the aggregate investment level is determined in each region, the demand for the capital good is met by a dedicated regional capital goods sector that constructs capital goods by combining intermediate inputs in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these intermediate inputs subject to a CRESH aggregation function.
- Producers supply goods by combining aggregate intermediate inputs and primary factors in fixed proportions (the Leontief assumption). Source-generic composite intermediate inputs are also combined in fixed proportions (or with a very small elasticity of substitution under a Constant Elasticity of Substitution (CES) function), whereas individual primary factors are chosen to minimise the total primary factor input costs subject to a CES (production) aggregating function.

2.3.2 Scenario definition

This study uses computable general equilibrium modelling to measure the net economic impact of work-related injuries and illnesses in Australia. The net refers to the comparison of two scenarios, a baseline and a policy. The baseline represents the historical reality, where work-related injuries and illnesses were present between 2008-2018 and, as a result, impact the Australian economy. The policy scenario analysed in this report is a world where there are no new work-related injuries and illnesses. The policy scenario is constructed by introducing a 'shock' to the baseline scenario and is stylised and aspirational in nature. It does not model any specific policies, but rather the outcome if policies were successful in eliminating the new work-related injuries and illnesses.

2.3.3 Database setup

Before introducing policy shocks into the baseline scenario, the underlying CGE database must be constructed. For this project, DAE-RGEM has been modified in a number of ways to reflect the unique modelling task at hand. The aggregation components are outlined in Table 2.2 and cover regional, sectoral and occupational dimensions.

Table 2.2: CGE Model database aggregation

Dimension	Notes	Our approach
Regional	**The Global Trade Analysis Project (GTAP) database provides detailed economic data for 141 countries**[17] • Australia is represented in aggregate, however DAE routinely uses ABS and other data to disaggregate the GTAP database at the state levels • Regions can also be split out at the SA3 or LGA level.	National level aggregation
Sectoral	**The GTAP database contains 65 sectors** • This can be aggregated to something closely resembling the ANZSIC 19 industries • In some areas GTAP provides slightly less detail than ANZSIC (i.e. retail and wholesale trade is one sector) • In most instances GTAP provides sufficient detail, and if necessary, we can perform a manual split using ABS or other data to create a new sector	Aggregation corresponding to the ANZSIC 19 industries • Deloitte has split road transport, manufacturing, construction and agriculture, fishing and forestry to ANZSIC 2 digit as separate sectors, with awareness of the potential small sub-sectors for regions such as NT
Occupational	**The GTAP database contains 5 occupational groupings:** • Officials and managers, Technicians, Clerks, Service and shop workers, and Agricultural and lower skilled workers • These can be aggregated into any combination of the 5 occupations.	Split out employment at the occupational level

Source: Deloitte Access Economics (2022).

2.4 Developing inputs for CGE

This section outlines the process to derive the inputs for the CGE modelling.

2.4.1.1 Total health system costs

Health system costs were attributed to all work-related injuries and illnesses. The estimated health system cost was disaggregated by the nature of the injury or illness. The average expenditure for each type of injury or illness was derived based on the AIHW disease expenditure database, and the estimated prevalence of the condition.[18] The average health system cost was $5,482 per case

[17] The Global Trade and Analysis Project (GTAP) is a global data base describing bilateral trade patterns, production, consumption and intermediate use of commodities and services.
[18] Australian Institute of Health and Welfare, Disease expenditure in Australia in 2018-19 (2021) <https://www.aihw.gov.au/reports/health-welfare-expenditure/disease-expenditure-australia/contents/summary>.

of injury or illness, estimated by weighting the average cost of each type of injury or illness by the number of cases of injury and illness in year 2018. The individual cost by nature of injury is available in Table A.5. While it is acknowledged that health system costs may be ongoing over several years (particularly in the case of long-term injuries or illnesses), it was assumed that all costs were incurred in the year of the injury.

The health system cost input for the CGE model was the total health system expenditure by State/Territory and by year.

2.4.1.2 Absenteeism

Absenteeism was informed based on SWA NDS and ABS data. Absenteeism days were based on the number of working days between the last day of work (when the injury or illness occurred) and the first day of return to work. The total number of days lost was disaggregated across year, State/Territory, occupation and industry. Total absenteeism days were then converted to an FTE worker (assuming an FTE is equivalent to 240 days worked in a year).

The absenteeism input for the CGE model was the total FTEs lost by State/Territory, occupation, industry and year.

2.4.1.3 Presenteeism

Presenteeism was attributed to work-related injuries and illnesses only in cases where the worker returned to work. Presenteeism was estimated based on the Work Ability in Australia pilot study conducted by Safe Work Australia in 2014 and was directly used in our analysis.[19] Although, the SWA National Return to Work data included an estimation of presenteeism, there was no control group (i.e. population that had no work-related injury or illness) included in the same survey, so it was not possible to estimate the presenteeism directly.[20] The 2014 analysis estimated that returning to work following a work-related injury in the previous 12 months was associated with a 6 per cent decline in work productivity following a work-related physical injury and a 16 per cent decline due to a work-related mental health condition. Presenteeism impacts were applied to the total number of people returning to work and disaggregated by year, State/Territory, occupation and industry. Presenteeism impacts were applied for the first 12 months following the work-related injury or illness.

The presenteeism input for the CGE model was the average decline in work productivity (%) by State/Territory, occupation, industry and year.

2.4.1.4 Reduced employment

Reduced employment includes the work-related injuries and illnesses where the person was unable to return to the workforce. This subgroup of work-related injuries and illnesses includes people who made a workers' compensation claim, indicated that they had a total or partial impairment, and that they had not returned to work. To estimate the number of years of labour supply lost due to injury or illness, the number of years before retirement was calculated based on the worker's age and assuming a retirement age of 65 years. For example, a worker aged 20 was assumed to have 45 years remaining in the labour force. The 45 years remaining is further discounted to account for the fact that not all workers remain employed full time over the course of their remaining working life. On average, a year of labour supply lost due to injury or illness was assumed to be equivalent to 60 per cent of an FTE based on observed participation and employment trends. Notably, reduced employment has an ongoing impact beyond the 2018 reference period. The long-term costs beyond 2018 were included within the present analysis.

The reduced employment input for the CGE model was the total FTEs lost by State/Territory, occupation, industry and year.

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[19] Noone, J. H., Mackey, M.G., & Bohle, P. (2014). Work ability in Australia – pilot study: A report to Safe Work Australia. Canberra: Safe Work Australia.
[20] Social Research Centre, 'National Return to Work Survey 2018: Summary Report' Report commissioned by Safe Work Australia (2018) <https://www.safeworkaustralia.gov.au/system/files/documents/1811/national-rtw-survey-2018-summary-report.pdf>.

2.4.1.5 Premature mortality

Premature mortality includes the work-related injuries or illnesses which were fatal for the worker as indicated by the workers' compensation claim. Similar to section 2.4.1.4, the years of labour supply lost due to the fatality were estimated based on the worker's age and an assumed retirement age of 65. Each year of lost work was then discounted to be equivalent to 60 per cent of an FTE based on observed employment trends.

The premature mortality input for the CGE model was the total FTEs lost by State/Territory, occupation, industry and year.

2.4.1.6 Informal care

In instances where a worker met the criteria for reduced employment (as discussed above), it was assumed that the worker may also require an informal carer. Based on data from the ABS Survey of Disability, Ageing and Carers (2018), it was assumed that an informal carer would provide 25 hours of care per week.[21] The total hours of care provided were attributed as a loss of labour supply, as these represent hours that the informal carer would otherwise have spent working. Informal care costs were not disaggregated by the industry or occupation in which the work-related injury or illness incurred, as this distribution does not inform the occupation of the informal carer.

The informal care input for the CGE model was the total FTEs lost by State/Territory and year.

2.4.1.7 Total efficiency costs

Total efficiency costs were informed by the total payments made by an employer following a workers' compensation claim, as recorded in the SWA NDS dataset. These costs included all payments made in the year that the injury or illness occurred as well as in all subsequent years following the injury or illnesses. For work-related injuries and illnesses where the worker was unable to return to work (the injuries described in 2.4.1.4 and 2.4.1.5), there were additional costs of hiring and training new staff incurred by the employer. This additional cost was assumed to be $23,860 based on the 2021 HR Industry Benchmark Survey.[22]

The total efficiency costs input for the CGE model was the total expenditure by State/Territory, occupation, industry and year.

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[21] Australian Bureau of Statistics, 'Disability, Ageing and Carers, Australia: Summary of Findings' (2019) <https://www.abs.gov.au/statistics/health/disability/disability-ageing-and-carers-australia-summary-findings/2018>.
[22] ELMO Software AU, 2021 HR Industry Benchmark Report, (2022) <https://elmosoftware.com.au/resources/research-reports/hr-industry-benchmark-survey-report-2021/>.

2.5 Shocks for CGE modelling

The costs of work-related injury and illness identified in section 2.4 have broader economic consequences in addition to their estimated cost. This section outlines the shocks used within the CGE model to estimate the broader impact on the economy.

The CGE model is flexible and can be engineered to provide insights to a range of questions. The model provides answers by introducing a range of 'shocks' to the baseline. Typically, shocks are introduced into the CGE model in three different ways. The following economic variables are used to shock the economy within the CGE framework.

- **Labour supply** measures the number of hours workers are willing and able to work at a given wage. Work-related injuries or illnesses reduce the total employees available to work and thus negatively impact the total available labour supply. This is measured within the CGE model as an 'output' shock.
- **Labour productivity** measures the number of goods and services that can be produced by 1 hour of labour supply. Work-related injuries or illnesses decrease the average level of productivity of the workforce. This is captured as a 'productivity' shock.
- **Employer overhead** measures the costs borne by employers that do not relate to labour, materials or production. These may include costs like Workcover or legal fees. Work-related injuries or illnesses increases the level of employer overheads and are modelled as a 'price lever' shock.

Each of these economic variables correspond to one or more of the inputs to the CGE model described in section 2.4. 0 outlines the relationship between the inputs to the CGE model and the resulting CGE shock. An explanation of the relationship between each CGE input and the CGE shock is provided in the text below.

Table 2.3: Inputs to the CGE modelling and resultant CGE shocks

	CGE shock		
Input for CGE	**Labour supply**	**Labour productivity**	**Employer overhead**
Health system costs	✓	✓	
Absenteeism	✓		
Presenteeism		✓	
Reduced employment	✓		
Premature mortality	✓		
Informal care	✓		
Efficiency costs			✓

Source: Deloitte Access Economics (2022).

Health system costs associated with work-related injuries and illnesses are modelled as expenditure that could be avoided if work-related injuries and illnesses did not occur at all. It was assumed that this expenditure could be allocated to other individuals in the absence of work-related injury and illness, and thus be used to deliver improved health outcomes to the broader population. Better health outcomes could be realised through reduced waiting times for treatment (as waiting times would be shorter if work-related injury or illness did not occur) or through better allocation of funds to improve treatment outcomes for patients. Improved health outcomes for the broader population were modelled as a shock to labour supply and to labour productivity.

Productivity losses were modelled as labour supply ('output') shocks where the result of work-related injury or illness was a reduction to the available labour in the economy. A labour productivity shock was used for presenteeism as this input affects the average productivity of the workforce. This means that while the labour supply has not changed, the total output that the labour force can produce is diminished.

Efficiency costs are the sum of all costs incurred by the employer as a consequence of a work-related illness or injury. The impact on the employers was modelled as an additional overhead which reduces efficiency, as the employer incurs additional expenditure in order to produce the same amount of output.

2.6 Data Sources

2.6.1 Cost of work-related injury and illness

2.6.1.1 The ABS Work-Related Injuries Survey

The ABS performs the Work-Related Injuries (WRI) Survey quadrennially and captures individuals who experienced a work-related injury or illness aged 15 and over who worked at some time in the last 12 months. The survey collects the following information:

Table 2.4: Data items included in the ABS WRI survey

Category	Variables collected
Nature of the injury or illness	• Fracture/ broken bone • Chronic joint or muscle condition (includes RSI, OOI and OOS) • Sprain/strain/dislocations • Cut/open wound • Crushing injury/internal organ damage/bruising • Needle stick injury/grazes/splinters • Stress or other mental health condition • Burns (includes friction burns) • Amputation/Other/No further information
Demographic subgroups	• Age (grouped across 5 years) • Sex
Industries	• ANZSIC categories
Occupation	• ANZSCO categories
Economic outcomes	• Absenteeism • Reduced workforce participation • Forgone future income – estimated by differences between industry and occupation where injury/illness occurred and current income

Source: Deloitte Access Economics (2022).

2.6.1.2 The SWA National Dataset for Compensation-Based Statistics

Safe Work Australia compiles the national dataset for compensation-based statistics (NDS) based on data obtained from workers' compensation authorities in each jurisdiction (including the states and territories and the Commonwealth). This captures individuals who experienced a work-related injury or illness and claimed workers' compensation for this injury or illness. This analysis considers all claims related to work-related injury and illness, including claims which were rejected and those that are still pending. The dataset collects the following information:

Table 2.5: Data items included in Safe Work Australia's NDS

Category	Variables collected
Nature of the injury or illness	• Musculoskeletal and connective tissue diseases • Joint diseases (arthropathies) and other articular cartilage diseases • Spinal vertebrae and intervertebral disc diseases - dorsopathies • Diseases involving the synovium and related tissue • Diseases of muscle, tendon and related tissue • Other soft tissue diseases • Other musculoskeletal and connective tissue diseases, not elsewhere classified • Mental diseases • Digestive system diseases • Skin and subcutaneous tissue diseases • Nervous system and sense organ diseases • Respiratory system diseases • Circulatory system diseases • Infectious and parasitic diseases • Neoplasms (cancer) • Other diseases • Other claims
Demographic subgroups	• Age (as a continuous variable) • Sex
Industries	• ANZSIC categories
Occupation	• ANZSCO categories
Economic outcomes	• Absenteeism • Reduced workforce participation • Forgone future income – full incapacity only • Overtime and overemployment • Compensation payments made by employers • Payments for goods and services made by employers • Non-compensation payments made by employers

Source: Deloitte Access Economics (2022).

It is noted that the NDS does not cover all cases of work-related injuries and diseases for the reasons below:

- While state, territory and Commonwealth Government workers' compensation legislations provide coverage for the majority of employees, some specific groups of workers are covered under separate legislation. Claims lodged by police in Western Australia and military personnel of the Australian Defence Forces are not included.
- Work-related injuries and diseases of self-employed workers are under-represented because workers' compensation schemes do not generally cover self-employed workers. Around 10% of Australian workers are self-employed. Denominators used to calculate rates only include the jobs and hours of employees who are eligible for workers' compensation.

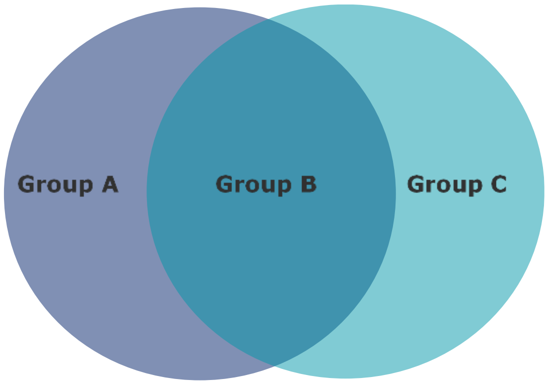
- Mesothelioma claims are under-represented because many mesothelioma cases, which are commonly linked to work-related exposure to asbestos, are compensated through mechanisms other than workers' compensation.
- Diseases are under-represented because many diseases result from long-term exposure to agents or have long latency periods, which makes the link between the work-related disease and the workplace difficult to establish.[23]
- As mentioned previously, not all injuries and illnesses led to a workers' compensation claim. Though our approach to combining the ABS and SWA NDS data would have captured most of the individuals that have experienced work-related injuries and illnesses through the reference period, it was not possible to capture all costs due to this data limitation.

2.6.1.3 Combining the ABS and SWA data

The ABS and SWA datasets capture different groups of individuals who experienced a work-related injury or illness. The ABS dataset captures individuals who worked at some point in the last 12 months and experienced a work-related injury in that period. The SWA NDS included additional information such as workers' compensation and costs to employers that are necessary for this analysis, but it only captures individuals who applied for workers' compensation. Included as part of the SWA NDS data were work-related traumatic injury fatalities where the data indicated that the worker was deceased. Hence the population can be broken down into the following groups based on data availability of ABS and SWA NDS:

- **Group A:** Individuals who did not apply for worker's compensation are captured in the ABS data.
- **Group B:** Individuals who applied for compensation and who worked in the last 12 months are captured in both the ABS and SWA NDS data.
- **Group C:** Individuals who claimed workers' compensation and who did not work in the last 12 months are captured in the SWA NDS data.

Figure 2.5 : Combining ABS and NDS data



Source: Deloitte Access Economics (2022).

This analysis combines these datasets (Figure 2.5) to capture every person who experienced a work-related injury or illness. Group B was estimated using SWA NDS data only. Group B was excluded from the ABS data in order to avoid double counting of work-related injuries and illnesses.

2.7 Rationale for new methodological approach

The cost of work-related injuries and illnesses have been estimated previously within Australia and internationally using cost of illness frameworks. Within Australia, a number of these studies have

[23] Safe Work Australia, *Explanatory notes: National data set for compensation-based statistics for Safe Work Australia* (2020), <https://www.safeworkaustralia.gov.au/resources-and-publications/statistical-reports/explanatory-notes-national-data-set-compensation-based-statistics-safe-work-australia>

been completed by SWA, with the most recent study finding that the cost of work-related injuries and illnesses totalled $61.8 billion in 2012-13.[24] Earlier studies completed by SWA found similar results, with the cost of work-related injuries valued at $57.5 billion and $60.6 billion in 2005-06 and 2008-09, respectively.[25]

Other comparable international studies capture the same cost components, although some variation exists due to differences in assumptions and data sources available.[26] A study completed by Health and Safety Executive (HSE), the independent regulator for WHS in the United Kingdom, finds that the cost of work-related injuries and illnesses in 2018-19 was $28.6 billion.[27] In a similar vein to this work, HSE's study also utilises an incidence approach and captures some of the same cost inputs including productivity losses, healthcare costs, administrative and legal costs, but also includes additional costs such as the impact on the individual's quality of life after incurring the injury or illness.

The approach taken in this report presents an innovative extension upon these studies. Where previous analyses have measured the economic impact of work-related injury and illness through a cost of illness lens, this framework has been criticised, as the economic impact of disease or injury is hard to be interpreted in meaningful ways, regardless of how large the final number is.[28]

This report combines two methods: cost of illness and CGE modelling. Using CGE analysis to estimate the economic consequences of disease and injury has been advocated for by the WHO.[29] CGE models are uniquely positioned to quantify how the entire economy may react over time to potential changes in policy, technology, or other external factors – such as the removal of work-related injuries and illnesses. The resultant outputs are in terms of both GDP and employment, measures which can be easily used to understand the magnitude of the impact of work-related injury and illness.

Another important distinction is that previous cost of illness approaches do not consider the secondary effects of work-related injury and illness. Therefore, the costs under a cost of illness approach will be largest in the sector where the most work-related injuries and illnesses occur. For example, in SWA's previous report, the Health care and social assistance industry had the largest total cost of $8.2 billion. However, this may not be true with the CGE model. On top of the number of work-related injuries and illnesses that occurred in a sector, other factors such as the relative size of a sector, labour intensiveness of a sector, and how sectors interact with each other are also considered in the CGE model and impact the results in their own ways.

The enhancement of methods within the report mean that these results are tangible and interpretable to the reader. **However, the modelling and assumptions are not comparable to previous estimates of work-related injury and illness. As such, the results and any conclusions should be treated as unique and separate from previous cost of illness studies into work-related injuries and illnesses.**

2.8 Assumptions, limitations and scope for future analysis

The results from removing work-related injuries and illnesses in Australia are informed using a CGE framework. This approach follows emerging work by the World Health Organisation (WHO) and Michael Millar in modelling health related issues. As the approach taken here to model the impact of work-related injuries and illnesses is novel in an Australian context, there are avenues in the future to build on and refine the work. The following sections discusses selected issues where

[24] Safe Work Australia, *The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2012-13*, (2015), <https://www.safeworkaustralia.gov.au/system/files/documents/1702/cost-of-work-related-injury-and-disease-2012-13.docx.pdf>
[25] Ibid.
[26] Tompa, E., Mofidi, A., van den Heuvel, S. et al., *Economic burden of work injuries and diseases: a framework and application in five European Union countries*, 21 (49), *BMC Public Health*
[27] Health and Safety Executive, *Costs to Britain of workplace fatalities and self-reported injuries and ill health*, (August 2020), <https://www.hse.gov.uk/statistics/pdf/cost-to-britain.pdf>
[28] Chisholm, D., Stanciole, A.E., Edejer, T.T.T. and Evans, D.B., 2010. *Economic impact of disease and injury: counting what matters. Bmj,* 340.
[29] World Health Organisation, *WHO guide to identifying the economic consequences of disease and injury* (2009).

such developments will assist estimation and communication of Australia's work-related injuries and illnesses in a CGE framework.

2.8.1 Assumptions and limitations

As this is the first report to translate the impact of work-related injury and illness into a CGE modelling framework in Australia, there are limitations that arise and options for the analysis to be extended in the future.

Several impacts or effects of work-related injury or illness have not been captured in the present analysis:

- This study chose a timeframe of 2008-09 to 2018-19 to reflect the economic impact of work-related injuries and illnesses pre-COVID. It must be noted that the study findings may be impacted by work environment changes that have been realised in a post-pandemic economy, such as the adoption of hybrid working models.
- The incidence approach used in the modelling does not capture the impact of work-related injury or illness that occurred prior to 2008. For example, a work-related death occurring in 2007 would still be impacting the economy during the reference period but was not included within this analysis.
- Workers who incur a work-related injury or illness may return to the workforce following a period of absence, but the average time that this worker remains in the workforce may be reduced as a result of work-related injury or illness. For example, an individual may now be more likely to retire at age 60 (or earlier) as opposed to age 65. While this could be modelled as a labour supply impact within the CGE framework, there was insufficient data to determine the magnitude of this impact.
- Following a work-related injury or illness, some workers cannot return to their original job and must re-train for a new occupation. Data was not available to inform the proportion of workers who required re-training, and thus no estimate was made to quantify this impact.
- Unhealthy work environments may also lead to increased prevalence of conditions such as diabetes or cardiovascular disease. Where these have not been recorded as a work-related injury or illness, the impact of these conditions has not been captured under the present analysis.
- Work-related diseases are under-reported in the available NDS and ABS datasets due to difficulty establishing a causal work connection and the latent nature of many of these diseases. This may also mean the worker-related fatalities due to work-related disease are also under-reported.
- This analysis only comments on the benefits of removing work-related injury and illness. The analysis does not account for the costs of regulation nor the costs of implementing additional safety interventions and measures that would be required in order to reduce the number of work-related injuries and illness.

Where new data becomes available to estimate any of the above impacts or to include any additional shocks not discussed in the present report, it is acknowledged that the modelled results would change.

2.8.2 Future work

Understanding the economic impacts of health and safety related issues in a CGE modelling framework is an emerging area of study. This report lays an early foundation on which future work in this area can build and refine.

Future studies into the economic impacts of work-related injuries and illnesses would benefit from improved frequency and scope of data collections. This would not only strengthen the inputs and conclusions of similar analysis, but also enable alternate analysis, including for example a 'prevalence' approach.

Strategic policy makers will also likely benefit from understanding the future potential impacts of work-related injuries and illnesses through a forward-looking analysis. In doing so, the analysis can also consider the economic consequences of a range of related factors including:

- The shift to hybrid working, as has been recently accelerated by COVID-19.

- The influence of COVID itself as a work-related illness (if the worker can demonstrate they caught it at work).
- The rise of work-related psychological injuries caused by greater awareness and overall recognition of mental health conditions, which pose a significant impact due to long recovery periods.
- Longer-term work-related issues including migration policy, skills shortages, and Australia’s ageing workforce.

Future work into the economic impacts of work-related injuries and illnesses may also benefit from sensitivity analysis to give greater indication of the magnitude of impact of certain parameters. Sensitivity analysis may be useful for (but would not be limited to) testing assumptions such as the likelihood of a worker remaining in employment (over their lifetime) under the scenario where that worker was not injured, the magnitude of health system costs, and the time provided by informal carers (which is dependent upon the severity of the workers’ injury).

Lastly, it is important to note that economic impacts are only one lens through which to analyse the consequences of health and safety issues. While this report provides a robust and internally consistent quantification of the economic impacts of work-related injuries and illnesses, other non-market and social impacts (e.g. quality of life) are as important to consider. To ensure national policy making for WHS remains strong and fit for purpose, policy and decision makers should continue to strengthen their understanding of the quantitative impacts in the context of Australia’s health and safety outcomes.

3 Distributional impact of work-related injuries and illnesses

There were 6.9 million work-related injuries and illnesses that occurred between 2008-18, an average of 623,663 injuries and illnesses per year. All industries and occupations were affected by work-related injury and illness.

3.1 Summarised distributional impact of work-related injury and illness

Table 3.1: Distributional impact of work-related injury and illness

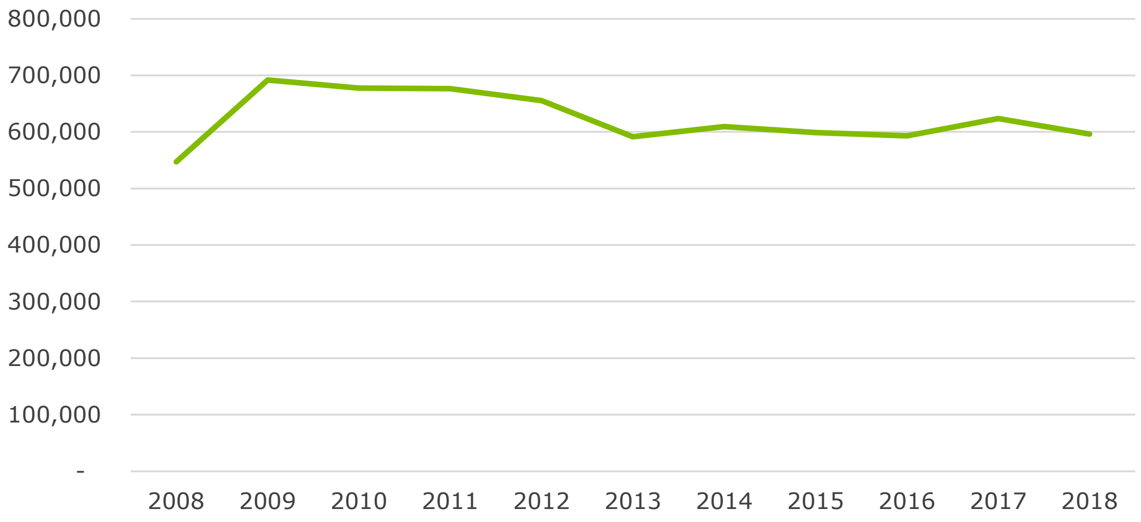
Component	Description	Total impact
Incidence	The total number of new work-related injuries and illness that occurred between 2008-18	There were 6.9 million work-related injuries or illnesses between 2008-18.
Jurisdiction	The geographical distribution of work-related injuries and illnesses across Australia	NSW had the most work-related injuries and illnesses (2.3 million), followed by VIC (1.7 million) and QLD (1.3 million).
Industry	The distribution of work-related injuries and illnesses across industries in Australia	The Health industry accounted for 14.5 per cent of all injuries, followed by Retail trade (9.0 per cent) and Public administration (7.8 per cent).
Occupation	The distribution of work-related injuries and illnesses across occupations in Australia	The occupation with the largest proportion of work-related injuries and illnesses was Agricultural and lower skilled workers (26.4 per cent), followed by Officials and managers (25.8 per cent) and Clerks (23.3 per cent).
Nature of injury	The type of work-related injuries or illnesses that occurred	Work-related injuries and illnesses were most often related to soft tissue disorders (27.0 per cent), trauma to joints and ligaments (15.2 per cent), fractures (10.2 per cent) and mental health conditions (8.2 per cent).

Source: Deloitte Access Economics 2022.

3.2 Incidence

There were 6.9 million work-related injuries and illnesses that occurred between 2008-18, an average of 623,663 injuries and illnesses per year. Approximately 43 per cent of injuries and illnesses were attached to compensation claims with data available from the SWA NDS. It is noted that the SWA NDS data included all compensation claims, regardless of whether the claim had been accepted, rejected or whether it was still pending. The remaining 57 per cent of injuries were estimated using the ABS WRI dataset. Chart 3.1 displays the incidence of work-related injuries and illnesses over time.

Chart 3.1 : Incidence of work-related injuries or illnesses, 2008-18, Australia

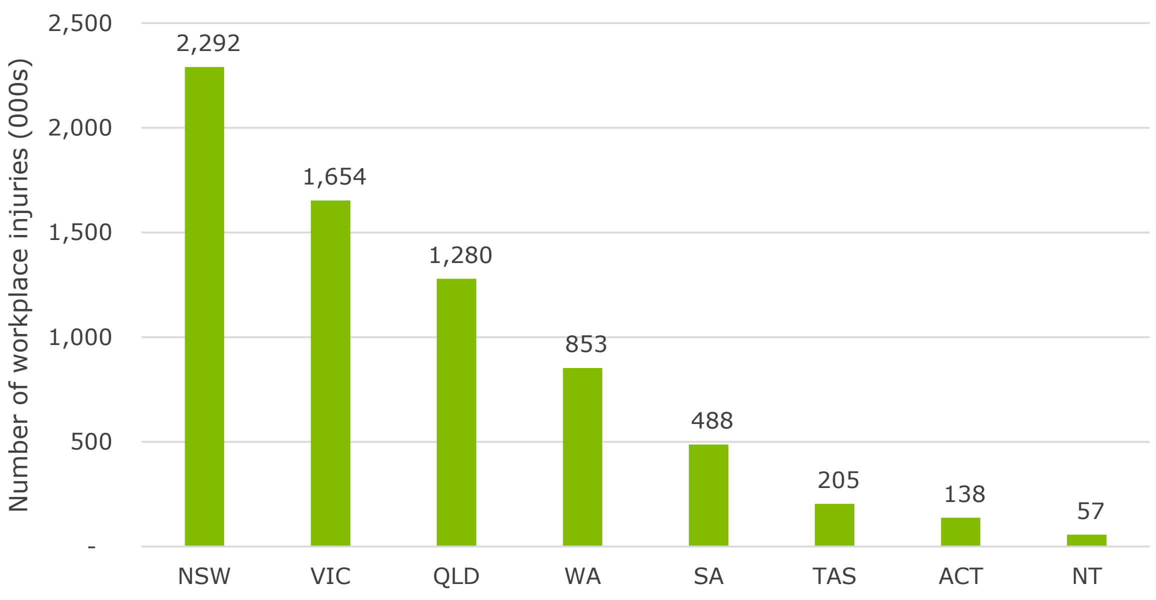


Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

3.3 Jurisdiction

Work-related injuries and illnesses occurred most often in Australia's most populous states. New South Wales had the most work-related injuries and illnesses (2.3 million), followed by Victoria (1.7 million) and Queensland (1.3 million). It should be noted that some claims in Victoria are not reported in the SWA NDS data because of the "employer excess", which refers to the first 10 days of the period of incapacity.

Chart 3.2 : Work-related injuries and illnesses sorted by jurisdiction, 2008-18



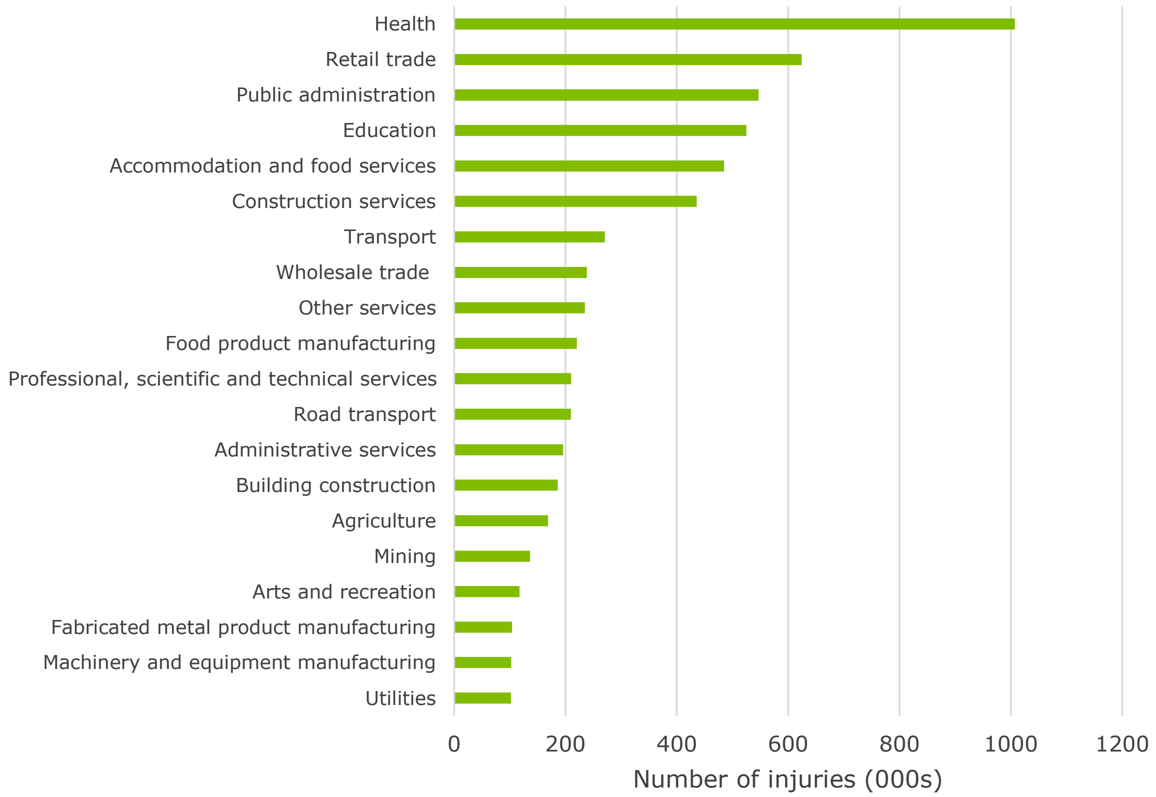
Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

3.4 Industry

Each work-related injury or illness was assigned one of 39 industry codes. This informs the distributional impact of work-related injury or illness across industries in Australia. Not all industries are affected equally by work-related injuries and illnesses. Industries with more work-related injury or illness are likely to have greater costs, and the impact of work-related injuries and illnesses on these industries are expected to be largest. As the CGE model could apply these shocks by industries, disaggregating costs by industries could capture how these industries were impacted by work-related injuries and illnesses, and how these impacts changed the economy, including possible secondary effects.

Chart 3.3 displays the industries where more than 100,000 injuries occurred during the reference period. The Health industry accounted for 14.5 per cent of all injuries, followed by Retail trade (9.0 per cent) and Public administration (7.8 per cent).

Chart 3.3 : Distribution of work-related injuries and illnesses by industry

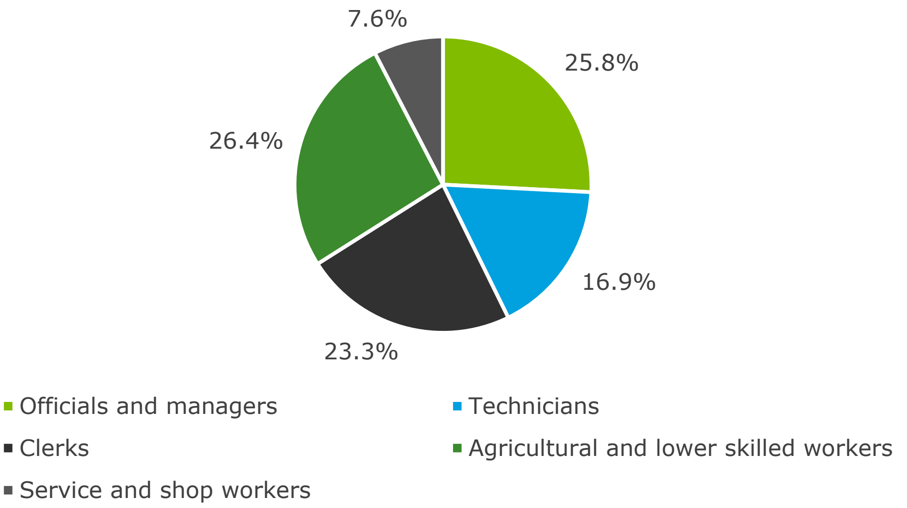


Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

3.5 Occupation

The occupation with the largest proportion of work-related injuries and illnesses was Agricultural and lower skilled workers (26.4 per cent), followed by Officials and managers (25.8 per cent) and Clerks (23.3 per cent). Based on SWA NDS claims alone, 37.0 per cent of these claims were from Agricultural and lower skilled workers.

Chart 3.4: Distribution of work-related injuries and illnesses by occupation

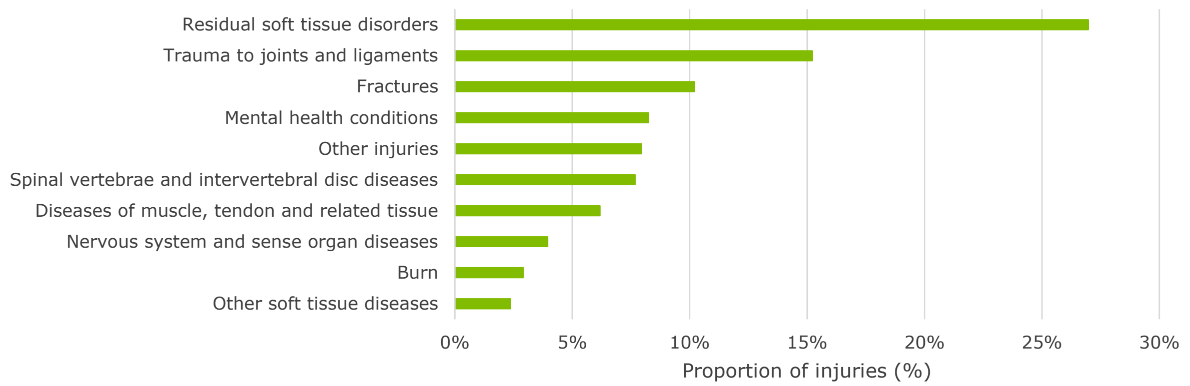


Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

3.6 Nature of injury

Work-related injuries and illnesses were most often related to soft tissue disorders (27.0 per cent), trauma to joints and ligaments (15.2 per cent), fractures (10.2 per cent) and mental health conditions (8.2 per cent). The distribution of the 10 most common work-related injuries is shown in Chart 3.5.

Chart 3.5 : Distribution of work-related injuries and illnesses by nature of injury



Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

4 Cost of work-related injuries and illnesses in Australia

Overall, between 2008 to 2018, work-related injuries and illnesses led to a productivity loss of 2.2 million FTEs, and on top of this $37.6 billion in costs were incurred by the health care system.

4.1 Summarised costs of work-related injury and illness

In total, between 2008-18, 2.2 million jobs (FTE) were lost due to productivity losses from work-related injuries and illnesses, and further, $37.6 billion in costs were incurred by the health system (0).

Table 4.1: Cost of work-related injury and illness

Component	Description	Total impact
Absenteeism	Short term productivity losses from time off work	835,770 FTEs
Presenteeism	Reduced productivity upon returning to work	331,000 FTEs
Reduced employment	Permanent withdrawal from labour force following work-related injury or illness	605,789 FTEs*
Premature mortality	Loss of labour due to work-related injury or illness resulting in death	63,568 FTEs*
Informal care	Productivity losses from informal carers taking additional time off of work to care for a person with work-related injury or illness	408,061 FTEs*
Health system costs	Costs incurred by the health system following work-related injury or illness	$37.6 billion
Efficiency costs	Costs incurred by the employer following work-related injury or illness	$49.5 billion

Source: Deloitte Access Economics 2022. * Total impact is measured from 2008-2065.

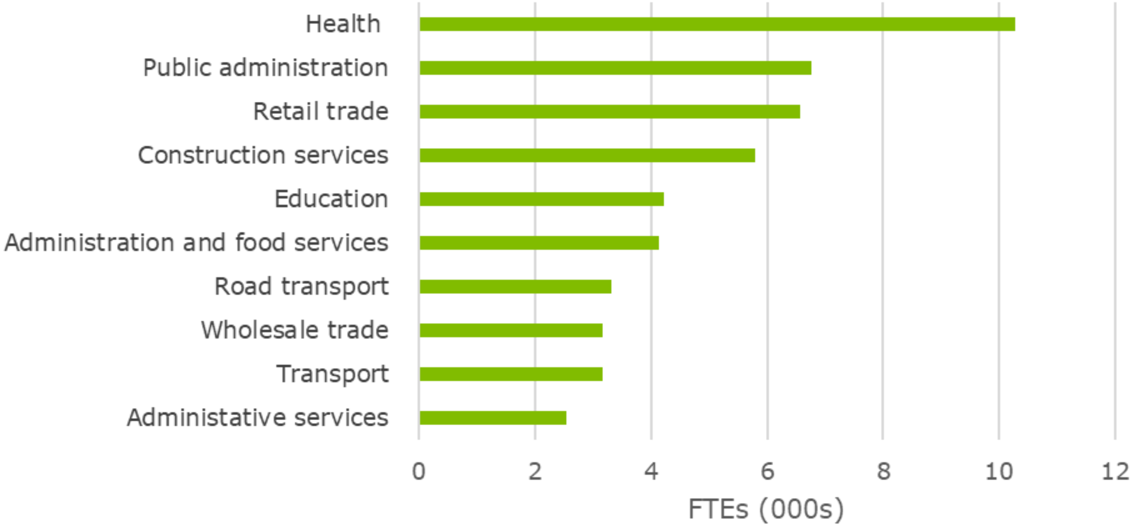
4.2 Productivity losses

4.2.1 Absenteeism

Short term losses in employment due to work-related injury and illness had a large impact on the economy's labour supply. It was estimated that the average work-related injury or illness resulted in 45.8 working days lost for compensated injury and illness and 14 days for non-compensated injury or illness. The total days of missed work were converted to a total number of FTE workers lost from the economy. It was estimated that 835,770 FTEs were lost due to absenteeism across the reference period, or an average of 75,979 per year.

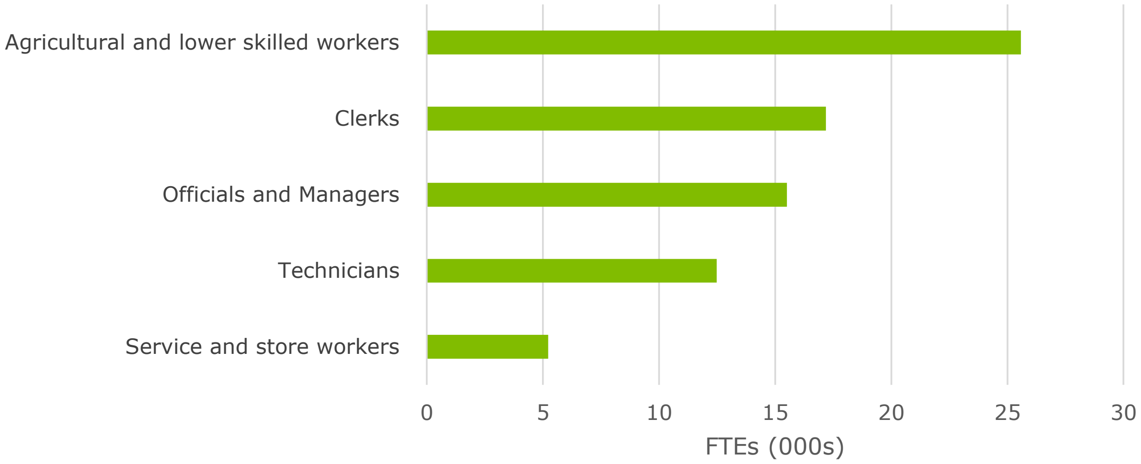
Absenteeism impacts were the largest in the Health industry, with an estimated yearly impact of 10,270 FTEs.

Chart 4.1 : Absenteeism impact across the most impacted industries, annual average FTE loss



Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

Chart 4.2 : Absenteeism impact across occupations, annual average FTE loss



Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

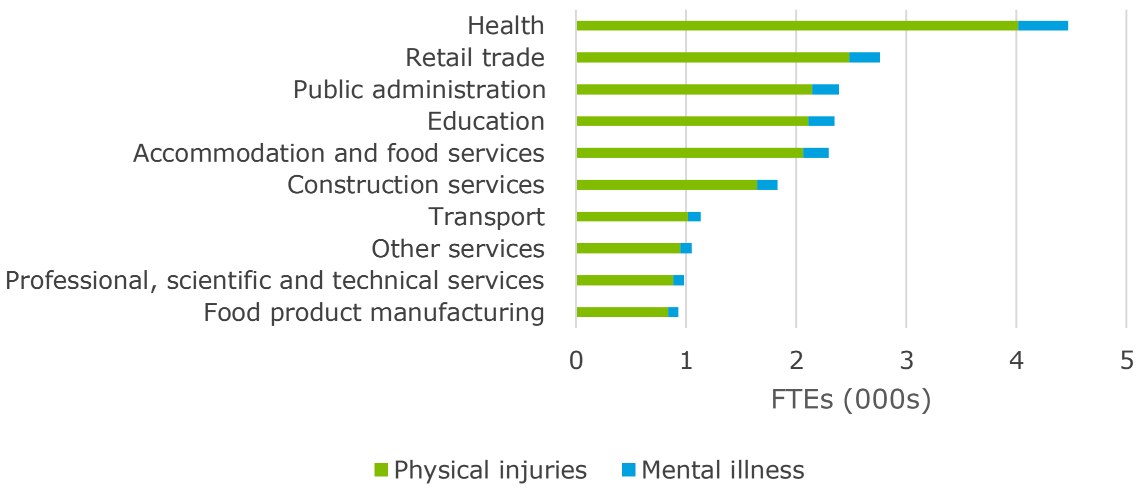
4.2.2 Presenteeism

Individuals returning to their job after sustaining a work-related injury or illness may continue to experience an effect over their productivity. Physical injuries and diseases were estimated to reduce productivity by 6 per cent, while returning from mental health conditions was estimated to have a 16 per cent impact on productivity.[30] It is noted that presenteeism impacts from physical diseases, especially chronic conditions, are likely to be underestimated due to the underreporting of these diseases (largely due to difficulties establishing a causal work connection).

[30] Noone, J. H., Mackey, M.G., & Bohle, P. (2014). Work ability in Australia – pilot study: A report to Safe Work Australia. Canberra: Safe Work Australia.

Presenteeism impacts were the largest in the Health industry, with an estimated yearly impact of 4,469 FTEs. The overall estimated impact of presenteeism was equivalent to 331,000 FTEs over the reference period.

Chart 4.3 : Presenteeism impact across industry, annual average FTE loss

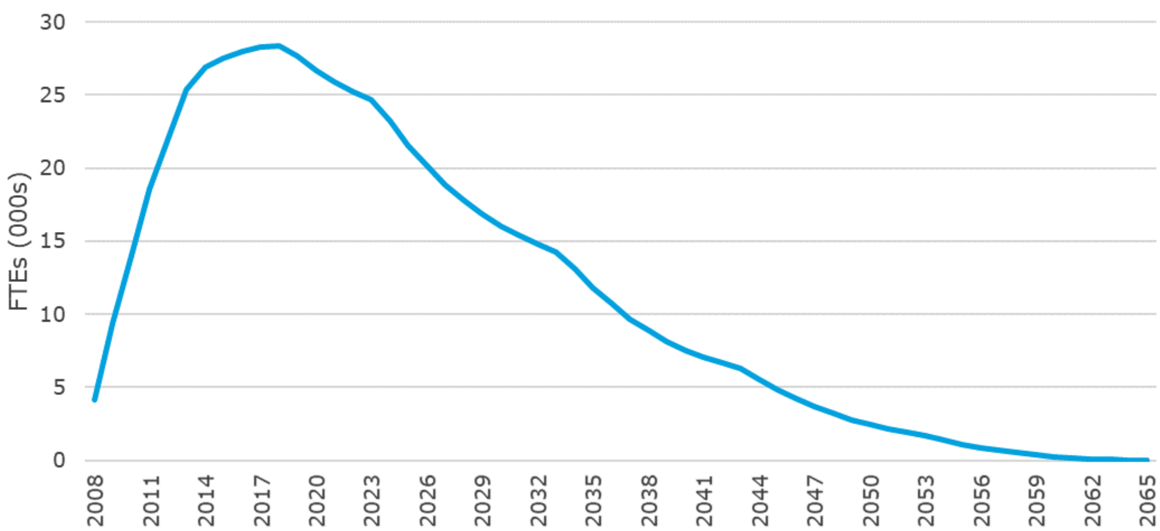


Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

4.2.3 Labour force withdrawal and mortality

A work-related injury and illness that results in permanent incapacity or death has a significant long-term impact on labour supply within the economy. For example, a death of a worker aged 25 can have an impact on labour supply for the next 40 years. For this reason, Chart 4.4 presents the labour supply loss (in terms of FTEs) over the period of 2008-2065, including both the cumulative effect during the reference period (2008-18) and the time after the reference period. This highlights that the total loss of labour from these injuries or illnesses occurs not only during the reference period, but also has long lasting effects.

Chart 4.4 : Labour force withdrawal and mortality impact in FTE losses, 2008 to 2065 Australia



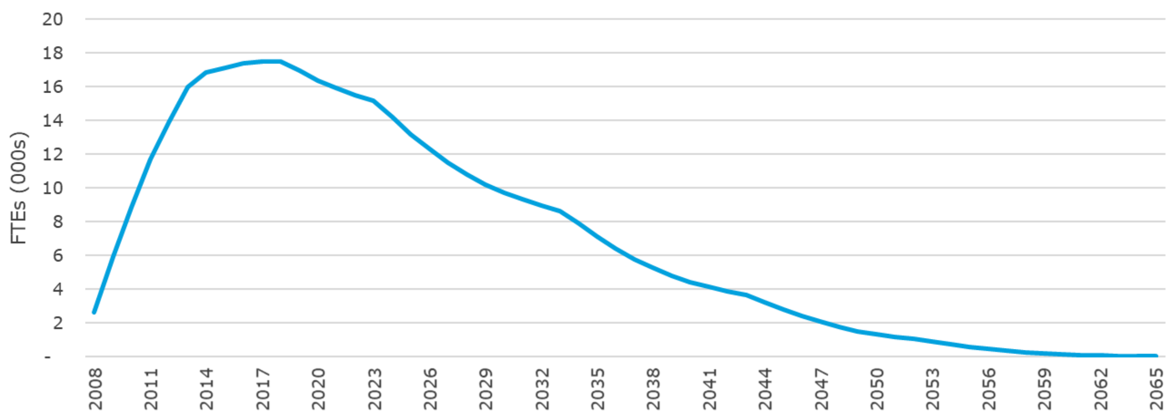
Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

4.2.4 Informal care

People who experienced a work-related injury or illness may require ongoing support in their daily lives. This support is typically provided for by a spouse, family member or friend. While informal care is unpaid work, it is not free from an economic perspective. Informal carers may take time off their own work to provide support, further lowering the labour supply within the economy.

There is no breakdown of informal care costs by industry, as the informal carer's occupation is not linked to the occupation where the work-related injury or illness occurred. Rather, the loss in labour supply is distributed across all industries within the state or territory. As informal care is linked to permanent labour force withdrawal, the trend in impact over time is consistent with section 4.2.3.

Chart 4.5 : Informal care impact (FTE loss) 2008 to 2065 Australia

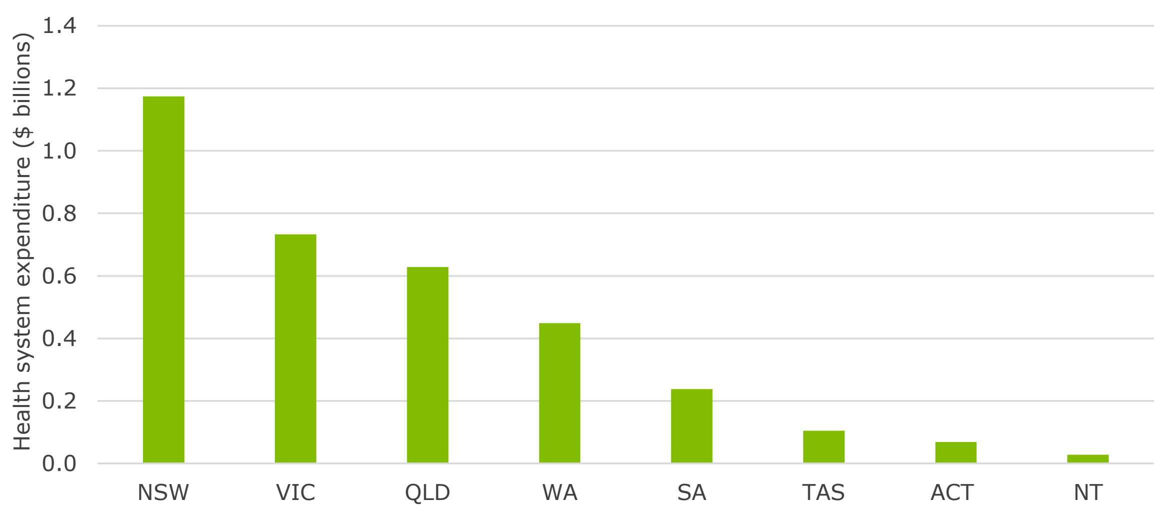


Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

4.3 Health system costs

On average, a work-related injury or illness was expected to cost the health system $5,482. It was estimated that the average annual expenditure on work-related injuries and illnesses was $3.4 billion over the reference period. Of the most common injury types, residual soft tissue disorders were estimated to cost $8,567 per injury, followed by $5,884 for trauma to joints and ligaments, and $2,030 for fractures. See Appendix A.3 for further information on these costs.

Chart 4.6 : Average annual health system expenditure ($ billions)

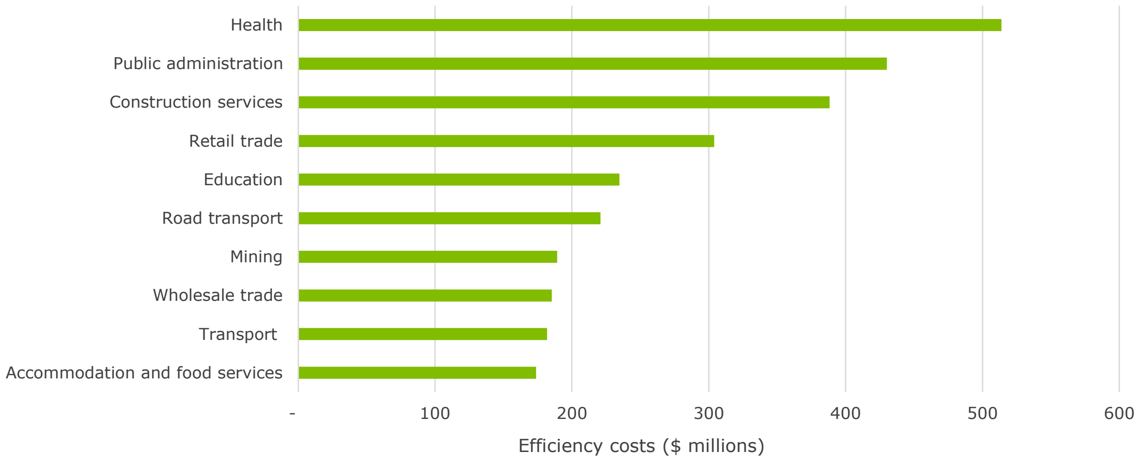


Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

4.4 Other financial costs

Employers may incur efficiency costs associated with compensation claims when work-related injuries or illnesses occur. These include compensation payments, payments for goods and services and other non-compensation payments. Alongside these costs, firms also face financial losses arising from hiring and training new staff following a work-related injury or illness. Over the reference period, it was estimated that employers incurred $49.5 billion in efficiency costs, averaging $4.5 billion per year.

Chart 4.7 : Average annual efficiency costs faced by employers ($ millions)



Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

5 Impact on the Australian economy

In the absence of work-related injuries and illnesses between 2008 to 2018, Australia's economy would have been $28.6 billion larger each year ($29.1 billion including long-term impacts). Alongside this, there would have been 185,500 additional jobs every year, and more than two-thirds of these jobs would have been accounted for by the skilled workforce.

5.1 Summarised economic impact of work-related injury and illness

If all work-related injuries and illnesses which occurred between 2008-2018 had not happened, the economy would have been $28.6 billion larger each year. There would have been an additional 185,500 FTE jobs in each year and more than two-thirds of these additional jobs would have been skilled roles.

These impacts are not spread evenly across jurisdictions, industries, or occupations. 0 provides a summary of high-level findings.

Table 5.1: Impact of work-related injury and illness

Component	Description	Total impact
GDP	**Average additional annual impact to GDP ($)**	**$28.6 billion**
	New South Wales (% of total)	40%
	Victoria (% of total)	25%
	Queensland (% of total)	16%
	Western Australia (% of total)	9%
	South Australia (% of total)	5%
	Australian Capital Territory (% of total)	3%
	Tasmania (% of total)	2%
	Northern Territory (% of total)	1%
Jobs	**Average additional FTE jobs created each year**	**185,500 FTEs**
	Officials and managers	52,200 FTEs
	Clerks	45,300 FTEs
	Agricultural and lower skilled workers	38,400 FTEs
	Technicians	32,900 FTEs
	Service and shop workers	16,600 FTEs

Source: Deloitte Access Economics 2022.

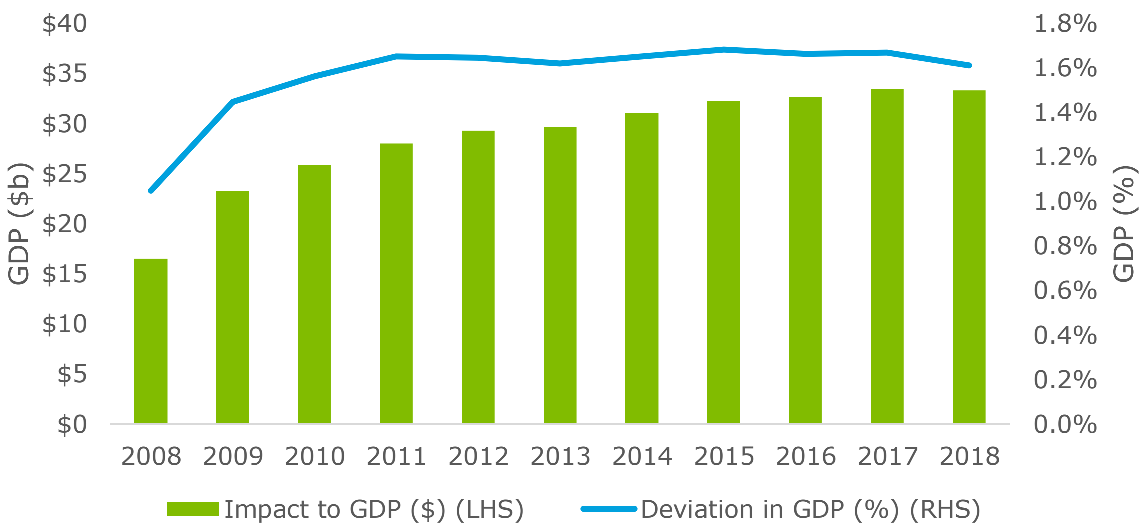
5.2 The economic impact of work-related injuries and illnesses is significant

5.2.1 The economic impact of work-related injuries is nearly equivalent to that of the Agricultural industry

In the absence of any new work-related injuries or illnesses over 2008 to 2018, on average Australia's economy would have been $28.6 billion larger each year (Chart 5.1). Including future impacts from long term injuries and work-related deaths, this number could be expected to increase to over $29.1 billion.

In relative terms, this equates to a GDP being around 1.6 per cent higher on average each year. At this level, the impact of work-related injuries and illnesses in Australia would be nearly equivalent to the direct annual contribution to the economy from the Agriculture industry (1.9 per cent of Australian GDP in 2022[31]) and comparable to the estimated economic growth forgone during NSW's COVID-19 lockdown in 2021.[32,33]

Chart 5.1 : Annual increase in GDP ($ billions) and GDP (%), 2008-18, Australia (2022)



Source: DAE-RGEM.

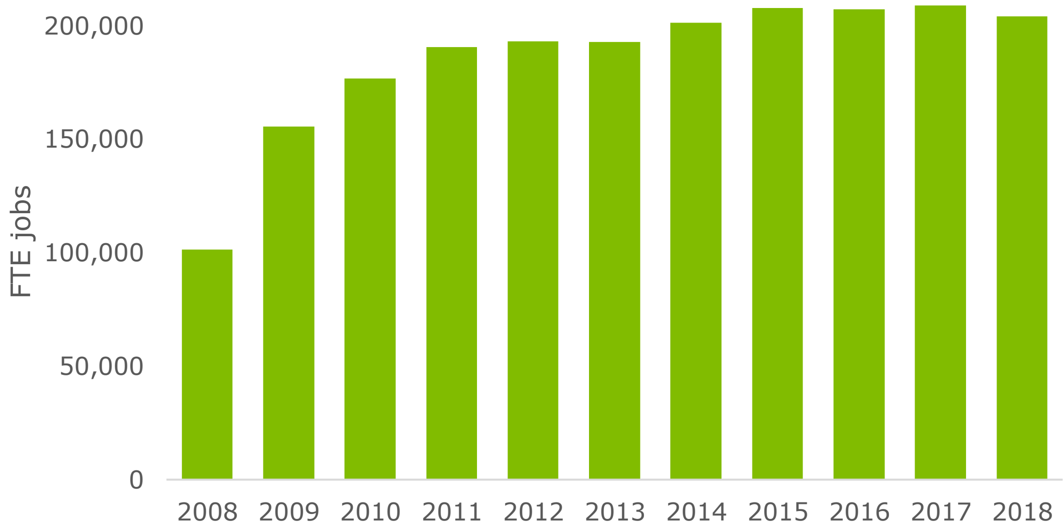
All totalled, the cumulative impact to GDP of removing Australia's work-related injuries and illnesses between 2008 and 2018 is estimated to have totalled $315 billion. Inclusive of all future costs, this number reaches $334 billion. During this period, annual GDP impacts grew over time, with the estimated GDP increase in 2018 ($33.3 billion) more than twice that estimated for 2008. This growth mainly reflects the removal of impediments to investment growth and capital accumulation that occurs as a result of removing injuries and illnesses in the Construction industry (which comprises a large share of overall injuries and illnesses).

[31] Department of Agriculture, Water and the Environment, '*Snapshot of Australian Agriculture 2022*', (2022) <https://www.awe.gov.au/abares/products/insights/snapshot-of-australian-agriculture-2022>

[32] NSW Treasury estimated the weekly cost of the NSW lockdown to be valued at $1.3 billion each week.

[33] Parliament of New South Wales, '*Greater Sydney Lockdowns*' (2021), <https://www.parliament.nsw.gov.au/lc/papers/pages/qanda-tracking-details.aspx?pk=88098>

Chart 5.2 : Annual impact to employment (FTEs), 2008-2018, Australia (2022)



Source: DAE-RGEM.

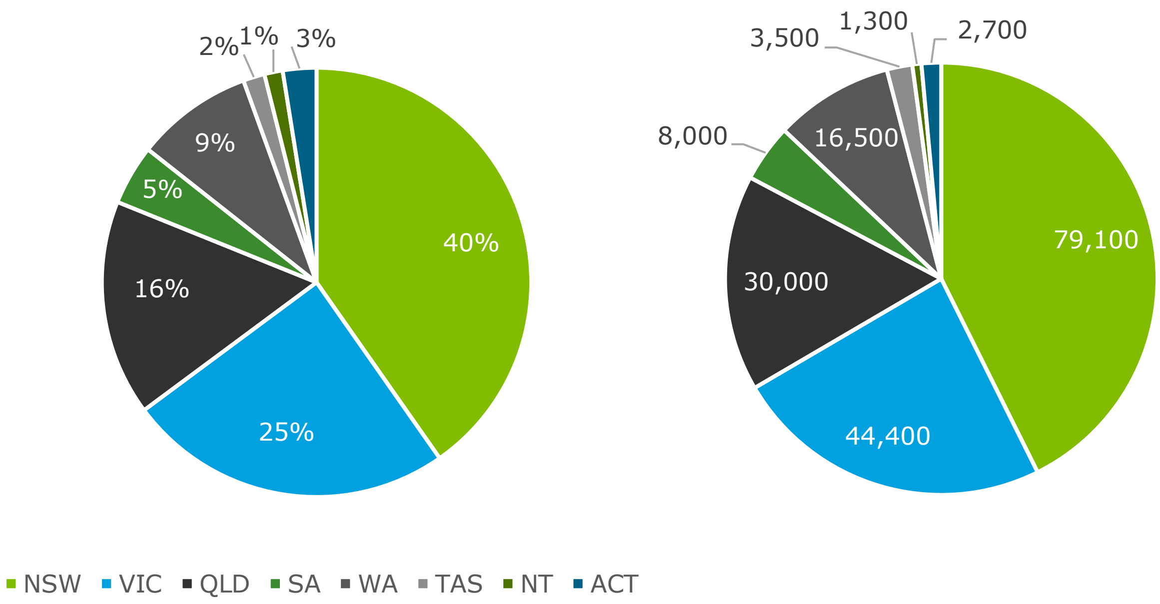
Alongside the increase in economic activity, the removal of work-related injuries and illnesses in Australia is also expected to have had a positive impact on employment. Across Australia, on average 185,500 additional jobs would have been created each year (Chart 5.2), with additional jobs added in 2018 (over 204,000) more than double that in 2008.

Employment is modelled to increase over time, despite the yearly number of work-related injuries or illnesses remaining relatively constant. The driving force behind this is the accumulation of absent workers from injuries in previous years. For example, an individual injured in 2008 who is unable to return to the workforce will affect the labour supply over the next several years. This explains why the increase in employment is lowest in 2008, which represents the first year of the reference period, as there is no additional accumulation of employment from injuries removed in previous years, reflecting the underlying incidence approach in the cost of illness framework. The increase in employment from 2015-18 appears to level out, indicating that the effect of the accumulation of absent workers from previous years has peaked.

5.2.2 The impact by each state and territory reflects the size of the region's economy

Impacts to Australian GDP and employment differ across jurisdictions but are largely reflective of the relative size of the individual states and territories and their associated labour forces. New South Wales, Australia's largest state by population, accounts for 40 per cent of the total impact to Australian GDP, followed by Victoria (25 per cent) and Queensland (16 per cent; Chart 5.3). Similarly, New South Wales accounts for 79,100 of the additional FTE jobs created each year, followed by Victoria (44,400 of the total) and Queensland (30,000 of the total).

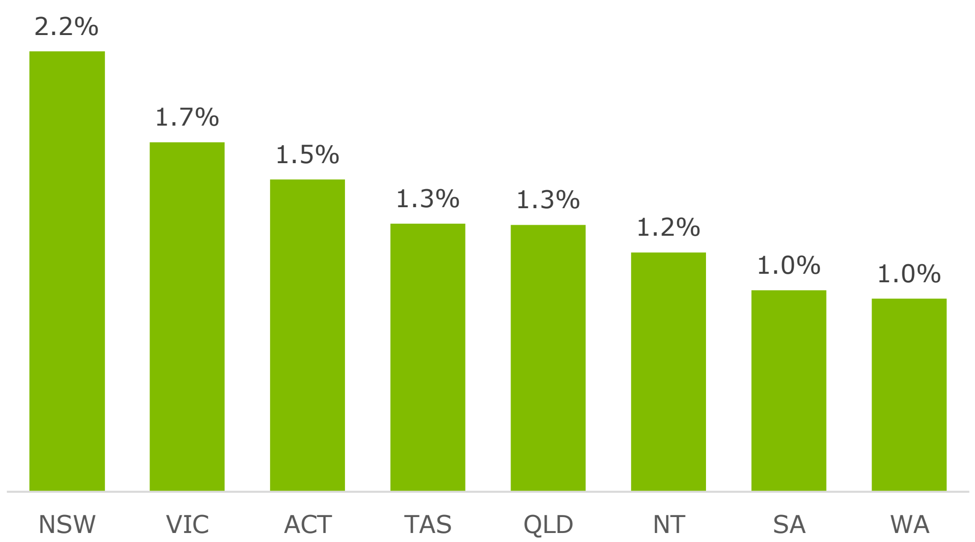
Chart 5.3 : Annual impact (%) to GDP and employment (FTEs), by jurisdiction, 2008-18



Source: DAE-RGEM.

New South Wales is estimated to have experienced the greatest impact to their individual gross regional product (GRP; the market value of all final goods and services produced in a region), growing by 2.2 per cent on average each year relative to the baseline (Chart 5.4). This is followed by Victoria and the Australian Capital Territory, experiencing a 1.7 per cent and 1.5 per cent impact to GRP respectively. Western Australia observes the lowest impact to GRP, recording a 1.0 per cent average impact relative to the baseline. This result is primarily a function of the relative size of state and territory economies, and the number of work-related injuries occurring within each state – which is broadly correlated to the size of each state's workforce.

Chart 5.4 : Annual impact (%) to GRP (relative to the baseline), by jurisdiction, 2008-18



Source: DAE-RGEM.

Industry impacts also vary across regions. For example, the impacts to GRP in New South Wales, Victoria, South Australia and the Northern Territory are predominantly observed across the

Construction and Business services industries. Meanwhile, the Australian Capital Territory observes the vast majority of its impact to GRP in Public administration and safety, with negligible impacts across other industries. This result is in line with expectations, given the public service is the territory's largest employer. Similarly, Tasmania, with its ageing demographic, observes the greatest impact to GRP in Health care and social assistance as this is the state's largest employer. Queensland and Western Australia experience a large decline in Mining given the prominence of the industry within both these regions, leading to the lower impact of removing work-related injuries and illnesses overall.

5.3 The economic impact is not uniform across occupations

5.3.1 Most of the jobs created are for Australia's skilled workforce

Of the additional 185,500 FTE jobs created across the Australian economy on average every year between 2008 and 2018, most of these roles would have been concentrated across skilled occupations. Roles that require a tertiary or high-level trade qualification – Officials and Managers, Technicians and Clerks – are estimated to have increased by 130,400 FTE jobs overall each year (Chart 5.5). This figure can be broken down into 52,200 Officials and Managers, 45,300 Clerks and 32,900 Technicians.

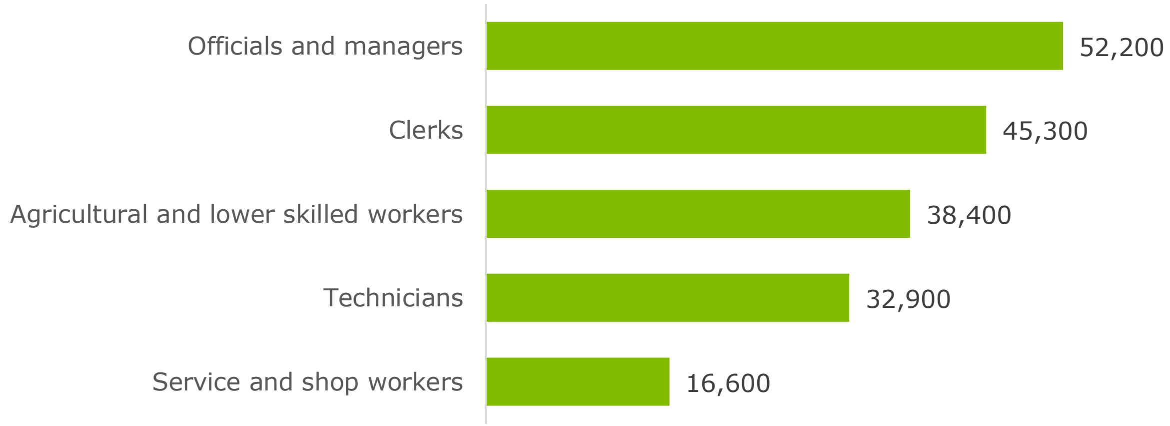
Officials and Managers as well as Clerks – the occupations which would have experienced the greatest rise in overall employment from the removal of work-related injuries and illnesses– recorded a relatively significant portion of work-related injuries and illnesses, however they do not represent the occupations which experience the greatest number of work-related injuries and illnesses.

These results reflect broader and deeper impacts to the economy in terms of employment, because workers who left the workforce due to work-related injuries and illnesses would have stayed and created more demand within the economy for goods and services – such as housing, food and health services – with the wages they earn. This additional demand has flow-on effects to other parts of the economy as more resources (including capital and labour) are required to meet this demand, leading to the creation of more jobs. The composition of jobs created mirror the future shape of the Australian labour market – which is more focused on higher skill level jobs.

This finding suggests Australia's transition towards a knowledge-based economy could be accelerated by reducing work-related injuries and illnesses. It also highlights that when an individual experiences an injury or illness, the impact is not limited to the person directly affected, it also holds economic implications for all industries and occupations.

In addition, investment spurred by additional workers in Construction and other sectors oriented around the generation of new capital has further catalysed additional demand for, and employment in, high skilled occupations. In contrast, Agricultural and lower skilled workers, who represent the highest share of work-related injuries and illnesses, are not the largest beneficiaries in terms of volume of employment. This is due to the limited capacity of industry to absorb and accommodate additional supply of lower skilled labour, which provides comparatively less return for employers per additional unit of employment.

Chart 5.5 : Impacts to employment (relative to the baseline) on average, by occupation, 2008-2018, Australia



Source: DAE-RGEM.

Note: Refer to Appendix B for a skill level breakdown.

5.3.2 Across the economy, wages (on average) are expected to rise

Alongside an increase in the pool of workers, avoiding work-related injuries and illnesses also leads to enhancements in labour productivity, which lead to the realisation of efficiencies across the entire economy. These labour productivity improvements are driven by workers operating at improved capacity via avoided presenteeism costs, and improvements to labour productivity across the broader population through freed up healthcare resources. The gain in productivity outweighs the increase in labour supply, and our analysis shows workers across all occupations and skill levels would have benefited as wages are estimated to rise by 1.3 per cent each year on average.

5.4 This economic impact is not uniform across industries

5.4.1 Sectors which experience the highest number of work-related injuries gain the most from their removal

The avoided impacts of work-related injuries and illnesses directly stimulates economic activity across effectively all sectors in the economy. Industries that are burdened by the greatest number of work-related injuries and illnesses, such as Construction and Manufacturing, are the most positively affected relative to others (Chart 5.6). These industries are relatively labour intensive, and benefit heavily, from the inflow of labour as workers who would have previously suffered a work-related injury or illness are returned to the workforce.

On average, each year between 2008 and 2018, outputs in the Building construction, Heavy and civil engineering construction and Heavy manufacturing industries are anticipated to have been 4.8 per cent, 4.6 per cent and 4 per cent higher than in the baseline. This increase in output would have led to an additional $3.2 billion, $2.5 billion and $1.2 billion impact to GDP on average each year. These industries are also positively impacted from large capital inflows as the Australian economy grows in size (relative to the global economy) and becomes a stronger investment opportunity.

Chart 5.6 : Impacts to output (relative to the baseline) (%) on average, by industry, 2008-2018, Australia

Source: DAE-RGEM.

Note: Some related industries have been grouped together. Food Manufacturing includes Beverage and Tobacco Product Manufacturing and Food Product Manufacturing. Light Manufacturing includes Pulp, Paper and Converted Paper Product Manufacturing, Petroleum and Coal Product Manufacturing and Furniture and Other Manufacturing. Heavy Manufacturing includes Transport Equipment Manufacturing, Polymer Product and Rubber Product Manufacturing, Fabricated Metal Product Manufacturing and Non-Metallic Mineral Product Manufacturing.

As industries are relieved of their work-related injury and illness burden, their capacity to expand leads to a round of secondary effects. This includes, for example, greater demand for goods and services in other sectors as a result of a larger, more productive, workforce. These effects would have been concentrated in the services sector (where much of household and business expenditure in Australia is directed) and includes industries such as Information technology, Wholesale trade and Professionals (1.9 per cent, 1.8 per cent and 1.7 per cent higher than in the baseline), where injuries and illnesses are not particularly prevalent.

Other industries which would have benefited from a growing economy include the Transport industry, which due to its nature – moving people or goods – is an intermediary to other sectors in the economy, and so expands as the economy does. Sectoral outputs in the Road transport industry are projected to have been 1.9 per cent higher than in the baseline.

While most industries in Australia are estimated to have grown stronger between 2008 and 2018 when work-related injuries and illnesses are removed, some industries would have grown slower (relative to the baseline). This is known as crowding out and occurs when heightened activity in expanding sectors draws productive resources away from other industries. In the absence of work-related illnesses and injuries, crowding out is relatively minimal and mostly contained in the Mining and selected manufacturing industries. Across Mining, Textile manufacturing, Basic metal manufacturing and Basic chemical manufacturing, output is estimated to have decreased by 0.3 per cent, 0.4 per cent, 0.5 per cent and 0.7 per cent, respectively, on average each year. For these industries, an absence of work-related injuries and illnesses is expected to have led to greater competition for non-labour inputs as other sectors seek more capital and other materials (both intermediate and raw) to complement the increase in available labour. Under the scenario, these largely export oriented industries do not experience growth in demand, proportionate to sectors expanding domestically through access to additional labour.

5.4.2 Jobs across all industries rise, led by a large gain in employment in Construction

When the effects of work-related injuries and illnesses are removed from the economy, all industries would have seen employment growth, albeit to differing extents. The Construction industry – across its three separate sectors (Construction services, Building construction and Heavy and civil engineering construction) – would have observed the largest rise in employment, recording more than 32,000 new FTE jobs every year on average between 2008 and 2018 (Chart 5.7). This result is a function of the high share of skilled labour. This means that the labour within the sector tends to be more productive, leading to high sectoral outputs in addition to high employment. Industries within the services sector, including Professionals, Wholesale trade and Administrative and support services, would have also experienced a similar trend, recording 11,200, 8,700 and 6,600 additional FTE jobs each year respectively.

Meanwhile, other sectors which would have been expected to observe the greatest rise in employment are not the same as those which experienced the largest growth in outputs. Health care and social assistance – the industry which records the greatest volume of work-related injuries and illnesses (see Chart 1.1) – would have experienced a much greater increase in employment relative to its deviation in output. Retail trade, Public administration, Education and training and Accommodation and food services would have also observed a similar trend. This can be attributed to the types of agents within the economy who consume these goods – mostly Government and Households, as opposed to industry use. Government and private expenditure tend to move with GDP, however industries like Construction, which are more entwined in the supply chain, expand for other reasons, for instance demand from other sectors which are also growing. As a result, they tend to grow faster than GDP, and hence faster than the Government and final consumption sectors.

Chart 5.7 : Impact on employment (FTEs) on average, by industry, 2008-2018, Australia

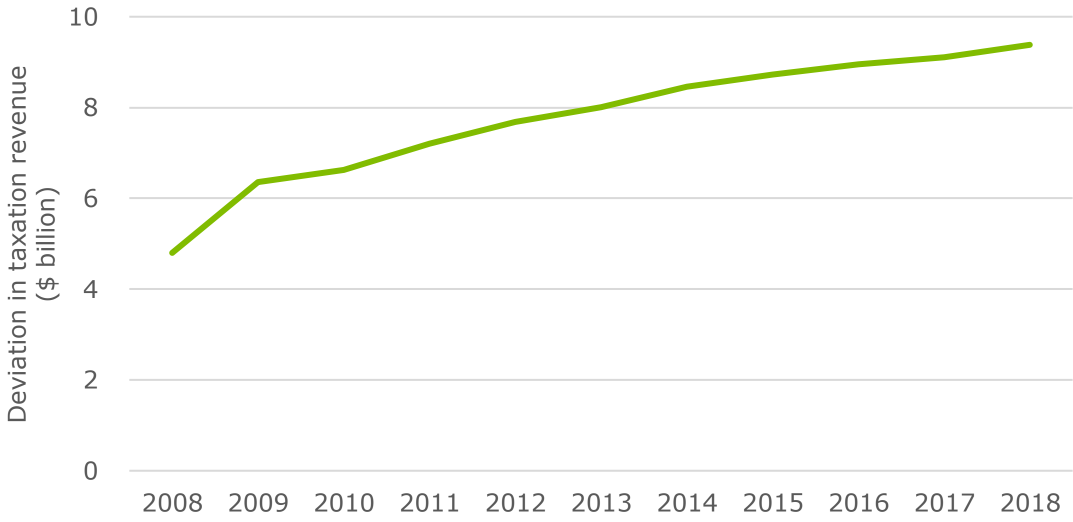
Source: DAE-RGEM.

Note: Some related industries have been grouped together. Food Manufacturing includes Beverage and Tobacco Product Manufacturing and Food Product Manufacturing. Light Manufacturing includes Pulp, Paper and Converted Paper Product Manufacturing, Petroleum and Coal Product Manufacturing and Furniture and Other Manufacturing. Heavy Manufacturing includes Transport Equipment Manufacturing, Polymer Product and Rubber Product Manufacturing, Fabricated Metal Product Manufacturing and Non-Metallic Mineral Product Manufacturing.

5.5 Tax revenue increases, reflecting higher labour income and company tax

Gross State Product (GSP) and GDP impacts in a world without work-related injuries would have resulted in additional taxation revenue at the state and federal level. The net effect on tax revenue reflects higher labour income and company tax, but also includes forgone tax revenue. On average, it is estimated that an additional $7.7 billion in federal, state, and local government taxes would have been generated annually between 2008 and 2018 if work-related injuries and illnesses were avoided.

Chart 5.8: Impacts to Taxation revenue (relative to the baseline), 2008-2018, Australia



Source: DAE-RGEM.

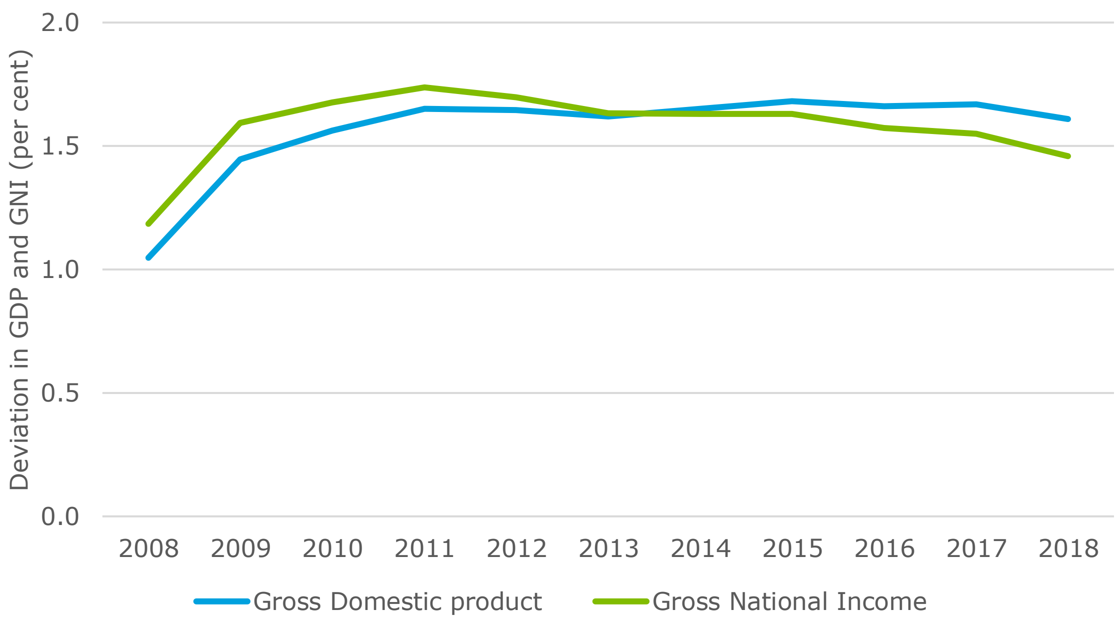
5.6 Gross National Income also increases over time, reflecting better overall welfare

Economists have a variety of ways of measuring economic welfare. Gross National Income (GNI) is the value of all items produced by residents of a country plus income earned by residents from abroad. This is often preferred to GDP as an indicator of welfare because it tends to closely correlate with nonmonetary measures of the quality of life, such as life expectancy at birth, mortality rates of children, and enrolment rates in school.[34]

The modelling shows that between 2008 and 2018, avoiding work-related injuries would have increased GNI in Australia by 1.6 per cent each year on average. This is marginally higher than the impact on GDP. Chart 5.9 shows the impact on GNI versus GDP over time. GNI impacts initially outpace GDP, with the economy benefiting from a strong inflow of investment driven by increased productive capacity from additional labour – particularly in the Construction industry, which reduces the cost of capital creation investment. This capital is primarily used by capital intensive and export-oriented sectors, prompting further gains through a boost to terms of trade. Over time, as the incremental impact of additional labour plateaus, GNI falls slightly lower than GDP, as the interest on the initial influx of Foreign Direct Investment (FDI) is repaid over time.

[34] The World Bank, Data, *'Why use GNI per capita to classify economies into income groupings?'*<https://datahelpdesk.worldbank.org/knowledgebase/articles/378831-why-use-gni-per-capita-to-classify-economies-into>

Chart 5.9 : Impacts to GDP and GNI (per cent deviation from baseline), 2008-2018, Australia

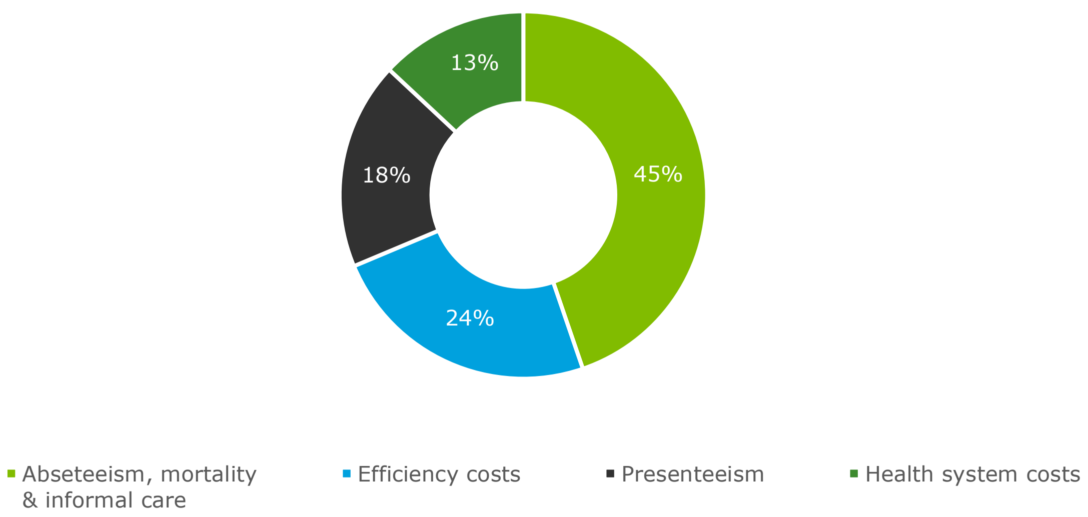


Source: DAE-RGEM.

5.7 Absenteeism and mortality account for the majority of economic impacts

The largest impact to GDP (45 per cent of the total) would have been provided by workers who previously experienced a work-related death or injury which caused them to be absent from the workplace, and under this hypothetical scenario would have been able to remain in the labour market (Chart 5.10). Other components account for about 55 per cent of the impact to GDP.

Chart 5.10 : Breakdown by cost component average yearly impact to GDP, Australia



Source: DAE-RGEM.

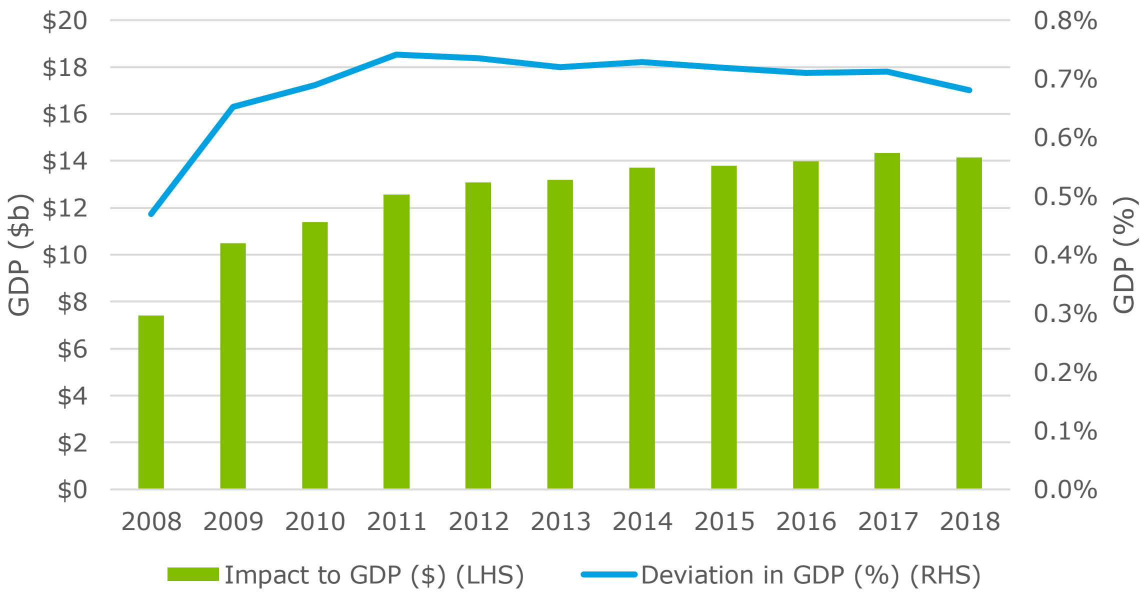
5.7.2 Absenteeism, mortality and informal care

Labour is a key factor of production, so adding to the availability of labour effectively strengthens the overall productive capacity of the economy. At the firm level, work-related injuries and illnesses remove key skills and expertise from the economy, placing constraints on the ability of the economy to expand and form capital – particularly in industries like Construction and Manufacturing. Avoiding work-related injuries and illnesses provides the industry with a larger pool of workers and skills to draw upon, allowing the economy to expand.

The impact of absenteeism and work-related deaths comprise a substantial share of the overall economic impact of work-related injuries and illnesses. Without the absenteeism and deaths caused by work-related injuries and illnesses, the Australian economy would have been approximately $12.5 billion, or 0.7 per cent, larger each year between 2008 and 2018 (Chart 5.11). In terms of employment, absenteeism, mortality and informal care account for around 60 per cent, or approximately 110,000, of the average of 185,500 jobs created each year through avoiding work-related injuries between 2008 and 2018 – a comparatively higher share than the impact to GDP.

As with the total results, impacts to GDP and employment accumulate over the modelling time horizon, reflecting the accumulation of absent workers from injuries and illnesses in previous years.

Chart 5.11 : Annual increase in GDP ($ billions) and GDP (%), Absenteeism, mortality and informal care, 2008-18, Australia (2022)



Source: DAE-RGEM.

5.7.3 Efficiency costs

Work-related injuries and illnesses lead to a range of costs and overheads borne by employers including legal and other administrative costs. Avoiding these costs frees up resources that can be re-directed or re-invested toward more productive areas, including the hiring of additional labour. This also improves the relative attractiveness of labour in comparison to capital, increasing the demand for workers and catalysing additional employment activity. Efficiency costs do not consider the costs of regulation or the costs which would be incurred to introduce additional safety measures to reduce the incidence of work-related injury and illness.

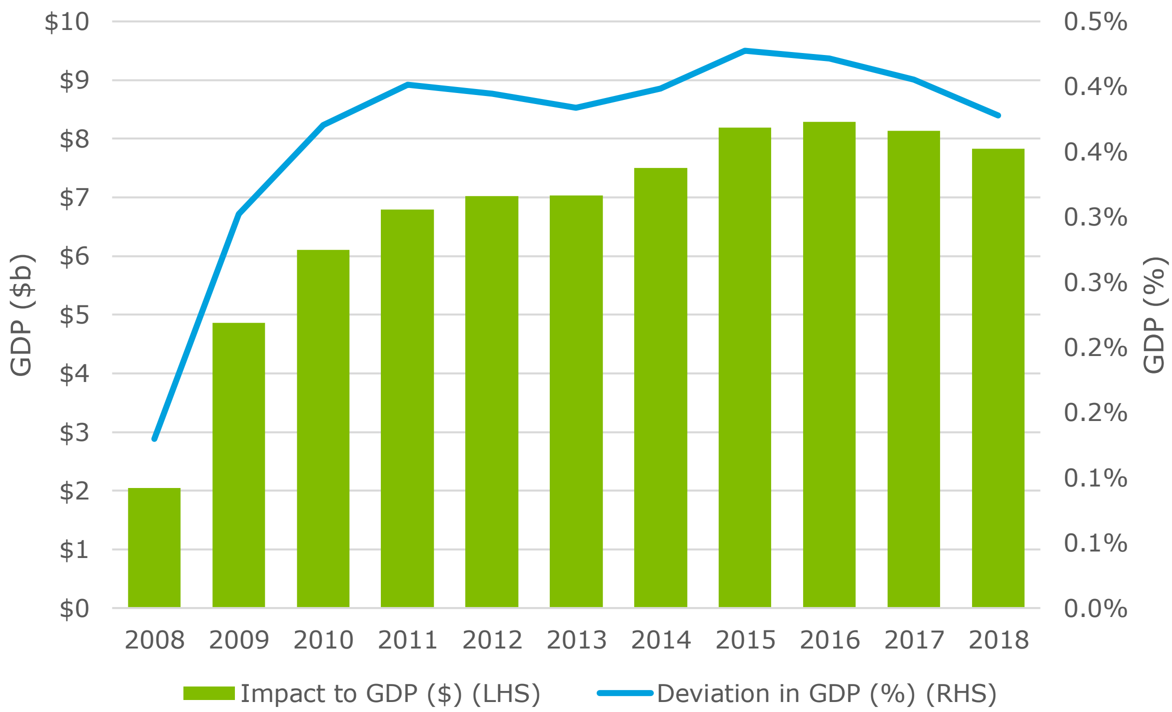
The impact of avoided overheads and costs associated with work-related injuries and illnesses accounts for 24 per cent of the overall economic impact. By avoiding these costs, the Australian economy would have been approximately $6.7 billion larger each year between 2008 and 2018 (Chart 5.12).

In terms of employment, efficiency costs account for around 30 per cent, or approximately 56,000 of the average of 185,500 jobs created each year through avoiding work-related injuries and illnesses between 2008 and 2018 – representing a relatively proportionate share to the impact on

GDP. Reducing costs related to employing labour helps to catalyse additional employment and generate higher wages. This leads to proportionate benefits to both GDP and employment.

As with the overall results, impacts to GDP and employment accumulate over the modelling time horizon, reflecting the accumulation of costs related to injuries in previous years, which can carry over multiple periods depending on the nature of an injury or illness.

Chart 5.12 : Annual increase in GDP ($ billions) and GDP (%), Efficiency costs, 2008-18, Australia (2022)



Source: DAE-RGEM.

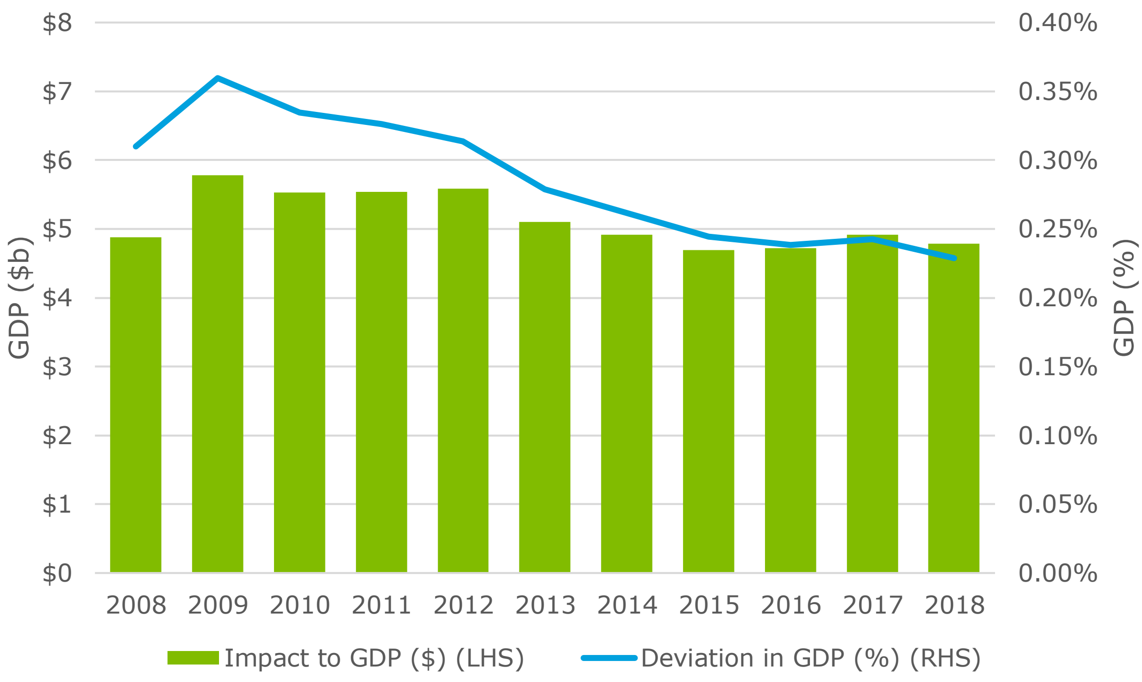
5.7.4 Presenteeism

People who return to their jobs following work-related injury or illness often work at a reduced capacity in their usual role or are assigned duties outside the range of their usual skillsets, impacting labour productivity. Avoiding work-related injuries and illnesses means that labour can produce at full capacity, and it is allocated more efficiently across potential roles based on skills. This leads to higher levels of output per hour worked, as well as higher wages – making the use of labour a relatively more attractive input to production.

The impact of avoiding presenteeism costs associated with work-related injuries accounts for 18 per cent of the overall economic impact. By avoiding these costs, the Australian economy would have been approximately $5.1 billion larger each year between 2008 and 2018. For employment, presenteeism accounts for around 6 per cent, or approximately 12,000 of the average of 185,500 jobs created each year through avoiding work-related injuries and illnesses between 2008 and 2018 (Chart 5.13).

In comparison to absenteeism and efficiency related impacts, this accounts for a relatively lower share of the overall employment impact than for GDP. This is because the benefits of presenteeism are primarily driven by improvements to the productivity in the employment of existing labour, which contributes to value-added through positive wage effects and higher levels of income per worker.

Chart 5.13 : Annual increase in GDP ($ billions) and GDP (%), Presenteeism, 2008-18, Australia (2022)



Source: DAE-RGEM.

5.7.5 Health System costs

When injured or ill workers present for care, it adds demand to the health system. Higher demand on the system creates congestion and diverts expenditure from other areas.[35] Avoiding work-related injuries and illnesses allows for health expenditure to be allocated toward other needs, allowing for other injured or ill members of the population to return to work faster and providing better health outcomes to the population more broadly. These factors translate to improved labour productivity improvements across the broader population and workforce.

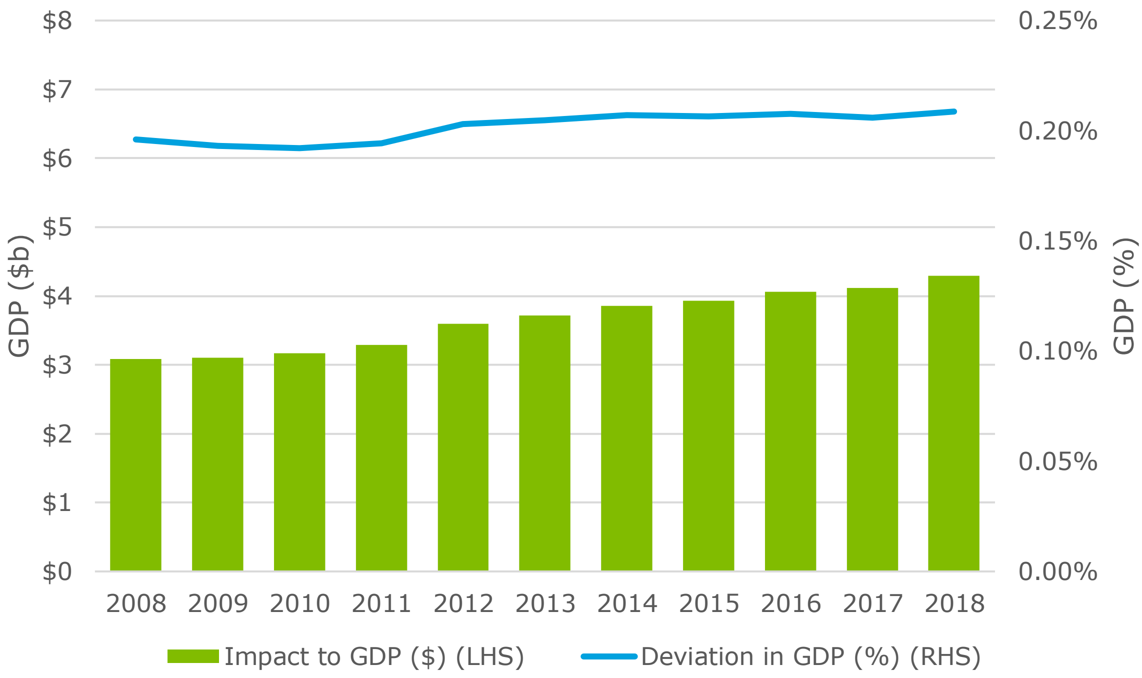
The impact of avoiding healthcare system costs accounts for 13 per cent of the overall economic impact. By avoiding these costs, the Australian economy would have been approximately $3.7 billion larger each year between 2008 and 2018 (Chart 5.14).

In terms of employment, health system costs account for around 5 per cent, or approximately 8,600 of the average of 185,500 jobs created each year through avoiding work-related injuries and illnesses between 2008 and 2018. This accounts for a relatively lower share of the overall employment impact when compared to impacts related to absenteeism and efficiency costs. This is due to the mechanism through which additional healthcare resources manifest throughout the broader economy, which relate to increased productivity of the existing workforce. As with presenteeism, this leads to more profound impacts on value-added through higher wages than it does on employment.

Health system cost impacts grow broadly in line with growth in GDP, gradually accumulating as additional resources are dispersed to the broader economy.

[35] Note: In this modelling, spending on healthcare is assumed to remain at its historical level. In other words, savings are assumed to be distributed to alternative areas of the health system, and are not treated as reduced government expenditure or a commensurate taxation burden.

Chart 5.14 : Annual increase in GDP ($ billions) and GDP (%), Health system costs, 2008-18, Australia (2022)



Source: DAE-RGEM.

6 Summary

If there had been no work-related injury or illness between 2008 and 2018, the Australian economy would have been substantially better off. Australians would have had access to more and better jobs, and would have been rewarded with higher wages. WHS is critical to Australian productivity and prosperity.

6.1 Conclusion

6.1.1 Our findings

Each year there was, on average, 623,663 work-related injuries and illnesses between 2008 and 2018. This led to significant productivity losses arising from absenteeism and presenteeism, as well as ongoing losses to labour supply from work-related deaths and injuries or illnesses causing permanent incapacity. These long-term productivity losses continue to have an influence over the economy through to 2065. There were further costs incurred by the health system totalling $3.4 billion annually, while annual payments of $4.5 billion went towards workers' compensation and other financial costs.

In the absence of work-related injuries and illnesses over the reference period, Australia's economy would have been $28.6 billion larger each year. Including future impacts from long term injuries and work-related deaths, this number could be expected to increase to over $29.1 billion. There also would have been an additional 185,500 FTE jobs every year. This impact would have translated to a 1.6 per cent increase in GDP every year, which is comparable to the current direct contribution of the Australian Agriculture industry or the estimated economic growth foregone during NSW's COVID-19 lockdown in 2021.

The largest impact to GDP (45 per cent of the total) would have come from workers who experienced a work-related death or injury which caused them to be absent from the workplace. Other components account for about 55 per cent of the impact to GDP.

The findings of this work have important implications for policy. In this report, we see that the impacts on GDP compound over time (as the capital stock is constrained). We further see that while selected industries (e.g., Construction) and occupations (e.g., Managers) account for the majority of estimated impacts, these groups are not necessarily the ones that have the greatest number of work-related injuries or illnesses. This result displays the broader and deeper economic impacts of employment in motion, as workers who experienced a work-related injury or illness remain in the workforce and earn wages that they spend on good and services, strengthening the rest of the economy in the process.

Critically too, the bulk of the new 185,500 jobs created are skilled roles, spread across Officials and Managers (52,200 FTEs), Technicians (32,900 FTEs) and Clerks (45,300 FTEs). This result suggests that Australia's continued transition towards a knowledge-based economy could be accelerated by reducing work-related injuries and illnesses, given most of the new jobs created will require higher skills.

Importantly, this analysis finds that Australian wages would have increased, with productivity gains driving a broad uplift in income to labour across all occupation types. This is particularly insightful given policy makers often look to industrial relations policy levers to tackle issues relating to wages and productivity growth. This analysis reveals that WHS also has a role to play in contributing to Australia's economic prosperity.

Overall, this study overwhelmingly finds that when a worker experiences a work-related injury or illness, it is not only those directly affected that suffer – including the individual, their families and community – it is also the wider Australian workforce that loses the opportunity to access more and better jobs with higher wages.

This report presents a unique, innovative approach to quantifying the impacts of work-related injury and illness in Australia in 2008 to 2018. This analysis presents a significant extension upon previous studies that focused on the economic burden of work-related illnesses and injuries using a cost of illness framework. The present methodology uses cost of illness methods to determine the relevant impacts of work-related injury and illness, and CGE modelling to estimate the potential economic value of removing work-related injury and illness. Cost of illness principles were used to define three core impacts: productivity losses, health system costs and other financial costs. These impacts were quantified within the CGE model through shocks to labour supply, labour productivity and to employer overheads.

This analysis estimates the value that could be created within the Australian economy in the absence of work-related injuries and illnesses in terms of both changes to GDP and to employment. These numbers may be interpreted alongside Australia's GDP and employment, allowing for a meaningful interpretation of the scale of impact that work-related injury and illness has on the Australian economy. It also provides insights into how work-related injuries and illnesses may impact everyone in Australia, not just those who were directly impacted. **The study presented here, including the model and assumptions, is not comparable to previous estimates of work-related injury and illness. The results and any conclusions should be treated as unique and separate from previous cost of illness studies into work-related injuries and illnesses.**

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Appendix A – Detailed model inputs

A.1. Industries

Table A.1 : Reference key for industry abbreviations

Industry	Full description
AG	Agriculture
AFHT	Aquaculture, fishing, hunting and trapping, Agriculture, forestry and fishing support services
FL	Forestry and logging
MIN	Mining
FOODMAN	Food product manufacturing
BEVMAN	Beverage and tobacco product manufacturing
TEXTMAN	Textile, leather, clothing and footwear manufacturing
WOODMAN	Wood product manufacturing
PAPERMAN	Pulp, paper and converted paper product manufacturing, Printing (including the reproduction of recorded media)
PCMAN	Petroleum and coal product manufacturing
CHEMMAN	Basic chemical and chemical product manufacturing
POLYMAN	Polymer product and rubber product manufacturing
NONMETMAN	Non-metallic mineral product manufacturing
FABMAN	Fabricated metal product manufacturing
METMAN	Primary metal and metal product manufacturing
TRANMAN	Transport equipment manufacturing
MACHMAN	Machinery and equipment manufacturing
FURNMAN	Furniture and other manufacturing
UTILITIES	Electricity, gas, water and waste services
BCON	Building construction
ENGCON	Heavy and civil engineering construction
SERVCON	Construction services
WTRADE	Wholesale trade
RTRADE	Retail trade
AFS	Accommodation and food services
RTRAN	Road transport
OTP	Other transport
TRN	Transport, postal and warehousing
IMT	Information media and telecommunications services

FINSERV	Financial and insurance services
RER	Rental, hiring and real estate services
DWE	Property operators and real estate services
PROF	Professional, scientific and technical services
ADMIN	Administrative and support services
PAS	Public administration and safety
EDU	Education and training
HLTH	Health care and social assistance
ARTSREC	Arts and recreation services
OSERV	Other services

A.2. Productivity losses

A.2.1 Reduced workforce participation

Table A.2 : Total FTEs lost due to permanent withdrawal from the workforce and mortality

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AG	99	194	290	391	473	548	584	619	630	657	655
AFHT	23	58	79	109	126	145	162	166	169	180	181
FL	5	11	18	27	33	42	44	43	46	44	47
MIN	101	279	473	734	1,029	1,320	1,537	1,635	1,686	1,628	1,556
FOODMAN	149	352	502	673	780	861	870	892	903	896	882
BEVMAN	18	46	58	68	78	82	87	82	82	80	79
TEXTMAN	37	79	107	126	141	151	132	118	109	96	92
WOODMAN	58	100	163	211	241	258	263	264	264	270	278
PAPERMAN	45	105	155	212	235	253	250	237	229	216	218
PCMAN	5	10	12	17	18	21	17	18	18	17	17
CHEMMAN	33	71	99	123	139	163	170	169	181	181	185
POLYMAN	43	113	166	204	217	230	228	211	194	186	182
NONMETMAN	54	114	163	210	256	308	321	327	353	360	363
FABMAN	67	127	183	337	373	400	391	399	379	290	271
METMAN	164	302	430	544	649	731	757	740	740	735	718
TRANMAN	68	156	205	255	294	321	328	304	302	296	298
MACHMAN	110	233	325	403	484	541	551	543	545	537	523
FURNMAN	43	105	147	186	221	246	250	238	240	240	233
UTILITIES	48	101	150	206	262	304	320	349	339	344	335
BCON	122	258	385	505	601	680	723	731	748	779	779
ENGCON	99	199	287	360	449	535	563	560	547	552	547
SERVCON	328	765	1,140	1,467	1,767	2,075	2,191	2,224	2,282	2,351	2,350
WTRADE	219	490	751	928	1,075	1,238	1,303	1,298	1,304	1,336	1,333
RTRADE	260	640	966	1,220	1,443	1,673	1,820	1,874	1,923	1,998	2,016
AFS	217	461	672	884	1,007	1,144	1,204	1,234	1,257	1,257	1,275
RTRAN	205	443	634	836	1,003	1,160	1,249	1,273	1,308	1,309	1,307

OTP	24	53	98	128	148	165	178	184	173	169	159
TRN	149	344	502	667	807	916	978	996	1,011	1,000	983
IMT	20	55	80	113	136	147	156	158	167	167	171
FINSERV	41	89	128	165	203	223	235	245	261	272	282
RER	27	66	95	115	140	161	165	172	173	176	173
DWE	11	30	45	54	69	85	97	99	99	100	99
PROF	116	239	361	441	512	564	582	580	590	599	603
ADMIN	217	471	681	903	1,059	1,188	1,204	1,225	1,232	1,229	1,232
PAS	289	783	1,352	1,890	2,212	2,546	2,740	2,888	3,012	3,134	3,263
EDU	124	262	394	496	563	633	661	677	687	720	740
HLTH	293	734	1,157	1,573	1,921	2,263	2,470	2,538	2,619	2,716	2,768
ARTSREC	39	73	117	156	188	211	236	252	256	266	259
OSERV	146	311	448	595	729	849	903	915	941	935	921
Total	4,118	9,324	14,021	18,532	22,083	25,382	26,919	27,477	28,000	28,319	28,374

Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

A.2.2 Absenteeism

Table A.3 : Total FTEs lost due to absenteeism by industry and year

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AG	1,459	2,000	1,923	1,974	1,852	1,826	1,750	1,886	1,771	1,721	1,815
AFHT	286	521	432	396	404	368	407	389	400	396	451
FL	68	76	95	101	64	70	83	94	112	84	80
MIN	1,121	1,589	1,605	1,791	2,154	2,137	1,838	1,699	1,596	1,512	1,690
FOODMAN	2,239	2,856	2,875	2,879	2,451	2,264	2,310	2,286	2,297	2,096	2,030
BEVMAN	243	275	290	268	239	254	230	205	220	200	206
TEXTMAN	309	412	309	367	272	220	171	189	209	194	213
WOODMAN	502	723	794	724	639	495	537	638	612	592	664
PAPERMAN	491	676	693	650	591	478	500	452	429	412	402
PCMAN	57	59	52	70	60	47	39	40	56	53	49
CHEMMAN	330	412	408	426	404	394	394	376	367	371	389
POLYMAN	464	668	638	580	486	419	392	434	383	339	346
NONMETMAN	438	698	651	772	620	596	600	587	671	749	696
FABMAN	476	502	578	645	474	464	430	384	352	358	371
METMAN	1,092	1,412	1,475	1,513	1,295	1,077	1,146	1,143	1,146	1,190	1,257
TRANMAN	712	971	1,087	1,194	1,058	968	978	772	834	771	637
MACHMAN	1,023	1,203	1,103	1,155	1,128	1,026	913	982	853	800	980
FURNMAN	402	571	584	577	487	431	448	469	445	398	374
UTILITIES	674	959	920	972	934	1,007	906	963	959	832	973
BCON	1,772	2,106	2,067	2,152	2,013	1,710	1,959	1,988	1,919	2,318	2,158

ENGCON	963	1,396	1,288	1,492	1,472	1,403	1,337	1,358	1,167	1,293	1,280
SERVCON	4,423	6,667	5,781	5,995	5,628	5,102	5,338	5,752	6,099	6,708	6,264
WTRADE	3,507	3,494	3,720	3,415	2,993	3,114	2,955	2,852	2,946	2,669	3,120
RTRADE	5,804	7,622	7,965	7,690	6,903	5,378	6,150	6,101	5,947	6,697	6,092
AFS	3,729	4,618	4,592	4,653	4,162	3,896	3,982	3,926	3,882	3,955	3,935
RTRAN	2,573	3,496	3,628	3,525	3,374	3,154	3,274	3,292	3,487	3,325	3,334
OTP	284	447	522	385	284	285	313	307	292	305	318
TRN	2,553	3,752	3,502	3,553	3,490	3,096	3,267	2,838	2,893	2,890	2,903
IMT	386	618	628	558	610	392	483	458	472	555	442
FINSERV	938	1,143	1,150	1,082	945	781	834	831	870	799	788
RER	310	405	362	404	329	286	281	342	305	305	265
DWE	304	377	424	430	400	307	394	402	378	525	467
PROF	1,935	2,049	2,110	2,204	1,900	1,485	1,705	1,730	1,754	2,025	1,866
ADMIN	2,251	2,717	3,052	3,191	2,529	2,128	2,031	2,184	2,393	2,709	2,640
PAS	5,623	7,732	7,779	7,138	7,052	6,936	7,031	6,514	6,145	6,270	6,053
EDU	3,235	4,757	4,621	4,338	4,053	3,431	4,011	4,237	4,332	4,867	4,433
HLTH	7,552	10,445	11,144	11,166	11,070	9,530	9,904	9,871	10,201	11,306	10,770
ARTSREC	1,089	1,516	1,630	1,652	1,343	1,078	1,203	1,156	1,226	1,304	1,251
OSERV	2,033	2,555	2,523	2,861	2,594	2,336	2,271	2,346	2,234	2,466	2,275
Total	63,653	84,493	85,002	84,939	78,757	70,367	72,794	72,472	72,654	76,359	74,277

Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

A.2.3 Presenteeism

Table A.4 : Total FTEs lost due to presenteeism by industry and year

Industry	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
AG	734	842	799	810	816	907	742	718	729	593	703
AFHT	96	116	107	110	113	119	98	98	99	82	101
FL	22	27	23	23	23	26	24	22	21	16	21
MIN	450	557	543	538	542	611	464	415	415	299	410
FOODMAN	933	1,144	1,093	1,075	1,034	1,018	844	815	803	690	771
BEVMAN	133	154	145	141	145	151	130	126	124	108	124
TEXTMAN	110	127	118	117	107	109	94	92	90	79	91
WOODMAN	190	242	241	235	220	205	174	168	172	154	174
PAPERMAN	240	282	276	260	244	244	207	205	203	175	205
PCMAN	25	31	27	29	29	28	22	22	20	19	23
CHEMMAN	173	207	197	199	195	196	169	167	165	145	167
POLYMAN	156	188	176	158	143	143	118	113	116	99	120
NONMETMAN	173	220	205	217	201	193	165	157	159	146	148
FABMAN	251	288	276	275	254	255	220	214	214	186	212
METMAN	340	446	452	460	423	367	298	261	274	245	277
TRANMAN	326	399	388	402	393	377	301	276	267	232	262
MACHMAN	395	494	480	486	486	453	385	362	357	324	371

FURNMAN	169	200	188	187	185	177	158	151	151	131	146
UTILITIES	424	505	501	491	478	565	416	400	395	257	403
BCON	832	953	917	928	884	707	820	806	808	974	848
ENGCON	323	412	389	392	388	314	311	295	293	348	299
SERVCON	1,762	2,066	1,972	1,972	1,938	1,551	1,732	1,678	1,695	2,032	1,760
WTRADE	890	1,124	1,100	1,093	1,050	1,157	836	789	792	543	816
RTRADE	2,635	3,222	3,166	3,170	3,043	2,199	2,577	2,457	2,448	3,094	2,393
AFS	2,192	2,551	2,465	2,460	2,453	2,215	2,206	2,133	2,153	2,267	2,167
RTRAN	869	1,063	1,020	1,016	997	962	826	775	781	720	780
OTP	191	251	277	241	200	183	143	139	145	141	155
TRN	1,097	1,380	1,373	1,313	1,273	1,230	1,042	974	948	878	946
IMT	249	295	286	287	278	182	240	230	235	309	225
FINSERV	459	544	534	531	488	426	401	386	383	380	389
RER	83	118	107	105	92	64	70	65	66	89	56
DWE	184	214	208	209	202	108	179	177	178	278	181
PROF	972	1,116	1,083	1,080	994	728	907	910	902	1,161	957
ADMIN	717	888	950	984	869	754	642	592	595	622	570
PAS	2,256	2,865	2,776	2,797	2,671	2,259	2,171	2,069	2,058	2,244	2,108
EDU	2,218	2,743	2,668	2,521	2,543	1,921	2,196	2,126	2,119	2,658	2,145
HLTH	4,175	5,029	4,968	4,972	4,927	4,004	4,223	4,024	4,047	4,680	4,107
ARTSREC	418	533	527	564	516	421	421	409	412	448	408
OSERV	1,008	1,185	1,129	1,166	1,181	1,064	1,020	957	949	1,006	922
Total	28,867	35,022	34,154	34,013	33,017	28,592	27,992	26,774	26,784	28,855	26,961

Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

A.3. Health system costs due to work-related injury and illness

Table A.5 : Average cost per injury, by nature of injury

Nature of injury	Estimated cost per injury ($)
Fractures	$2,030
Joint diseases (arthropathies) and other articular cartilage diseases	$1,793
Trauma to joints and ligaments	$5,884
Trauma to muscle and tendons	$5,884
Residual soft tissue disorders due to trauma or unknown mechanisms	$8,567
Mental health conditions	$689
Other injuries	$9,330
Intracranial injuries	$1,438
Spinal vertebrae and intervertebral disc diseases - dorsopathies	$827
Diseases of muscle, tendon and related tissue	$3,088
Digestive system diseases	$5,550
Nervous system and sense organ diseases	$242
Infectious and parasitic diseases	$66,881

Burn	$2,854
Other musculoskeletal and connective tissue diseases, not elsewhere classified	$3,088
Diseases involving the synovium and related tissue	$3,088
Skin and subcutaneous tissue diseases	$4,284
Other soft tissue diseases	$3,088
Circulatory system diseases	$2,946
Injury to nerves and spinal cord	$1,697
Other diseases	$6,249
Neoplasms (cancer)	$24,746
Respiratory system diseases	$602

Source: Deloitte Access Economics (2022), AIHW (2021). It is noted that data on diseases are under-reported due to long latency periods and difficulty establishing a causal work connection as well as differing arrangements across jurisdictions for compensation.

Table A.6 : Health system expenditure by State/Territory and year ($ millions)

State	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ACT	62	86	81	72	66	58	63	64	64	74	61
NSW	977	1,329	1,323	1,341	1,290	1,120	1,125	1,107	1,086	1,139	1,081
VIC	692	812	769	769	748	607	720	711	707	818	706
WA	419	567	514	482	476	471	440	417	400	372	380
SA	137	148	226	287	285	282	265	252	247	238	242
NT	25	30	29	29	29	30	30	28	26	25	26
QLD	570	698	652	647	641	599	609	617	617	645	621
TAS	105	138	126	109	105	103	97	96	91	85	94
Total	2,986	3,810	3,720	3,736	3,639	3,270	3,349	3,292	3,237	3,397	3,211

Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

A.4. Other financial costs

Table A.7 : Total other financial costs by industry and year ($ millions)

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AG	25	63	84	107	129	133	118	137	136	135	113
AFHT	7	19	24	27	30	32	39	31	35	38	36
FL	2	4	5	8	6	9	9	19	12	10	7
MIN	43	113	159	227	323	336	236	201	170	145	131
FOODMAN	41	102	144	186	193	171	133	134	138	129	110
BEVMAN	4	8	12	14	14	18	16	12	13	13	11
TEXTMAN	5	12	14	21	17	15	8	7	9	8	8
WOODMAN	13	33	48	51	56	44	44	46	48	48	48
PAPERMAN	10	25	34	39	37	34	27	21	22	22	20
PCMAN	1	3	5	4	3	5	3	4	3	4	2
CHEMMAN	5	13	22	29	29	29	24	23	19	26	24

POLYMAN	10	25	36	40	35	37	25	25	24	20	20
NONMETMAN	11	31	41	53	60	61	50	56	60	71	69
FABMAN	12	22	33	48	42	40	44	41	25	27	25
METMAN	35	70	105	125	144	117	105	98	102	105	101
TRANMAN	16	35	54	69	81	79	63	44	50	42	35
MACHMAN	24	54	69	84	100	96	83	85	72	68	76
FURNMAN	9	22	30	37	38	34	33	30	32	29	22
UTILITIES	13	35	49	72	77	85	67	77	67	70	63
BCON	35	81	108	139	146	142	150	148	137	152	152
ENGCON	27	68	97	128	152	178	138	125	98	111	108
SERVCON	101	243	325	423	464	464	426	435	472	486	431
WTRADE	55	130	202	220	237	258	185	186	193	179	193
RTRADE	83	219	349	371	395	390	334	317	312	303	271
AFS	49	116	164	208	209	215	186	201	196	188	179
RTRAN	54	138	203	228	263	264	248	237	273	259	262
OTP	8	20	32	29	29	25	33	31	26	33	31
TRN	57	139	184	227	268	249	205	172	164	175	161
IMT	9	26	35	43	49	40	34	32	39	36	28
FINSERV	13	36	53	58	56	49	55	45	54	48	42
RER	9	21	25	34	36	31	25	46	27	26	21
DWE	5	12	18	22	24	26	24	27	27	31	28
PROF	33	71	103	124	121	116	108	99	111	99	115
ADMIN	49	102	170	212	188	171	142	158	181	189	169
PAS	97	287	448	542	537	558	479	453	461	450	421
EDU	62	166	243	276	268	267	242	253	271	274	261
HLTH	116	336	522	645	692	624	510	507	564	577	560
ARTSREC	19	47	64	77	87	78	72	68	79	75	66
OSERV	35	83	114	149	178	169	149	146	143	158	129
Total	1,201	3,030	4,425	5,396	5,812	5,689	4,873	4,778	4,865	4,862	4,549

Source: Deloitte Access Economics (2022), ABS work-related injuries (2009-10, 2013-14, 2017-18), SWA NDS (2022).

Appendix B – Occupational skill level breakdown

Table B.1: Indicative skill levels attributed to major occupation groups in ANZSCO

Occupation	ANZSCO Major group	Predominant skill levels
Officials and managers	1,2	1, 2
Technicians	3	2, 3
Clerks	4,5	2, 3, 4, 5
Service and shop workers	6	3, 4, 5
Agricultural and lower skilled workers	7,8	4, 5

Source: Deloitte Access Economics (2022) and Australian Bureau of Statistics (2022).

Limitation of our work

General use restriction

This report is prepared solely for the use of Safe Work Australia. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose set out in the working order dated 8 February 2022 – to estimate the economic impact of work-related injuries and illnesses in Australia over the decade 2008–09 to 2018–19 using computable general equilibrium (CGE) model. You should not refer to or use our name or the advice for any other purpose.

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