The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2008–09

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EXECUTIVE SUMMARY

In 1995, an Industry Commission study[1] estimated that only 25 per cent of the total cost of work–related injury and disease was due to the direct costs of work-related incidents. The remaining 75 per cent was accounted for by indirect costs such as lost productivity, loss of income and quality of life. Using the 1992–93 financial year Australian National Accounts[2] estimate of $4.83 billion in payments to household from workers' compensation schemes as an estimate of direct costs, led to an estimate of total cost of work-related injury and disease of **$20 billion** for the 1992–93 financial year.

The Industry Commission methodology defined a range of indirect cost items covering various economic agents (employers, workers and the community) and level of severity. The average costs associated with each category were combined with estimates of the number of work-related incidents to produce an estimate of total costs.

In 2004, as part of its strategy of communicating information on the impact of occupational injury, disease and death, the National Occupational Health and Safety Commission (NOHSC) revisited this estimation methodology. Where new or emerging data sources allowed, the update expanded on the previous methodology by including additional estimates for indirect cost items that were identified but not included in the previous study.

The resultant methodology (discussed in detail in Section 1 of this report) and economic cost estimate was reviewed by independent consultants,[3][4][5] to examine and enhance the robustness of the methodology and data sources. The recommendations from these reviews were incorporated into the original NOHSC methodology. The results of the analysis were endorsed at a meeting of the NOHSC Information Committee and published in 2004[6]. The study estimated the total costs of workplace injury and illness to the Australian economy for the 2000–01 reference year to be **$34.3 billion**. This total is equivalent to 5 per cent of Australian Gross Domestic Product (GDP) for the 2000–01 financial year.

In 2008, the Australian Safety and Compensation Council (ASCC) updated this estimate, using the approved methodology, for the 200506 reference financial year. This year was chosen to align with the most recent Australian Bureau of Statistics (ABS) Work Related Injuries Survey (WRIS) data release[7].

The total economic cost for the 2005–06 financial year was estimated to be **$57.5 billion**, representing 5.9 per cent of GDP for the 2005–06 financial year[8]. It should be noted that this estimate represents foregone economic activity, and not the proportion of GDP that is lost as a result of work-related injury and illness.

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[1] Industry Commission, *Work, Health and Safety*, Report No. 47, September 1995.
[2] ABS Catalogue 5204.0, Australian System of National Accounts, 1992-93.
[3] Indirect Costs of Work Related Injury and Disease, Review of the Estimation Methodology, Report by The Allen Consulting Group to NOHSC, July 2003.
[4] Review of the Methodology and Estimates of Indirect Costs of Workplace Injury/Disease, Report by The Allen Consulting Group to NOHSC, November 2003.
[5] Costs of Workplace Injury and Illness: reviewing the estimation methodology and estimates of the level and distribution of costs, Report by Access Economics P/L, March 2004.
[6] The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community; National Occupational Health and Safety Commission, August 2004.
[7] ABS Catalogue 6324.0, Work-Related Injuries 2009-10, December 2010. This survey forms the basis of the estimate of number of cases.
[8] ABS Catalogue 5204.0, Australian System of National Accounts, 2005-06.

With the release of Work Related Injuries Survey data for the 2009–10 financial year, Safe Work Australia has re-estimated the total economic cost of work related injury to the Australian economy for the 2008–09 reference year. While data from the WRIS represents the 2009–10 financial year, other key sources of data (particularly workers' compensation claims) are only available to the 2008–09 financial year. For this reason, the estimate is developed for the 2008–09 financial year as the reference year. The total economic cost for the 2008–09 financial year is estimated to be **$60.6** billion, representing 4.8 per cent of GDP for the same period.

A number of significant methodological revisions have occurred between the publishing of the 2005–06 economic cost estimate and the current estimate. The major areas for revision were a re-evaluation of the number of permanent cases, to include only those work-related incidents that resulted in the worker being unable to return to work in any capacity, and a re-estimation of disease morbidity, an area which is known to be underestimated in workers' compensation statistics. These revisions are discussed in more detail in the methodology section of this paper.

In particular, the improved methodology to estimate the numbers of injuries or diseases resulting in full permanent incapacity compared with partial permanent incapacity has resulted in a significant decrease in full incapacity cases compared with the previous two estimates. As these types of cases are the most costly, this has had a significant downward effect on the estimate of overall costs and explains the lower proportion of GDP that this cost estimate represents compared to the previous estimates.

In addition, the revision in the estimation of disease morbidity will result in an increase in the estimated burden borne by workers, as the additional cases are assumed to be non-compensated.

For these reasons, the current estimate discussed in this paper should not be compared with the previous estimates in this series.

The relative growth in average weekly earnings when compared with current price GDP is a significant driver in the estimated cost as a proportion of GDP. In contrast to the previous update (2000–01 to 2005–06), when wage growth was considerably higher than economic growth, during the period from 2005–06 to 2008–09 GDP grew by 29 per cent while average weekly earnings increased by 17 per cent.

In terms of the burden to economic agents, 5 per cent of the total cost is borne by employers, 74 per cent by workers and 21 per cent by the community. The trends over the three iterations of this report are for an increasing proportion of costs borne by workers and a decreasing proportion of costs borne by the community. This difference is mainly accounted for by the growth in average weekly earnings and the effect this has on human capital costs and the distribution between worker and community. This issue is discussed in detail on page 33 of the report. The three estimates produced in this series are summarised below in Table 0.1.

This methodology is based on an 'ex-post' approach to assigning costs (i.e. after the incident), in which the costs of incidents occurring in the reference year only are considered. Under this methodology, workers' compensation premiums paid by employers are not considered as a cost to employers, rather the distribution of

payments to injured workers from money received from workers' compensation premiums are considered as a transfer cost to society.

If the $6.5 billion in workers' compensation premiums paid by Australian employers in the 2008–09 financial year[9] were to be redistributed using an 'ex-ante' approach (i.e. before the incident), the total cost borne by employers would be 16 per cent and the cost borne by the community would be 10 per cent. The differences between these approaches affect the distribution of costs but not the level of total costs. Economic costs borne by workers remain the same under either approach.

Economic costing is not an exact science. Cost estimates depend on the particular costing approaches used, the range of cost components that can be estimated, the quality of available data and the value of key parameters. The assumptions relating to the values of key parameters in this study have been chosen to be deliberately conservative. Appendix 3 outlines the results of an analysis of the sensitivity of the total cost estimate to changes in the value of key parameters. The estimated cost derived from the baseline parameter values is shown to lie towards the lower end of the range of cost estimates produced by this analysis.

It is important to recognise that the cost estimate presented in this report is an estimate of the human cost of work-related injury and illness, and relates to the outcomes of work-related injury and illness that occur within the chosen reference year (2008–09 for this study). It does not include costs that cannot be specifically related to injury or illness to employees (such as damage to property and loss of company image). The cost estimate also represents only one side of the work health and safety cost equation. For example, the costs incurred by employers for compliance with work health and safety regulations and prevention activities are not considered within the scope of the current study.

The initial study and cost estimate for 2000–01 included an appendix on the cost of pain and suffering, based on the value of a statistical life year. No such estimates have been included in this study, which instead focuses on the baseline estimates of economic costs.

[9] ABS Catalogue 5204.0, Australian System of National Accounts, 2008-09.

Table 0.1: Comparison of estimates of the economic cost of work-related incidents

Estimation period	Economic agent	Estimated cost ($b)	GDP ($b) a	Costs as % of GDP	Australian Workforce (millions) b
2000–01	**Total**	**$34.3**	**$689.3**	**5.0%**	**9.09**
	Employer	3%			
	Workers	44%			
	Community	53%			
2005–06	**Total**	**$57.5**	**$967.5**	**5.9%**	**10.20**
	Employer	4%			
	Workers	49%			
	Community	47%			
2008–09[c]	**Total**	**$60.6**	**$1 253.1**	**4.8%**	**10.93**
	Employer	5%			
	Workers	74%			
	Community	21%			

a ABS Catalogue 5204.0, Australian System of National Accounts, 2008–09.
b ABS Catalogue 6202.0, Labour Force Australia, May 2011.
c Due to significant revisions in the methodology, the 2008–09 estimate should not be compared with the two previous estimates.

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LIST OF ABBREVIATIONS

ABS Australian Bureau of Statistics

AIHW Australian Institute of Health and Welfare

ADMINC Administration Costs

ANA Australian System of National Accounts (ABS Catalogue No. 5204.0)

ASCC Australian Safety and Compensation Council

AWE Average weekly earnings (total earnings)

AWOTE Average Weekly Ordinary Time Earnings (excluding overtime)

CPI Consumer Price Index (ABS Catalogue No. 6401.0)

CPM Comparative Performance Monitoring Report

CRS Commonwealth Rehabilitation Service

DFaCS Commonwealth Department of Family and Community Services

GDP Gross Domestic Product

HKC Human Capital Costs

MEDC Medical Costs

NDS National Dataset for Compensation Based Statistics

NOHSC National Occupational Health and Safety Commission

PDC Production Disturbance Costs

PV Present Value

RBA Reserve Bank of Australia

TRANSC Transfer Costs

WCI ABS Wage Cost Index (Catalogue No. 6345.0)

WRIS ABS Work-related Injuries Survey (Catalogue No. 6324.0)

WRMC Workplace Relations Ministers' Council

INTRODUCTION

1. Work-related injuries, illnesses and deaths impose costs on employers, workers and the community. These include both direct costs and indirect costs. Direct costs include items such as workers' compensation premiums paid by employers or payments to injured or incapacitated workers from workers' compensation jurisdictions. Indirect costs include items such as lost productivity, loss of current and future earnings, lost potential output and the cost of providing social welfare programs for injured or incapacitated workers. The level of costs borne by each economic agent varies with the severity of the injury or disease. While measures of direct costs are understood and reasonably simple to measure, these costs cover only a fraction of the total cost of work-related injury and disease.

2. The purpose of this study is to update the estimated cost of work-related injury and illness based on the methodology developed and applied in 2004 by the National Occupational Health and Safety Commission (NOHSC). The methodology is an adaptation of a 1995 Industry Commission report[10] with further modifications based on the recommendations of independent reviews of the method by the Allen Consulting Group[11] and Access Economics[12]. This methodology was endorsed by the NOHSC Information Committee in September 2004[13].

3. The methodology for the current update has been revised to provide more robust estimates of the number of full incapacity cases and the extent of disease morbidity. These changes are discussed in more detail in the *Methodology* section of this report. The current update is based on the 2008–09 financial year as a reference year.

4. Section 1 of this report summarises the methodology used in deriving the estimate, describing each step in the process of estimating total costs. The major steps include: developing a framework for classifying costs in terms of the burden to economic agents and the major sources of indirect costs; classifying incidents in terms of severity and nature, and estimating the number of incidents and the typical cost associated with an incident in each category.

5. Section 2 summarises the major findings of the study, giving the breakdown of average and total costs by various factors including location, economic agent, and the severity and nature of the incident.

6. A detailed description of the process for deriving typical costs by severity category and nature is given in Appendix 1, while a detailed breakdown of cost by jurisdiction is presented in Appendix 2. Appendix 3 details the results of a sensitivity analysis of the method to changes in key parameters and assumptions.

[10] Industry Commission, *Work, Health and Safety*, Report No. 47, September 1995.
[11] Review of the Methodology and Estimates of Indirect Costs of Workplace Injury/Disease, Report by The Allen Consulting Group to NOHSC, November 2003.
[12] Costs of Workplace Injury and Illness: reviewing the estimation methodology and estimates of the level and distribution of costs, Report by Access Economics P/L, March 2004.
[13] The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community; National Occupational Health and Safety Commission, August 2004.

SECTION 1. METHODOLOGY

Methodological considerations

7. The economic costs included in this study are difficult to measure and cannot be estimated from a single data source. An estimation methodology must be employed that combines the relevant information in a robust and transparent manner. The most important consideration is the nature of the data on which the number of cases is based. For this study, the number of cases is defined by combining details of new workers' compensation cases for the reference year and estimating the future cost associated with each new case and estimates from the Australian Bureau of Statistics (ABS) Work Related Injuries Survey (WRIS). The estimate of the number of new cases is used as a proxy for the ongoing cost of cases from previous reference years. This characteristic of the data allows the aggregation of costs for each new case over the reference year and implies that an 'ex-post' approach to measuring costs (considering the cost of a case after it has occurred) is best suited to the current study.

8. The basic methodology for deriving an estimate of economic costs is to identify and define the categories of economic costs affecting the major economic agents, namely employers, workers and the community. Using the severity of an injury or disease as a major driver of average cost, a scale for measuring incidents by the level of severity is created. This scale is used to calculate and aggregate total costs to determine the overall level of indirect costs.

9. For various estimates, a range of values could be appropriate for use in the estimation process. Where possible in this study, parameter values are chosen to be deliberately conservative. By applying this rationale to the estimation of parameter values, we believe that the estimate of total costs will also be conservative and the 'true' value of costs is likely to be higher than the value estimated.

10. The cost estimation methodology is based on the concept of the 'human cost' of work-related injury and illness. Essentially, workplace incidents can be thought of as involving damage to humans or property, or a combination of the two. Only those costs associated with actual injuries or illnesses are included in the cost estimate under the human cost framework. As an example of the human cost approach, the costs associated with loss of goodwill and corporate image and the cost of machinery damage and replacement are not included in total costs. These costs can be incurred as a result of workplace incidents in which no injuries occur to employees, or the costs can be unrelated to number of injuries or illnesses that occur as a result of the incident.

11. The nature of the compensation based data on which the estimate of work related injuries and illnesses is based means that the costs associated with incidents where no injury or illness occurs is made cannot be reliably identified. For this reason, it is conceptually more robust to exclude all such costs and concentrate only on human costs in the current study.

Applying the methodology

12. The economic costs associated with work-related injury and illness are estimated for a range of indirect cost items over five severity categories, ranging from short periods off work with full return to normal duties to full incapacity and fatality (see paragraph 44 and Table 1.2 for the definitions of each severity category).

13. The methodology for deriving the estimate for total costs can be categorised by the following steps:

1. Identify the major categories of economic costs borne by economic agents (employers, workers and the community)
2. Determine the best source of measurement for each cost item
3. Define the levels of severity of injury or disease to differentiate between incidents with different cost structures
4. Identify which cost items apply to each severity category
5. Determine the number of incidents which fall into each severity category, and the average duration of time lost for a typical incident in each category
6. Calculate the average cost of a typical incident in each severity category by aggregating the typical costs associated with each cost item, and
7. Calculate the total cost of all work-related incidents by combining the typical cost of an incident with an estimate of the number of such incidents and aggregating over all classes of incidents.

14. The following sections discuss each of these steps and the important methodological considerations used to underpin the total cost estimate. Full details of the estimation of typical costs for each category of incident are given in Appendix 1.

Measuring cases using an incidence approach

15. The Access Economics review[14] of the relevant literature identified two key approaches for dealing with the issue of measuring annual occupational injuries and illnesses: the incidence approach and the prevalence approach. The distinction between the approaches is that the incidence approach measures new cases occurring during the reference year, while the prevalence approach measures all cases (whether new or ongoing) in the system at a given point in time in the reference year.

16. The incidence approach assesses the number of people entering the compensation (or medical) systems during a particular year as a result of work-related accident or illness and the costs (both current and expected future costs) associated with those cases. Since only new cases are measured under the incidence approach, in order to estimate total costs the expected future cost of new cases over the lifetime of a case is used to proxy the cost in the reference year of cases that were already in the system at the start of the current reference year.

[14] Access Economics (2004) Costs of Workplace Injury and Illness to the Australian Economy: Reviewing the Estimation Methodology and Estimates of the level and distribution of costs, Reports for the National Occupational Health and Safety Commission, March 2004.

17. The alternative prevalence approach assesses the number of people within the compensation or medical systems at a given point in time, regardless of when the injury or illness occurred. Under this approach, costs are generally allocated in a top-down manner, where total expenditures for a given year are proportioned across the identified categories of injury or illness. While the prevalence approach to measuring total cases would provide the best estimate of total costs, since costs would be estimated over the total number of cases currently in the 'system' at a given point during the reference year, it is difficult to obtain accurate prevalence data relating to occupational injury or illness. Using inaccurate or incomplete prevalence data is likely to result in an underestimate of the number of cases and therefore produce an underestimate of total costs.

18. The methodology presented in this paper is based on an incidence approach to measuring total work-related incidents. Accepted workers' compensation claims have been identified as the best single source for estimating the number of occupational injuries and illnesses for a given year. The workers' compensation data on which the estimate of the total number of incidents is based allows the identification of new accepted workers' compensation claims for the reference year and thus readily lends itself to using the incidence approach to estimate the number of cases. This information is supplemented with the WRIS, Safe Work Australia estimates of injury fatalities[15] and disease fatalities[16] to form the basis for the total number of cases.

19. The incidence approach allows a better estimate of the economic cost of disease cases, since it allows the future costs for new cases to be followed over the expected lifetime of the case. Under a prevalence approach, it would be difficult to identify and cost a case involving a work-related disease if that case had left the compensation system (as would occur if a lump-sum payment had occurred) but was still incurring medical and other costs to the person in the ensuing years.

20. Based on an incidence approach to measuring total cases, a key characteristic of the methodology is the inclusion in the total cost estimate of the expected future costs of incidents occurring in the reference year. The costs that an injury or disease imposes in future years are discounted to present values. This provides a measure of the costs in the reference year associated with injuries and illnesses occurring in previous years. This approach is known as the *lifetime cost* approach, and provides an indicator of the financial and economic benefits of reducing work-related incidents. In order to proxy the costs incurred in the current reference year from cases occurring in previous years, the costs incurred into the future from these cases are estimated using present value calculations over the expected lifetime of the case.

21. The *lifetime cost* approach makes the assumption that the level and structure of current costs will accurately reflect ongoing costs into the future. In the event that advances in health care technology and treatments will affect the level and structure of costs, the lifetime cost approach may distort the estimate of future costs based on current treatment and costs. In this discussion, the assumption is made that current treatment costs will be a good predictor of the type and level of future costs.

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[15] Safe Work Australia (2010), Work-related Traumatic Injury Fatalities, Australia 2007-08, Safe Work Australia, December 2010.

[16] Access Economics (2003b), Review of the methodology and estimates of workplace fatalities, Report to the National Occupational Health and Safety Commission, September 2003.

Distributing costs using an ‘ex-post’ approach

22. As discussed in the executive summary, the methodology is based on an ‘ex-post’ approach in which costs are attributed to incidents after they occur and as a direct result of the incident. The ‘ex-post’ view of costs is generally associated with the incidence approach to measuring total cases.

23. The alternative view is an ‘ex-ante’ approach, where the expected costs of incidents are estimated in advance of the event or incident. This approach is traditionally associated with a prevalence approach to measuring total cases, where total expenditures for a given year are apportioned across the categories of injury or illness. This approach is also known as a ‘top-down’ estimation process.

24. The nature of the compensation-based data on which the estimate of the total number of cases is based lends itself to an ‘ex-post’ estimation process. The current and future costs associated with each case can be assigned individually (since the number of cases and the nature of each case is known) and the total cost estimated by aggregating the cost of each case and/or cost component from the ‘bottom-up’.

25. An important distinction between these two views is the treatment of workers’ compensation premiums paid by employers. Under the ‘ex-post’ treatment, such payments are not considered as a cost to the employer but treated as a burden to the community as compensation payments are re-distributed to injured and ill workers. Under the ‘ex-ante’ treatment, workers’ compensation premiums are considered as a cost to employers for all incidents that will occur in the reference year. Paragraph 72 in the results section shows the impact on the distribution of total costs of adopting the ‘ex-ante’ view. It should be noted that the choice of the method for assigning costs will affect the distribution of costs between economic agents but not the level of total costs.

Conceptual categories for cost items

26. Identifying the proportion of costs borne by economic agents (employers, workers and the community) is an important facet of the analysis. Estimating the burden of economic costs will allow an understanding of the incentives on employers and regulators to provide a safe workplace. The distribution of the burden of costs is achieved by devising a framework that defines the major aspects of total costs and assigns the proportion of these cost groups to each of the economic agents.

27. The classification structure for economic costs is based on the following conceptual cost groups:

- production disturbance costs – costs incurred in the short term until production is returned to pre-incident levels
- human capital costs – long run costs, such as loss of potential output, occurring after a restoration of pre-incident production levels
- medical costs – costs incurred by workers and the community though medical treatment of workers injured in work-related incidents
- administrative costs – costs incurred in administering compensation schemes, investigating incidents and legal costs

- transfer costs – deadweight losses associated with the administration of taxation and welfare payments, and
- other costs – includes costs not classified in other areas, such as the cost of carers and aids and modifications.

28. Table 1.1 summarises the conceptual cost groups used to categorise economic costs, and the cost components in each conceptual group that are borne by the key economic agents (employers, workers and society).

29. In Table 1.1, Total costs (T) are the sum of production disturbance costs (PDC), human capital costs (HKC), medical costs (MEDC), administrative costs (ADMINC), transfer costs (TRANC) and other costs (OTHERC).

30. Each item can be further sub-categorised by severity level, compensated or uncompensated status, and disease or injury. For each item, total cost is the sum of costs borne by employers, workers and society. Tables A1.1 to A1.3 in Appendix 1 summarise cost items by their burden on each economic agent.

31. In addition to these cost items, estimates can also be included for the total cost of pain and suffering and early death to workers experiencing work-related injury and illness. The previous study in 2000–01 included an appendix on the cost of pain and suffering, based on the value of a statistical life year. No such estimates have been included in this study, which instead focuses on the baseline estimates of economic costs.

Table 1.1: Economic costs borne by the employer, worker and the community

Conceptual group	Total (T)	Employer (E)	Worker (W)	Society (S)
Production disturbance costs	Value of production (inc. overtime)	Overtime premium	Loss of income prior to RPR[a], net of compensation, welfare and tax	Compensation and welfare payments transferred to worker for temporary loss of wage; tax losses prior to RPR;
		Employer excess payments		
		Sick leave		
	Staff turnover costs	Staff turnover costs	Zero	Zero
Human capital costs	Present value of earnings before incident minus earnings after incident	Zero	Loss of income after RPR, net of compensation, welfare and tax	Compensation and welfare payments for lost income earning capacity; tax losses after RPR
Medical costs	Medical and rehabilitation costs incurred as a result of the injury	Threshold medical payments	Gap payments	Compensation medical payments
			Private health insurance payments	Public health system payments
Administrative costs	Legal costs	Real legal costs incurred plus fines and penalties	Real legal costs incurred	Real legal costs incurred
				Deadweight costs of enforcement minus fines and penalties credit
	Investigation costs	Employer investigation costs	Zero/negligible	Real costs of running the compensation system (including investigation of claims)
	Travel costs	Zero/negligible	Travel costs net of compensation & concessions	Compensation for travel costs
				Travel concession
	Cost of funeral today minus present value of future cost	Zero	Net costs of bringing forward funeral	Compensation for funeral costs
Transfer costs	Real deadweight costs of transfer payments (welfare and tax)	Negligible	Zero (accounted for in netting other items)	Deadweight costs of welfare payments (DSP, SA, Mobility Allowance, Rent Assistance)
				Deadweight costs of tax losses
Other	Carers	Zero	Carer costs net of carer payment/allowance	Payments to carers plus deadweight cost
	Aids, equipment and modifications	Zero	Aids etc (net cost after reimbursements)	Reimbursements for aids etc plus deadweight cost

Source: Access Economics P/L 2004 Report on 'The Costs of Work-related Injury and Illness'
a RPR time to return or permanent replacement of injured worker

Measuring lost productivity

32. The distinction between production disturbance costs and human capital costs can be thought of in terms of the time period covered by the reduction or loss of productivity. The two distinct periods that categorise a serious workplace incident are:

- the short term initial disruption until production is restored (either by the worker returning to work if possible or being replaced), and
- the longer term period when there is potential loss or reduction of the labour resource as a result of the workplace incident.

33. Two possible approaches to measuring lost productivity are: human capital (lost wages) and the frictional method. The human capital method takes a longer term approach, assuming that if a worker is unable to return to work, or has a reduced capacity on return, then the productive capacity of the economy is reduced as a result. The friction method values the costs of lost production in the short term, while assuming that in the longer term the structural unemployment in the economy will provide a worker able to compensate for the lost potential from the injured worker.

34. In the model used for this analysis, frictional costs are included in the production disturbance costs item, while the human capital costs item covers the long term costs of injury in terms of lost output and potential. In line with the recommendation of the Access Economics review, human capital costs are included in total costs, since foregone production (as measured by the friction approach) is only one component of total cost and lost or reduced human resources are also a significant and real economic cost of work-related incidents. While some lost potential is likely to be 'picked-up' by previously unemployed workers entering the labour force, it will not be entirely replaced.

35. As an example, consider the case of a worker suffering a full incapacity disease at age 46, earning the average weekly wage of $1 313 per week. In the short term, production disturbance costs for the individual are equal to the value of the worker's wages (plus on-costs and overtime) over the time lost before replacement (8.5 weeks), or $19 650. In the long term, the human capital costs are equal to the present value of the individual's expected income over the period between leaving work and retirement. Assuming the worker would have retired at age 64, and using a discount rate of 1.64 per cent (see paragraph 49), the cost of lost human capital to the economy would be $1 240 450. This cost is partially borne by the worker (lost income) and society (lost potential output and deadweight losses).

36. Literature reviews from work in similar studies (such as Leigh et. al. estimating the cost of occupational injuries and illnesses to the United States economy[17]) suggest that the human capital/lost wages approach is predominantly used to estimate lost productivity. This method was used by the Bureau of Transport Economics when estimating total road crash costs in Australia for 1996[18].

[17] Leigh J.P. et. al. (2000), *Costs of Occupational Injuries and Illnesses*.
[18] Bureau of Transport Economics (2000), *Road Crash Costs in Australia*, BTE Report No. 102, Canberra.

Identifying the levels of severity of work-related incidents

37. The costs associated with work-related injury and disease will vary depending on the severity of the incident. Severity can range from minor incidents involving little or no absence from work to fatalities. In addition, whether an incident results in an injury or disease will also be a determining factor on the cost structure of the incident.

38. Generally, it is the case that the more severe the incident, the longer the time taken to recover and return to duties. Further, the more intensive the medical treatment required, the higher will be the costs associated with the incident. For the purposes of this analysis, five mutually exclusive categories of severity were created to define the level of severity (Table 1.2). These categories are based on definitions available from the National Dataset for Compensation-based Statistics, 2nd edition (NDS2), and are based on incident severity and duration of absence. With no reliable indicator of return to work status available in NDS2, we assume that capacity on return to work is based on duration of absence, with six months of absence being the point at which workers return with reduced capacity. For this reason, the classification system is not exhaustive of all possible cases and combinations of severity, duration of absence and return to work status. For example, it is possible to have incidents where a worker resumes partial duties with duration of less than six months absence, and similarly cases where a worker returns at full capacity after a period of more than six months. Return to work indicators available through the NDS 3rd edition[19] are currently being examined as part of the National Workers' Compensation Action Plan 2010–13, and this data item could be used to revise the classification system in future work on this methodology.

39. In general, work-related incidents that do not involve absences from work are thought to contribute negligibly to total costs. However, some incidents can have a considerable effect on productivity without involving a significant absence from work. Incidents such as these are difficult to measure through compensation based statistics, both in terms of the number of such incidents and their compensable cost structure. They are also difficult to identify through other sources such as the WRIS. For these reasons, incidents with less than one shift of time lost are excluded from the analysis.

40. The definitions of each category and the method of applying them to NDS data has been revised from the methodology used for the 2005–06 estimate, published in March 2009. The defined labels will be used in the summary tables that follow.

41. In particular an improved method has been used to distinguish permanent full incapacity from permanent partial incapacity to better identify workers who are unable to return to work. Data supplied by workers' compensation jurisdictions suggest that up to 10 per cent of the cases classified as permanent incapacity result in the worker being unable to return to work in any capacity.

42. Using this revised methodology, the additional permanent cases not considered to be no return to work cases are categorised using the partial incapacity category. This

[19] NDS3 data is currently available for a limited range of financial year updates and jurisdictions, but will become more prevalent in future updates of the NDS dataset.

category assumes that the worker is able to return to the work force following a period of incapacity, at a reduced capacity when compared with pre-incident levels.

43. The revisions applied to the methodology in this version have resulted in a significant reduction in the number of cases classified as permanent incapacity. This much better aligns with the original intent of the definition of the severity categories and the methodology used to calculate the unit cost for such permanent incapacity cases. In previous editions, the data distinguishing between permanent full incapacity and permanent partial incapacity was unavailable.

44. In addition to the categories summarised in Table 1.2, work-related incidents are also categorised according to their nature, as either an injury or a disease. Injuries are defined as work-related incidents resulting from a single traumatic event where the harm or hurt is immediately apparent. In contrast, diseases result from repeated or long-term exposure to an agent or agents, where the harm or hurt may not become apparent until after a latency period.

Table 1.2: Definition and labelling of severity categories

Category label	Severity Category	Definition
Short absence	Less than 5 days off work	A minor work-related injury or illness, involving less than 5 working days absence from normal duties, where the worker was able to resume full duties.
Long absence	Five days or more off work and return to work on full duties	A minor work-related injury or illness, involving 5 or more working days and less than 6 months off work, where the worker was able to resume full duties.
Partial incapacity	Five days or more off work and return to work on reduced duties or lower income	A work-related injury or illness which results in the worker returning to work more than 6 months after first leaving work.[a]
Full incapacity	Permanently incapacitated with no return to work	A work-related injury or disease, which results in the individual being permanently unable to return to work.
Fatality	Fatality	A work-related injury or disease, which results in death.

[a] We assume cases in this category result in a return to work on reduced duties or income, with a resumption of normal duties. This category includes permanent incapacities for which a minimal duration of absence from work occurred and therefore the worker was able to return to work in some capacity, or for which a return to work in some capacity is possible.

Measurement of indirect cost items

Table 1.3 summarises the general estimation method and data sources that were used to determine average costs associated with each indirect cost item.

Table 1.3: Definitions and data sources for indirect cost items

Indirect Cost Item	Data Item	Sources
Loss of productivity (Value of Production)	Average weekly earnings by gender, state/territory and industry sector, average duration of absence by severity category.	ABS Employee Earnings and Hours, ABS Cat. No. 6306.0 and NDS workers' compensation data
Cost of overtime and over-employment	Average weekly earnings by gender, state/territory and industry sector, average duration of absence by severity category.	ABS Employee Earnings and Hours, ABS Cat. No. 6306.0 and NDS workers' compensation data
Employer excess payments	Employer costs for the first 3.3 days of a claim and the first $290 of medical costs.	Estimates based on the average excess provisions by each jurisdiction
Loss of current income	Pre-injury earnings less compensation payments and average social welfare payments received.	ABS Employee Earnings and Hours, ABS Cat. No. 6306.0, NDS workers' compensation data and Social Welfare Payments
Recruitment, training and staff turnover costs [a]	The cost of replacing existing staff affected by work-related incidents (26 weeks of average wages), and training of new staff (2.5 weeks of average wages).	
Loss of future earnings (Human capital costs)	For cases involving full incapacity or fatality: loss of earnings from time of injury to retirement age (assumed to be 62 years), assuming a discount profile and productivity loss. For full incapacity, future earnings can also include average social welfare payments received (since these contribute to post-injury income).	ABS Employee Earnings and Hours, ABS Cat. No. 6306.0, NDS workers' compensation data and Social Welfare Payments
Medical and rehabilitation costs	Average medical and rehabilitation costs, with assumptions about the costs borne by employees not applying for compensation.	NDS workers' compensation data
Investigation costs	Investigation costs: As a proxy for the costs to firms, investigation and inspection costs reported in jurisdictional annual reports are assumed to match the cost to employers for these functions.	CPM report data and Workers' Compensation Jurisdictions' Annual Reports
Legal fines and penalties [a]	Average fine/legal cost associated with a prosecution following investigation.	CPM Report, 12th edition, December 2010.
Legal costs and overheads [a]	Non-compensated legal costs associated with a typical work-related incident.	CPM report estimates of the disputation rate amongst workers' compensation claims and the average legal costs for dispute
Travel expenses	Payments made for travel expenses to workers' compensation jurisdictions by claimants (as a proxy, assuming that compensation is adequate to cover these expenses).	CPM report data and Workers' Compensation Jurisdictions Annual Reports
Social welfare payments	For severe incidents, average social welfare payment per recipient.	Department of Families, Housing Community Services and Indigenous Affairs Annual Report, 2009-10.
Rehabilitation	Average cost of rehabilitation per recipient, for cases involving lower duties, for full incapacity or fatality.	Department of Families, Housing Community Services and Indigenous Affairs Annual Report, 2009–10.
Loss of government revenue [a]	For full incapacity or fatality, taxation and other revenue foregone when workers are unable to work due to work-related incidents.	Average weekly earnings and estimates of the average or effective taxation rate for workers (source ATO web-site, ratio of income tax to total earnings)
Carers, modifications and aids	For full incapacity, the additional cost of care, house and other modifications and living aids.	DFaCS Survey of Disability Support Pensioners (2001).

[a] Indirect costs items included in the estimate of total costs that were considered but not estimated in the 1995 Industry Commission report

Distribution of indirect cost items by severity category

45. Table 1.4 illustrates the indirect cost items that are associated with each severity category. Indirect cost items are estimated individually for each severity category before being aggregated into a total.

46. However, some items, particularly those sourced from workers' compensation jurisdictions' annual reports, are estimated across all applicable severity categories due to the lack of available data relating to distribution by severity. In these instances, the cost is distributed between the severity categories and an average cost is derived based on the number of work-related incidents in each category.

47. An example is the legal fines and penalties category where the data for total convictions and fines imposed by workers' compensation jurisdictions can be found from annual reports. During the 2005–06 financial year, 402 convictions for $18 million in fines were recorded, leading to an average fine per conviction of $45 000.[20] For this category, costs are assumed to be incurred for full incapacity and fatal cases only, with prosecution rates of 3 per cent for full incapacity cases and 50 per cent for fatal cases.

Table 1.4: Distribution of indirect cost items by severity category

Indirect Cost Item	Severity Category				
	Short absence	Long absence	Partial incapacity	Full incapacity	Fatality
Value of production	✓	✓	✓	✓	✓
Overtime and over-employment	✓	✓	✓	✓	✓
Employer excess costs	✓	✓	✓	✓	✓
Staff turnover and training/retraining costs			✓	✓	✓
Loss of future earnings (Human capital costs)			✓	✓	✓
Medical and rehabilitation costs	✓	✓	✓	✓	✓
Legal Costs [a]				✓	✓
Investigation costs [a]	✓	✓	✓	✓	✓
Travel costs	✓	✓	✓	✓	✓
Social welfare payments		✓	✓	✓	✓
Loss of government revenue		✓	✓	✓	✓
Carers, modifications and aids				✓	

[a] These indirect cost items are estimated in aggregate across all applicable severity categories

Discounting future monetary values and the discount rate

48. Under the *lifetime cost* approach discussed previously, future costs of new cases for the reference year are modelled using present value calculations. The value of future payments or income streams are modified to an equivalent reference year monetary value by considering factors which affect the value of currency over time, such as saving and price/wage inflation. This information can be combined into a single value, called the *discount rate*, which summarises the likely changes in the value of money over time.

[20] Comparative Performance Monitoring Report; Workplace Relations Ministers' Council, 12th Edition, December 2010.

49. In this analysis, the discount rate is composed of:

- the opportunity cost of saving, modelled by average investment rates for common savings instruments. Opportunity cost is an economic concept defined as the advantage foregone as the result of the acceptance of an alternative. In this case the cost of spending or losing wages and other income is the cost of not saving that money into the future. The savings rate is modelled as the average interest rate over a selected period of a range of common savings instruments (term deposits and government bonds)
- price inflation, based on average consumer price index movements over a selected period, and
- a productivity factor, modelling the average increase in productivity. This is measured as wage increases above the prevailing wage inflation rate.

50. The productivity factor is only used in present value calculations involving real wages and models the implicit increase in wages for an individual and their experience and the resulting productivity increases over time.

51. Table A1.5 in Appendix 1 gives a summary of these parameters, while Appendix 3 gives a summary of the sensitivity of the cost estimate to changes in the values for the components of discount rate. For the results presented in Section 2 of the report, the rates used to form the discount rate were 6.0 per cent p.a. for savings and 2.6 per cent p.a. for inflation. This represents a discount rate of 3.4 per cent. When considering wage present value calculations, the productivity rate of 1.75 per cent p.a. was applied, leading to a modified discount rate of 1.65 per cent. Applying a range of possible rates (based on the historical period on which the rates cover, with longer periods giving higher average rates) to the calculation of total costs leads to a range of costs of between $69 billion and $84 billion for the 2008–09 reference year.

Determining the number of incidents in each severity category

52. The total number of work-related incidents (injury and disease) occurring in 2008–09 for Australia is estimated using an 'incidence' approach, in which only those incidents that occurred in the 2008–09 financial year are included in the total. The total number of incidents is estimated by combining compensation claim information from the NDS and data from the WRIS[21]. Cases are categorised by severity category, nature (injury or disease) and compensation status (compensated or non-compensated).

53. While the WRIS aligns to the 2009–10 financial year, the current estimate is developed for the 2008–09 reference year to better align with some of the other sources of data used in the estimate, particularly workers' compensation and fatalities data. This reference year ensures that workers' compensation claims in the NDS are sufficiently developed from the date of lodgement to provide accurate information on payments and time lost.

[21] ABS Catalogue 6324.0, Work-related Injuries Survey, December 2010.

54. NDS data provide the total number of accepted new compensation claims submitted to workers' compensation jurisdictions during the 2008–09 financial year. Accepted claims data can be categorised by severity, duration of absence, nature (injury/disease) and jurisdiction. However, since this data source contains only accepted workers' compensation claims, it does not cover all work-related incidents that occurred during the reference year. In particular, work-related incidents that result in a short duration of absence, or for which no compensation was paid, certain categories of working arrangements (self-employed) and some industries (such as agriculture and construction) will be significantly under-covered in the NDS data.

55. The WRIS is used as a base for total non-fatal non-compensated work-related incidents. It should be noted that the WRIS deals with injured workers and takes no account of whether a worker was injured on more than one occasion during the year. To the extent that workers suffer multiple periods of absence from work, the WRIS will underestimate the total number of work-related incidents.

56. Another aspect of the WRIS to be considered is self reporting of the work-relatedness of the injury or illness. The more rigorous definition of work-relatedness used for the NDS and other such collections will not apply for estimates from the WRIS. It is not clear what effect this would have on the estimates of work-related incidents, however comparison of compensation based statistics with ABS Survey of Employment Arrangements and Superannuation (SEAS)[22] data suggests that this distinction has less effect for longer term cases (such as full incapacity). Since the determination of work-relatedness in SEAS is conceptually similar to the method used for the WRIS, it is reasonable to assume that the same comparison will apply between the NDS and the WRIS. If this is the case, the effect on the level of total costs will be minor, since the largest contributors are long term injury or illness, where there are only minor differences between the surveys in terms of the definition of in-scope incidents.

57. For the 2009–10 financial year, the WRIS estimated that 640 700 workers (or 5.3 per cent of the working population) experienced a work-related incident. Of this total 410 600 workers did not receive compensation, either because no application was made or the application was rejected.

58. The WRIS also categorises incidents into days or shifts absent from work. Of the 410 600 workers experiencing a work-related injury that did not receive compensation, 209 300 lost part of a shift or experienced no time lost as a result of the injury. These incidents have been excluded from the analysis since they are likely to contribute only a negligible amount to total costs. While some incidents can reduce productivity without entailing any absence from work, their effect on productivity will be difficult to measure. For these reasons, cases with no absence from work and no lasting incapacity are excluded from the count of total cases.

59. Accepted workers' compensation claims from NDS were used as the basis for compensated cases, with the WRIS cases identified above (did not receive compensation with one or more days/shifts lost) forming the basis for the number of non-compensated cases. It is assumed that the distribution of incidents by severity category will be similar to the distribution for compensated (NDS) claims.

60. Additional estimates around disease morbidity have been included in this edition. Cases of work-related disease are known to be unreported in both workers'

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[22] ABS Catalogue 6361.0, Employment Arrangement and Superannuation, April to June 2007.

compensation data and through ABS surveys of the workforce. Disease classes such as neoplasm (cancers and tumours), asthma and other respiratory diseases and heart disease are common diseases resulting from workplace exposure. Table 1.5 shows the estimated number of disease morbidities in each of these groups. The estimates are based on a number of studies of population attributable fractions for workplace exposure. The additional disease morbidities estimated in this process are included in the non-compensated disease category (Table 1.6).

Table 1.5: Estimates of disease morbidity due to work-related exposures, 2008–09[a]

Disease	Morbidity estimate
Neoplasm [b]	5 000
Asthma [c]	3 000
Respiratory disease [c]	23 000
Heart disease [de]	30 000
Total	61 000

[a] Morbidity estimates are reported to the nearest 1000 cases
[b] Fritschi and Driscoll, *Cancer due to occupation in Australia*, Aust NZ J Public Health 2006; Vol 30.
[c] Australian Safety and Compensation Council, *Occupational Respiratory Diseases in Australia*, April 2006.
[d] Australian Institute of Health and Welfare, *Cardiovascular Disease: Australian facts 2011*, March 2011.
[e] Australian Safety and Compensation Council, *Work-related cardio-vascular disease Australia*, April 2006.

61. Applying these assumptions results in an estimate of 611 300 workers injured during 2008–09. Of these, 287 900 cases were not compensated and 353 200 received compensation. Table 1.6 summarises the distribution of total injured and ill workers from the combination of NDS data and the WRIS, by nature and duration. The summary applied to non-fatal cases only. The estimation of fatalities is discussed below.

Table 1.6: Work-related injuries (non-fatal) by duration of absence and nature, 2008–09[a]

	Time period	No compensation	Compensation	Total
Injuries	0–4 days	122 600	163 000	285 600
	5+ days	58 200	96 500	154 700
	Total	181 000	259 700	440 700
Disease	0–4 days	22 200	29 500	51 700
	5+ days	84 700	34 280	119 010
	Total	106 900	63 800	170 700
All incidents	0–4 days	144 800	192 500	337 300
	5+ days	143 100	131 000	274 000
	Total	287 900	323 500	611 300

Source: NDS data and ABS 6324.0, Work Related Injuries Survey, December 2009
[a] Totals are rounded to the nearest 100

62. The estimate of the number of cases derived from the combination of the WRIS and the NDS increased by 31 per cent between the 2000–01 estimate (350 200) and the 2005–06 estimate (457 700), and further 19 per cent between 2005–06 and 2008–09. Over the same period, the number of workers covered by workers' compensation grew by 21 per cent.

63. Estimates of fatal incidents are sourced from a separate project estimating the number of work-related fatalities, for injury and disease. Estimates of injury fatalities for 2008–09 are sourced from Safe Work Australia data publications[23]. Disease fatalities estimates are assumed to be a similar level to the previous study (2 210 total work-related disease fatalities). These disease fatality estimates are considered to be a conservative estimate. Studies using attributable fractions[24] derived from international research and applied to Australian cause of death data have estimated that there are between 2 300 and 7 000 deaths annually due to workplace exposure in Australia. These estimates replace the NDS totals for fatal claims, which are known to be an underestimate, particularly for disease claims. Table 1.7 summarises the distribution of work-related incidents by nature and severity category.

Table 1.7: Number and distribution of work-related incidents by severity category, 2008–09

			Short absence	Long absence	Partial incapacity	Full incapacity	Fatality	All Incidents
Injury	Compensated	Per cent	63	28	8	1	0*	100
		Number	163 000	73 000	22 000	1 500	276	259 800
	Not compensated	Per cent	68	24	7	0*	0*	100
		Number	122 600	44 000	13 300	900	124	190 900
Disease	Compensated	Per cent	46	32	21	1	0*	100
		Number	29 500	20 100	131 700	400	81	63 800
	Not compensated	Per cent	49	45	31	1	2	100
		Number	22 200	48 500	33 100	1 000	2 129	106 900
All cases	Compensated	Per cent	60	29	11	1	0*	100
		Number	192 500	93 100	35 700	1 800	357	323 500
	Not compensated	Per cent	50	32	16	1	1	100
		Number	144 800	92 500	46 400	1 900	2 253	287 900
	All cases	Per cent	55	30	13	1	0*	100
		Number	337 300	185 600	82 100	3 700	2 610	611 300

Sources: National Dataset for compensation based statistics (NDS) and ABS Work Related injuries Survey (WRIS)
* Percentage figures are rounded to the nearest 1%. Some figures that are less than 1% will appear as 0% in this table. For this reason, sub-totals may not match exactly with the relevant total.

64. The average duration of absence for each severity category is determined using NDS data. This data is presented in Table 1.8 below. The analysis is based on the

[23] Work-related Traumatic Injury Fatalities, Australia 2008-09. Safe Work Australia, December 2010.
[24] Attributable fraction methodology involves using available information and exposure to disease causing substances or situations in different occupations and industries to develop a proportion of particular diseases that could be caused by workplace exposure.

assumption that the characteristics of duration of absence are similar between compensated and non-compensated claims. Average duration for each group was defined as total time lost divided by the total number of compensated claims in each category.

65. These are conservative estimates of time lost, since they are based on compensation statistics that measure duration of absence only while compensation payments are occurring. However, the opposite may be the case for non-compensated cases, where duration of absence is potentially lower than compensated cases of a similar nature. Given the balance between compensated and non-compensated cases, these estimates are still likely to be conservative estimates of duration of absence before return to work.

66. The duration of absence figures in Table 1.8 are used to model the cost to the worker, in terms of lost wages of individuals in the human capital model. In the calculation of production disturbance costs, a maximum of four weeks of lost time is used to estimate employer costs, covering the period between the incident and the time when an injured or ill worker returns to work or is replaced.

Table 1.8: Average duration of absence (in weeks) by nature and severity category, Australia, 2008–09

	Short absence	Long absence	Partial incapacity	Full incapacity [a]	Fatality [b]
Injury	0.2	5.5	45.9	55.4	2.6
Disease	0.2	7.0	33.6	69.9	68.9

Source: National Dataset for compensation based statistics (NDS)

[a] Average time lost for full capacity cases is used to model the time in which the incident affects the employer. Since the worker is assumed to be permanently unable to return to work, the effects of the incident are assumed to incur costs to the worker and the community from the time of the incident.

[b] Average time lost for disease fatalities is estimated using a combination of duration of absence and the time period between occurrence and submitting a claim. This assumes for disease fatalities that a worker will experience a gradual onset of symptoms before a workers' compensation claim is filed, during which time their work performance will be affected.

Determining the average costs of a work-related incident

67. The average cost of a work-related incident was estimated by calculating the average cost associated with each relevant indirect cost item. These costs are then aggregated over each cost item to derive an overall estimate. Appendix 1 gives a detailed explanation of the estimation procedure applied to each item to derive a total average cost estimate.

68. Table 1.9 gives a summary of the average cost associated with each severity category, as well as the breakdown of the average cost to each economic agent. Typical unit costs for injury and disease incidents (averaged across severity categories) are estimated at $69 650 and $200 400 respectively.

Table 1.9: Average costs ($ per incident) for work-related incidents, Australia, 2008–09[a]

		Short absence	Long absence	Partial incapacity	Full incapacity	Fatality	Average
Employer	Injury	630	7 950	16 160	16 970	25 000	3 930
	Disease	770	9 910	12 170	14 800	63 350	9 670
Worker	Injury	140	3 160	453 410	1 438 420	1 300 000	46 090
	Disease	190	3 210	446 250	1 213 290	796 380	163 530
Community	Injury	1 930	16 840	59 830	1 582 680	725 000	19 630
	Disease	2 710	10 060	35 020	835 990	217 190	27 200
All	Injury	2 700	27 950	529 410	3 038 070	2 050 000	69 650
	Disease	3 670	23 170	493 440	2 064 070	1 076 920	200 400

Source: ASCC Estimation of indirect cost items (see Appendix 1 for more detail)
[a] Unit costs are rounded to the nearest $10.

Calculation and distribution of total costs

69. The total cost of work-related injury and disease is calculated by combining the information relating to the number of work-related incidents (Table 1.7) and the average cost of an incident by severity category (Table 1.9). Section 2 presents a summary of the application of this methodology.

SECTION 2. RESULTS

70. This section summarises the results obtained by applying the methodology from Section 1. In this analysis, unit (average) cost and total cost breakdowns are presented by a variety of factors, including location and industry of workplace, occupation, economic agent and the type and severity of the incident.

71. The cost of work-related injury and disease to workers, their employers and the community for the 2008–09 financial year data is estimated to be **$60.6 billion**. Injuries account for $30.7 billion of the total economic cost (51 per cent). The majority of cost is borne by individuals and society (95 per cent). Table 2.1 summarises the distribution of the total cost of work-related injury and disease by severity category, nature and the economic agent bearing the cost. These figures and the distributions presented in the following tables in this section are based on an 'ex-post' approach to assigning costs, where workers' compensation payments redistributed to workers are considered as a cost to society.

72. Under the 'ex-ante' approach, workers' compensation premiums paid by employers (estimated to be $6.5 billion in the 2008–09 financial year) are redistributed as a cost to employers rather than as payments transferred from society to injured workers. Under this assumption, the economic cost to employers would rise to $9.7 billion (16 per cent) and the community burden would be reduced to $6.2 billion (10 per cent). These totals are shown in Table 2.1. Because of the nature of the compensation based data on which total cases are based, it is not possible to provide the distribution of 'ex-ante' costs by the characteristics presented in Table 2.1 (severity type and nature).

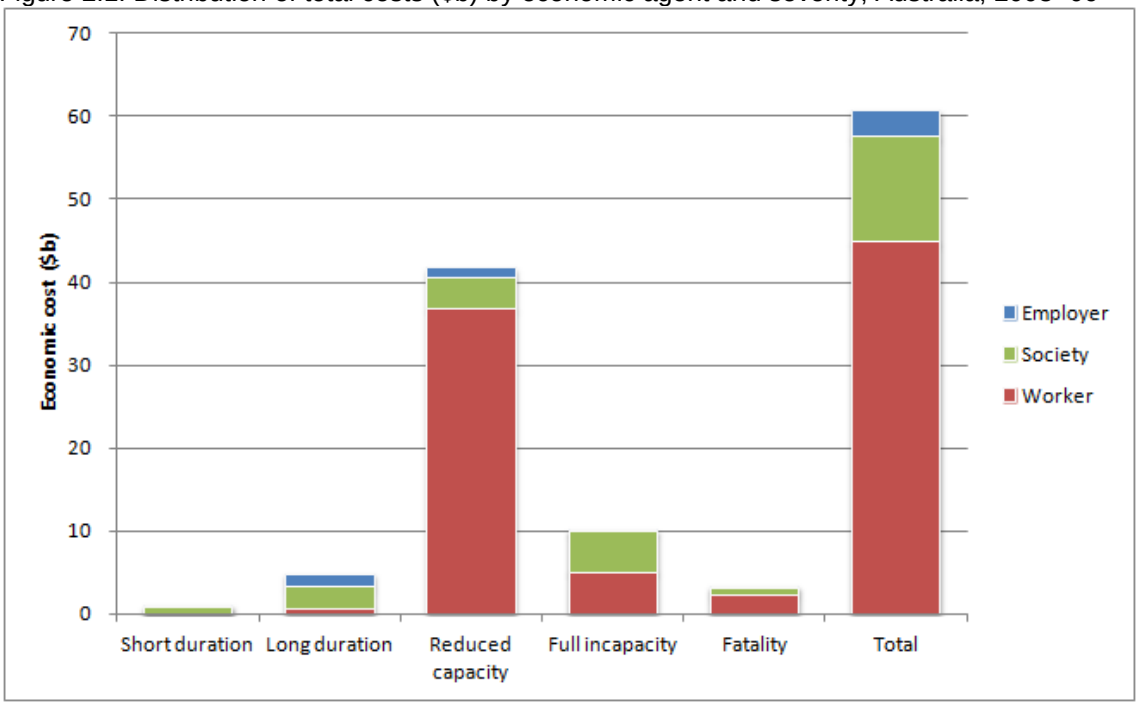
Table 2.1: Total costs of work-related injury and illness ($ million), Australia, 2008–09

		Short absence	Long absence	Partial incapacity	Full incapacity	Fatality	Overall cost (ex-post)	Overall cost (ex-ante)
Employer	Injury	200	900	600	0*	0*	1 700	
	Disease	0*	700	600	0*	100	1 400	
	Total						3 200	9 700
Worker	Injury	0*	400	16 000	3 400	500	20 300	
	Disease	0*	200	20 900	1 600	1 800	24 500	
	Total						44 900	44 900
Community	Injury	600	2 000	2 100	3 700	300	8 700	
	Disease	100	700	1 600	1 100	500	4 000	
	Total						12 700	6 200
All	Injury	800	3 300	18 700	7 100	800	30 700	
	Disease	100	1 600	23 100	2 700	2 400	29 900	
	Total	**900**	**4 900**	**41 800**	**9 800**	**3 200**	**60 600**	**60 600**

* Units are rounded to the nearest $100 million. Some sub-totals may not add due to rounding below $50 million. Sub-totals which are less than $50 million will appear as zero in this table.

73. Figure 2.1 presents the distribution of total economic costs by economic agent and severity category. The distribution is based on the 'ex-post' approach to assigning costs, where workers' compensation payments redistributed to claimants are considered to be a cost to society.

Figure 2.1: Distribution of total costs ($b) by economic agent and severity, Australia, 2008–09



74. The distribution of total economic costs of work-related injury and illness by the economic agent bearing the cost and the nature of the incident is presented in Table 2.2. The table also illustrates the unit cost of a typical incident in each of these categories.

Table 2.2: Total cost ($ billion) and average cost ($ per work-related incident) for work-related injury and illness, Australia, 2008–09

	Injury		Disease		Total	
	Total Cost ($ billion)	Unit cost ($ per incident)	Total Cost ($ billion)	Unit cost ($ per incident)	Total Cost ($ billion)	Unit cost ($ per incident)
Employer	1.7	3,900	1.4	8,200	3.1	5,100
Worker	20.3	46,100	24.5	143,500	44.8	73,300
Community	8.7	19,700	4.0	23,400	12.7	20,800
Total	**30.7**	**69,700**	**29.9**	**175,200**	**60.6**	**99,100**

75. Based on these estimates, the average cost to the individual is considerably higher for work-related diseases ($143 500) than for an injury ($46 100). In contrast, the cost to the community is not as dependent on the type of incident ($19 700 per incident for injury compared with $23 400 per incident for disease).

76. The average unit cost for a work-related incident, borne by all economic agents, is estimated at $99 100. Unit costs for diseases are estimated to be higher than unit costs for injuries ($175 200 compared with $69 700).

77. Table 2.3a shows the distribution of estimated total costs and unit costs by location (jurisdiction) of operation of the workplace. The differences in treatment of full

incapacity claims between jurisdictions are likely to have a significant effect on the distribution of total costs. Whilst some efforts have been made to ensure comparability between jurisdictions, the distribution of total costs by location should be considered as indicative only. Based on this distribution, New South Wales bears 34 per cent of the total cost from 35 per cent of total Australian cases.

78. The relative unit cost in each jurisdiction is also reflected in the total economic cost as a proportion of gross state product (GSP). The cost of injury and illness as a percentage of GSP is highest for the Australian Capital Territory and Queensland (6.2 per cent and 5.3 per cent), while the highest unit cost occurs for the Australian Capital Territory ($114 100 per case). Appendix 2 presents a more detailed distribution of total costs by jurisdiction.

Table 2.3a: Cost ($ million) of work-related injury and illness, by location of workplace, 2008–09[a]

Jurisdiction	Total Cost ($ million)			Economic cost %	Distribution (%)			Unit Cost
	Injury	Disease	Total	GSP/GDP[b]	Costs	Cases	Workforce	$/case
Australian Capital Territory[c]	900	800	1 700	6.2	2.8	2.4	1.8	114,100
Queensland	7 600	6 300	13 900	5.3	23.0	21.1	20.5	107,500
Tasmania	700	500	1 200	5.1	2.0	2.0	2.1	98,900
South Australia	2 000	2 100	4 100	5.0	6.7	7.7	7.2	87,100
New South Wales	11 100	9 200	20 300	4.9	33.5	35.1	31.4	94,700
Victoria	4 600	8 500	13 100	4.3	21.6	20.8	25.0	103,200
Northern Territory	300	300	600	3.5	1.0	1.0	1.1	97,700
Western Australia	3 400	2 300	5 700	3.1	9.5	9.9	10.8	94,300
Australia	**30 700**	**29 900**	**60 600**	**4.8**	**100.0**	**100.0**	**100.0**	**99,100**

[a] Units are rounded to the nearest $100 million
[b] Source: ABS State Accounts (Catalogue No. 5220.0), November 2010. Compared with 2009–10 estimates of reference year chained volume measures of GDP and GSP.
[c] In this analysis Commonwealth Government cases and costs are included in the ACT estimate. Workforce numbers have been adjusted to account for this.

79. Table 2.3b presents the distribution of total costs and estimated unit costs by the industry of the workplace. These figures are based on differences in the number and distribution of claims and average weekly earnings between each industry division. These results suggest that the distribution of costs between industry divisions is similar to that of the number of incidents. The most notable exceptions to this are the manufacturing industry, which bears 14 per cent of the cost from 16 per cent of the total number of incidents (with a unit cost of $85 900 per case), while Property and Business Services bears only 8 per cent of the total cost from 11 per cent of the total number of incidents (a low unit cost of $71 700 per case). The Manufacturing, Construction and Health and Community Services industries account for nearly 40 per cent of total costs. The Communication Services industry had the highest unit cost of $175 200 per case, however only 2 per cent of the total number of cases for Australia in 2008–09 occurred in the Communication Services industry.

Table 2.3b: Cost ($ million) of work-related injury and illness, by industry of workplace, 2008–09[a]

Industry division	Total Cost ($ million)			Distribution (%)			Unit Cost
	Injury	Disease	Total	Costs	Cases	Workforce	$/case
Manufacturing	4 400	4 200	8 600	14	16	9	85,900
Health and Community Services	3 300	3 700	7 000	11	12	11	97,700
Construction	3 400	3 000	6 400	11	9	9	110,600
Retail Trade	2 200	3 100	5 300	9	8	11	115,200
Transport and Storage	2 500	2 200	4 700	8	7	5	105,800
Property and Business Services	2 400	2 300	4 700	8	11	9	71,700
Education	1 700	2 400	4 100	7	6	8	103,700
Government Administration and Defence	1 600	1 700	3 300	6	7	10	78,000
Personal and Other Services	1 400	1 500	2 900	5	5	4	104,600
Wholesale Trade	1 700	900	2 600	4	5	4	93,600
Accommodation, Cafes and Restaurants	1 300	1 000	2 300	4	4	7	94,500
Agriculture, Forestry and Fishing	1 200	900	2 100	3	3	3	126,100
Mining	1 100	700	1 800	3	2	2	170,000
Cultural and Recreational Services	800	600	1 400	2	2	2	106,100
Finance and Insurance	600	700	1 300	2	1	4	157,100
Communication Services	500	600	1 100	2	1	2	175 200
Electricity, Gas and Water Supply	600	400	1 000	2	1	1	147,400
Australia	**30 700**	**29 900**	**60 600**	**100**	**100**	**100**	**99,100**

[a] Units are rounded to the nearest $100 million

80. Table 2.3c shows the distribution of total costs and unit costs by age[25] and sex for the 2008–09 financial year. These costs are calculated by combining the number of cases, average total earnings and the average age at incident for each of the specified age groups.

81. The calculation of human capital costs is based on a valuation of potential production forgone due to a work-related injury or disease. For this reason, the unit cost for younger employees will be significantly higher than for older employees due to the increased lost potential, calculated from the time of the incident to retirement age. This is reflected in Table 2.3c, which shows that the unit cost of a work-related injury or disease is significantly higher for the 15 to 24 and 25 to 34 years age group and decreases with increasing age.

82. The unit cost of a work-related injury or illness is significantly higher for males than for females. Incidents involving males account for over two thirds of the total economic cost while comprising just over 60 per cent of the total number of incidents.

[25] Age is defined as the age at the time of the incident or exposure leading to the injury or illness.

Table 2.3c: Cost ($ million) of work-related injury and illness, by sex and age group, 2008–09 [a]

Age group	Total Cost ($ million)			Distribution (%)		Unit Cost
	Injury	Disease	Total	Costs	Cases	$/case
15 to 24 years	5 700	7 500	13 200	22	17	127,500
25 to 34 years	7 500	7 300	14 800	24	18	137,100
35 to 44 years	8 300	7 600	15 900	26	20	129,000
45 to 54 years	6 800	6 200	13 100	22	25	85,900
55 years and over	2 400	1 200	3 600	6	20	29,000
Sex						
Female	10 000	11 000	20 900	34.6	38.2	89,600
Male	20 700	18 900	39 700	65.4	61.8	105,000
Australia	**30 700**	**29 900**	**60 600**	**100.0**	**100.0**	**99,100**

[a] Units are rounded to the nearest $100 million

83. Table 2.3d shows the distribution of economic costs by occupation. While Managers and Administrators and Advanced Clerical Workers have the highest unit cost ($670 500 and $508 200 respectively, due to their average wage level), they comprise only 3% of cases and 20% of costs.

84. Workers in occupations covering Tradespersons & related workers, Intermediate Production & transport workers and Labourers & related workers, while comprising 28% of the workforce, contribute 59% of total cases and 40% of total costs. This indicates that the rate of incidence for work-related incidents is very dependent on the occupation group. This is shown in Table 2.3d, where the three occupation groups mentioned above have a rate of incidence, with over 90 cases per 1000 workers, considerably higher than the rate of 54.5 cases per 1000 workers over all occupation groups.

Table 2.3d: Cost ($ million) of work-related injury and illness, by occupation group, 2008–09[a]

Occupation group	Total Cost ($million)			Distribution (%)			Incidence	Unit Cost
	Injury	Disease	Total	Costs	Cases	Workforce	/1000 workers	$/case
Managers & Administrators	3 500	6 100	9 600	16	2	9	14.2	670,500
Professionals	2 700	1 600	4 300	7	12	21	31.1	59,700
Associate professionals	2 600	2 700	5 300	9	7	12	30.2	129,700
Tradespersons & related workers	5 500	5 100	10 600	18	20	12	90.1	85,600
Advanced clerical , sales & service workers	1 100	1 500	2 600	4	1	3	14.7	508,200
Intermediate clerical, sales & service workers	4 100	4 400	8 500	14	12	17	37.4	120,600
Intermediate production & transport workers	3 600	1 600	5 200	9	17	8	120.0	49,800
Elementary clerical, sales & service workers	3 100	3 600	6 700	11	7	9	43.2	151,100
Labourers & related workers	4 600	3 300	7 900	13	22	8	140.1	60,500
Australia	**30 700**	**29 900**	**60 600**	**100**	**100**	**100**	**54.5**	**99,100**

[a] Units are rounded to the nearest $100 million

85. Table 2.3e shows the distribution of economic costs by cause of injury or illness (mechanism). Over one third of the total number of cases and total economic cost are associated with body stressing or manual handling cases. Mechanisms which are more associated with disease cases, such as sound and pressure, biological factors and mental stress have a higher unit cost than those largely associated with injuries (such

as falls and trips and body stressing). While mental stress cases comprise four per cent of the total number of cases, they contribute nine per cent of the total economic cost.

Table 2.3e: Cost ($ million) of work-related injury and illness, by cause of injury or illness, 2008–09 [a]

Mechanism	Total Cost ($ million)			Distribution (%)		Unit Cost
	Injury	Disease	Total	Costs	Cases	$/case
Fall, trips and slips of a person	6 400	2 300	8 700	14	18	78,000
Hitting objects	2 700	700	3 400	6	9	59,000
Being hit by objects	5 000	1 200	6 200	10	17	61,200
Sound and pressure	300	3 000	3 300	5	2	230,900
Body stressing	10 900	14 300	25 200	41	38	109,700
Heat, radiation and electricity	900	400	1 300	2	2	105,800
Chemicals and other substances	600	1 100	1 700	3	2	138,900
Biological factors	100	800	900	2	1	290,700
Mental stress	800	4 500	5 300	9	4	233,200
Other and unspecified mechanisms	3 100	1 600	4 700	8	8	100,700
Australia	**30 700**	**29 900**	**60 600**	**100**	**100**	**99,100**

[a] Units are rounded to the nearest $100 million

86. Table 2.4 shows the distribution of total and unit costs by severity category, differentiating between injuries and diseases. The table illustrates the significant differences in total and unit costs across severity categories.

Table 2.4: Unit costs ($ per incident) and total costs ($ million) of work-related injury and illness by severity and nature, 2008–09

		Short absence	Long absence	Partial incapacity	Full incapacity	Fatality	Total
Injury	Unit cost ($)	2 800	28 200	529 700	2 958 300	2 000 000	69 700
	Total cost ($m)	800	3 300	18 700	7 100	800	30 700
Disease	Unit cost ($)	1 900	23 300	493 600	1 928 600	1 127 300	175 200
	Total cost ($m)	100	1 600	23 100	2 700	2 400	29 900
All claims	Unit cost ($)	2 700	26 400	509 100	2 578 900	1 265 300	99 100
	Total cost ($m)	900	4 900	41 800	9 800	3 200	60 600

87. The share of costs borne by the individual and community rises sharply with severity. While employers and the community bear most of the cost of short-term injuries and diseases, the burden shifts to workers as the level of severity increases (Table 2.5). The majority of economic costs associated with full incapacity are borne by the community, through social welfare and other support schemes, and loss of potential (human capital).

Table 2.5: Distribution (%) of total cost of work-related injury and illness by severity category, 2008–09

	Short absence	Long absence	Partial incapacity	Full incapacity	Fatality	Overall
Employers (%)	22	33	3	0	3	5
Workers (%)	0	12	88	51	72	74
Community (%)	78	55	9	49	25	21
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**

88. The total cost of work-related injury and disease are spread across employers, workers and the community. It is estimated that:

- employers bear 5 per cent of the total cost – this includes loss of productivity from absent workers, recruitment and retraining costs and fines and penalties from breaches of work health and safety regulations,
- injured workers bear 74 per cent of the costs – costs include loss of current and future income and non-compensated medical expenses, and
- the community bears 21 per cent of the total cost – this includes social welfare payments, medical and health scheme costs and loss of potential output and revenue.

89. The burden of total cost borne by the economic agents has changed considerably from the 2000–01 estimate. The trend over the three iterations of this report have been for an increasing proportion of costs to be borne by workers and a decreasing proportion of costs borne by the community. In part, this is due to the growth in average weekly earnings. Between 2000–01 and 2008–09, average weekly earnings grew by 110%.

90. Human capital costs for workers are calculated as a residual between total human capital loss and deadweight loss to society from taxation and welfare redistributions. Since the former is a measure of lost future productivity, it is largely driven by the prevailing wage rate. However, transfer costs are related to unit health and welfare costs which are not directly related to wages. For this reason, the residual identity (human capital costs for workers) has shown significant increases (from 38 per cent of the total cost in the 2000–01 estimate to 55 per cent for the current estimate). This change has markedly shifted the distribution of costs between workers and the community since the original estimate was produced.

91. These figures are based on an ‘ex-post’ treatment of workers’ compensation premiums paid by employers (estimated to be $6.5 billion in the 2008–09 financial year), where the redistribution of premiums paid to injured workers is treated as a transfer cost to society. Under an ‘ex-ante’ treatment of costs, the $6.5 billion cost is transferred to employers, increasing the burden borne by employers to 16 per cent reducing the burden on the community to 10 per cent.

92. The actual cost borne by workers rises significantly with severity, with workers who are permanently incapacitated estimated to contribute, on average, over one million dollars in economic costs (including estimates for future income lost - see Table 1.9). The most severe incidents account for the bulk of total costs. Work-related injury and disease cases resulting in partial or full incapacity or fatality account for 90 per cent of

total costs from only 14 per cent total cases. Table 2.6 shows the distribution of claims and total costs by severity category and nature of incident.

Table 2.6: Distribution of costs and incidents (% of total costs and total incidents) of work-related injury and disease by severity, 2008–09

		Short absence	Long absence	Partial incapacity	Full incapacity	Fatality	All Incidents
Injury	Distribution of incidents (%)	65	27	8	1	0	**100**
	Distribution of total costs (%)	3	11	61	23	3	**100**
Disease	Distribution of incidents (%)	30	40	27	1	1	**100**
	Distribution of total costs (%)	0	5	77	9	8	**100**
All claims	Distribution of incidents (%)	55	30	13	1	0	**100**
	Distribution of total costs (%)	1	8	69	16	5	**100**

* Units are rounded to the nearest 1%. Cells accounting for less than 1% of the total cost will appear as zero in this table.

93. Generally, the more severe the incident, the higher the unit and total cost associated with that incident. Employers tend to bear most of the burden for minor and short-term incidents while the workers and the community bear a majority of the burden for more severe and longer-term incidents, such as full incapacity or fatality.

APPENDIX 1. INPUTS DERIVED IN THE PROCESS OF ESTIMATING TYPICAL COSTS

This appendix presents a detailed summary of the process and data sources used in estimating typical costs for a work-related incident in each severity category. A summary of the estimation of costs, and the key assumptions required, for each category of work-related incident is presented in Tables A1.1, A1.2 and A1.3 for cost items relevant to employers, workers and the community.

Table A1.1: Definitions, methods and assumptions for deriving key inputs, employer cost items

Cost Category (Conceptual Group)	Definition	Estimation
Cost of overtime and over-employment (PDC)	Proportion of overtime totally related to work-related injuries and wage of workers that would not be required if there were no work-related injuries.	Average weekly earnings x duration of absence in weeks x 0.4.
Employer excess payments (PDC)	Portion of the costs of a claim required to be paid by the employer before workers' compensation provisions begin.	Average cost per day per claim (estimated from NDS data) multiplied by 3.3 days.[b]
Staff turnover costs (PDC)	The costs to the employer associated with hiring new employees to replace injured or absent workers. This includes advertising costs and the costs associated with time spent in the recruitment process.	Turnover and recruitment costs are estimated to be equal in value to 26 weeks at average earnings less the amount simply 'brought forward' by work-related incidents.
Staff training and retraining costs (PDC)	The costs to the employer associated with training existing staff and retraining new staff. This could arise both from legislative requirements as a result of work-related incidents or simply the need to train staff with new skills as a result of increased responsibility or changed duties.	Average weekly earnings x 2.5.[c]
Medical threshold payments (MEDC)	Portion of workers' medical expenses to be met by the employer as part of employer excess provisions.	Average threshold medical payments, $500 in payments.
Legal fines and penalties (ADMINC)	Costs associated with successful prosecutions associated with proceedings initiated by workers' compensation authorities as a result of serious work-related incidents.	Average fine per conviction x number of convictions / total number of incidents. [d]
Investigation costs (ADMINC)	Costs associated with conducting an investigation into an incident and the administrative cost of collecting and reporting information on work-related incidents.	Workers' compensation expenditures relating to conducting investigations.

[a] For claims of longer duration or severity (such as full incapacity and fatality), the injured worker is assumed to be replaced after 8 weeks. The distribution of labour on-costs is based on data from the ABS Major Labour Costs survey, and includes costs such as payroll tax and superannuation.

[b] Employer excess provisions differ between jurisdictions, both in terms of nature and period. The most common form of employer excess is 4 days, where the employer is liable for the costs associated with the first four days of a claim. However, some jurisdictions require no employer excess provisions. The weighted average of the excess period over each jurisdiction is 3.3 days. For severity category 1 the actual days lost are used in this calculation. For other categories, 3.3 days is used to proxy employer excess payments.

[c] Training and re-training are assumed to occupy approximately 2 ½ weeks, covering both the time of the worker and also any training responsibilities of existing staff.

[d] Based on CPM estimates, the average fine per conviction is $45 000 and the prosecution rate is assumed to be 3% of incidents for full incapacity and 50% of incidents for fatalities.

Table A1.2: Definitions, methods and assumptions for deriving key inputs, worker cost items

Cost Category (Conceptual Group)	Definition	Estimation
Loss of current income (PDC)	Difference between pre-injury earnings and earnings following a work-related incident in the time following the incident to return to duties earnings less workers' compensation and social welfare payments.	Residual item, Total PDC less employer and society share of PDC.
Loss of future earnings (HKC)	Where the work-related injury or disease prevents natural career advancement and results in the worker being employed in a lower paid job, suffers a full incapacity or premature death.	Difference between expected future earnings in the absence of a work-related injury or disease and expected future income following the incident.[a]
Medical and rehabilitation costs (MEDC)	Expenditure on medical treatment not compensated via workers' compensation payments or government assistance.	The difference between medical costs incurred less medical payments covered by workers' compensation less government rebates.[b]
Travel expenses (ADMINC)	Expenses for travel to doctors, rehabilitation centres, solicitors etc., less costs made in form of direct payments already included in the direct costs estimate.	Estimated from workers' compensation payments made for travel expenses (6% of NDS non-compensation payments).
Legal costs (ADMINC)	Legal costs and expenses, less costs made in form of direct payments already included in the direct costs estimate.	Difference between the average legal costs and overheads for a dispute and the amount received in compensation for legal costs.[c]
Funeral costs (ADMINC)	Real costs of bringing forward a funeral.	Average funeral costs are estimated at $4 000. Brought forward funeral costs are the discounted present value of a funeral at the time of life expectancy compared with the age at the time of the incident.
Carers (OTHERC)	For full incapacity cases only, the present value of future costs for carers.	Estimated applicable Disability Support Pension payments of $2 056 per annum, discounted to present value over the period between the incident and reduced life expectancy.
Aids and modifications (OTHERC)	For full incapacity cases only, the present value of future costs for aids and modifications.	Estimated applicable Disability Support Pension payments of $646 per annum, discounted to present value over the period between the incident and reduced life expectancy.

[a] Workers are assumed to increase productivity (through experience and job knowledge) at the rate of 1.75% per annum. This figure is used in conjunction with discount and inflation rates to determine the present value of future income streams.

[b] Medicare covered services that are bulk-billed are assumed to incur no cost to the individual. Workers are assumed to bear 15% of the total cost of the services when that service is not bulk-billed and covered by Medicare. On average, 47% of total costs result from Medicare covered services, with the remaining 53% of costs available to be covered by private health insurance. Private health insurance covers 44% of cases, with the worker paying the gap payments of 5% on these costs. The costs of the remaining services are fully borne by the individual.

[c] Average legal costs and overheads per dispute are estimated to be $11 970 per dispute. According to CPM data, disputes occur at a rate of 1 dispute per 8 claims. Average compensation for legal costs varies according to the severity of the incident, but comprises 62% of non-compensation payments.

Table A1.3: Definitions, methods and assumptions for deriving key inputs, community cost items

Cost Category (Conceptual Group)	Definition	Estimation
Lost revenue (PDC/HKC)	The potential revenue lost when a worker suffers reduced earning capacity due to severe work-related incidents.	The taxation value of the present value of all future earnings over the period in which the individual is unable to work or that is lost though premature fatality.[a]
Social welfare payments (PDC/HKC)	Sickness and social welfare payments borne by the government for people with disabilities or the unemployed.	Average cost per recipient of social welfare programs.[b]
Health and medical costs (MEDC)	Costs borne by the government through the provision of subsidised hospital, medical and pharmaceutical services.	Total Medicare costs that are not borne by the worker.
Rehabilitation (MEDC)	Expenditure on vocational education and training, special treatments etc.	Average cost of rehabilitation service (per recipient) reported by the Commonwealth Rehabilitation Service (CRS).[c]
Inspection and investigation costs (ADMINC)	Costs incurred by the agency responsible for conducting inspections and investigations.	Average cost per inspection reported by workers' compensation jurisdictions.
Travel concessions for full incapacity (ADMINC)	Travel concessions and other allowances offered in cases where return to work is not possible.	Expenditure on travel costs by workers' compensation jurisdictions as a proxy for travel concessions.[d]
Transfer costs (TRANC)	Deadweight costs of welfare payments and tax loses.	

[a] Based on average weekly earnings over the period of lost earnings, with an average taxation rate of 40%. Savings, inflation and productivity rates are also applied in determining the present value of future income streams. This total is split into short and long term costs. Short terms costs are incurred in the period between the incident and return to work, while long term costs are incurred in the period following nominal return to work or replacement and retirement or to reduced life expectancy.

[b] Workers who suffer severe incidents are assumed to rely on the Disability Support Pension (average cost per case is $111 223 p.a.) following a period of compensation (for compensated incidents).

[c] Workers who suffer a full incapacity are assumed to rely on the CRS (average cost per case is $4 000 p.a.) following the period of compensation (zero for non-compensated incidents).

[d] The community is assumed to match compensation payments for travel costs 1–1 with the individual, in effect assuming a 50 per cent travel concession for severely incapacitated workers.

Tables A1.4 and A1.5 summarise some relevant information and estimates as required in the process of deriving typical costs for a work-related incident. These include derivation of inflation and savings rates, average age at the time of the incident by nature and severity category and average cases costs for various types of payments (such as medical, legal and travel costs).

Table A1.4: Parameters required for cost estimation

Item	Description	Estimate
Average earnings	Proxy for productivity, ABS Employee Earnings and Hours survey (ABS Cat. No. 6306.0), May 2010. Average weekly total earnings, persons, all employees.	$1 313 pw $1 370 pw + overtime
Discount rate	Opportunity cost of money: Average of rates of return for private and government saving instruments and RBA target for January 1990 to June 2009 (RBA table F2).	6.00% p.a.
Inflation rate	Average of annual weighted ABS Consumer Price Index (CPI, ABS Catalogue 6401.0), March 1993 to June 2009.	2.60% p.a.
Productivity rate	Annual increase in workers' productivity. Commonwealth Government Intergenerational Report.	1.75% p.a.
Bulk-billing rate	Proportion of consultations that are bulk-billed (source: DoHA Medicare statistics).	74.0% of cases
Private Health Insurance take-up	Private Health Insurance Administration Commission (PHIAC) estimates of coverage of health insurance, September 2007.	43.0% of cases
Reduced life expectancy for long term cases	AIHW Healthy Life Expectancy (HALE) (Source: AIHW Mortality, Life Expectancy, www.aihw.gov.au/mortality/data/life_expectancy.html).	73 years
Retirement age	Median retirement age of older Australians (Source: ABS Retirement and Retirement Intentions, December 2009, ABS Catalogue 6238.0).	64 years
Average time to settlement of claims	Average of weighted average of expected term to settlement (Workers' compensation jurisdiction annual reports, 2000–01).	3 years
Average overtime pay rate	Difference between average weekly ordinary time earnings and average weekly earnings (Source: ABS Employee Earnings and Hours, May 2010, ABS Catalogue 6306.0).	4.5%
Medical costs[a]	Total medical costs per claim: 72% of goods and services payments per claim, by severity and nature (NDS).	Dependent on severity category (Table A2)
Travel costs[a]	Total travel expenses per claim: 6% of non-compensation payments per claim, by severity and nature (NDS).	Dependent on severity category (Table A2)
Pain and suffering costs[a]	Compensation for pain and suffering: 19% of compensation payments per claim, by severity and nature (NDS).	Dependent on severity category (Table A2)

[a] See table A2 for estimates by severity category and nature

Average earnings used in present value calculations for lost income and lost productivity estimates are based on ABS estimates of ordinary time and total earnings for all employees (full-time and part-time, managerial and non-managerial). While the majority of work-related injury and illness cases are likely to occur to non-managerial employees, the exact composition of cases for this dimension is only estimable for compensated cases.

For this reason, we adopt the approach of using the all employees average weekly earnings from AWE as the standard wage rate, noting that Appendix 3 presents a summary of the sensitivity of the cost estimate to changes in key parameters such as average earnings.

Analysis of the distribution of age at the time of the incident (based on NDS data for compensated cases) suggests that the average ages presented in Table A1.5 are reasonable estimates for the age for a typical case. While the distributions of age for

each severity category are positively skewed, in most cases there is little difference between the average value and the median value.

Table A1.5: Parameters specific to severity and nature categories

Item	Unit		Short absence	Long absence	Partial incapacity	Full incapacity	Fatality
Average duration of absence	Days	Injury	1.1	27.3	229.3	276.9	43.6
		Disease	0.9	35.1	168.2	394.4	21.9
Average age at incident	Years	Injury	33	35	41	37	37
		Disease	37	39	42	46	51
Average medical cost	$/claim	Injury	$500	$2 300	$12 800	$13 375	$2 930
		Disease	$500	$2 040	$5 950	$11 325	$590
Average investigation cost	$/incident		$28	$527	$832	$2 374	$2 840
Average travel costs	$/claim	Injury	$4	$30	$322	$730	$0
		Disease	$23	$45	$344	$953	$455
Medicare coverage of costs	%	All claims	66%	30%	17%	12%	6%

Source: NDS dataset for Compensated Statistics.

Table A1.6 summarises the calculated items that comprise the total costs estimate. The table shows the major cost groups and categories, with costs further divided into burden by economic agent. Table 2.1 on page 27 of this report presents these figures with a breakdown by severity and nature of incident, using the classifications created in Tables A1.1 to A1.3.

Table A1.6: Summary of cost estimates for injury and illness, $m, 2008–09[a]

Total Costs	Total		Employer		Worker		Society	
Production disturbance costs (PDC)			Value of production				Welfare payments	334
			Employer excess	206			Tax revenue foregone	366
			Sick leave	528			Compensation payments [c]	514
	Value of production	4 361	VOP(E)	1 454		–	VOP(S)	
	Staff turnover	323	Staff turnover	323		–		–
	PDC	**4 685**	**PDC(E)**	**2 511**	**PDC(W)[b]**	**960**	**PDC(S)**	**1 214**
Human Capital costs (HKC)							Welfare payments	874
							Tax revenue foregone	1 379
							Compensation payments [c]	7 186
	HKC	**52 378**	**HKC(E)**	**–**	**HKC(W)[d]**	**32 939**	**HKC(S)[c]**	**9 439**
Medical costs (MEDC)					Gap/Private	351	Medical	1 016
					Rehabilitation	–	Rehabilitation	307
	MEDC	**1 787**	**MED(E)**	**114**	**MED(W)**	**351**	**MED(S)**	**1 322**
Administration costs (ADMINC)			Legal costs	449	Legal costs	361	Legal costs	88
			Penalties	10			Penalties	–
							Deadweight loss	1
	Legal costs	900	Legal costs	459	Legal costs	361	Legal costs	79
	Investigation costs	479	Investigation costs	89			Investigation costs	390
	Travel costs	479			Travel costs	71	Travel costs	21
	Funeral costs	4			Funeral costs	4	Funeral costs	0
	ADMINC	**1 475**	**ADMINC(E)**	**549**	**ADMINC(W)**	**436**	**ADMINC(S)**	**490**
Transfer costs (TRANSC)							Welfare deadweight loss	60
							Tax deadweight loss	163
	TRANSC	**223**		**–**		**–**	**TRANSC(S)**	**223**
Other costs (OTHERC)					Carer costs	123		
					Aids and modifications	39		
	OTHERC	**162**		**–**	**OTHERC(W)**	**162**		**–**
Total [e]		**60 700**		**3 173**		**44 848**		**12 689**

[a] Figures are rounded to the nearest $10 million
[b] PDC(W) = PDC – [PDC(E) + PDC(S)]
[c] Total compensation payments are estimated at $7.7 billion, of which $562 million are short term (the period up to return to work or replacement) and $7.14 billion are long term payments (following return to work or replacement).
[d] HKC(S) = Weflare(S) + Tax(S) + CompPay(S) => HKC(W) = HKC – HKC(S)
[e] Total = PDC + HKC + MEDC + ADMINC + TRANSC + OTHERC

APPENDIX 2. ECONOMIC COSTS BY JURISIDCTION

Table 2.3a in Section 2 shows a summary of total and unit costs by jurisdiction. This appendix expands on the information presented in the main body of the report by presenting a summary of costs by severity and cost category at the state level.

Table A2.1 below summarises total costs by jurisdiction for the economic agents included in the model and the major conceptual groups from Table 1.1.

Table A2.1: Cost of work-related injury and illness for Australian jurisdictions, by economic agent, conceptual cost category and severity category. 2008–09 ($ million) [a].

Category		New South Wales	Victoria	Queensland	Western Aust.	South Aust.	Australian Capital Territory	Tasmania	Northern Territory	Australia
Economic agent	Employers	1 100	670	730	310	220	90	60	30	3 210
	Workers	14 410	10 640	10 020	3 720	2 740	1 120	810	400	43 860
	Society	4 790	1 790	3 150	1 660	1 130	490	330	170	13 510
Conceptual category	Production disturbance	1 690	1 030	1 150	490	330	140	90	50	4 970
	Human capital	17 230	11 270	11 830	4 830	3 460	1 450	1 010	520	51 600
	Medical	640	390	430	170	140	40	40	20	1 870
	Administration	530	280	350	160	120	40	30	20	1 530
	Transfer	150	90	100	40	30	10	10		430
	Other Costs	60	30	40	20	10				160
Severity category	Short absence	370	130	210	140	100	40	20	10	1 020
	Long absence	1 760	730	1 160	580	390	170	120	60	4 970
	Partial incapacity	13 560	9 600	9 280	3 650	2 710	1 080	780	380	41 040
	Full incapacity	3 590	1 750	2 420	1 100	750	330	220	110	10 270
	Fatality	1 000	690	790	250	180	100	60	40	3 110
Total		**20 300**	**13 100**	**13 900**	**5 690**	**4 090**	**1 700**	**1 200**	**600**	**60 600**

[a] Units are rounded to the nearest $10 million

The basic pattern of distribution of costs, by of the categories in Table A2.1, shows very little variation between jurisdictions. This is particularly the case for conceptual cost categories, where around 85 per cent of total costs are categorised as human capital costs.

The relative cost borne by workers and society shows some variance between jurisdictions, from a low of 65 per cent borne by workers in Western Australia to a high of 81 per cent in Victoria.

Queensland and the Northern Territory also show a higher percentage of costs from fatal incidents (over 6 per cent of total costs) than other jurisdictions (the Australian average is 5 per cent). In the case of the Northern Territory, this is offset by a lower contribution of costs for temporary cases (13 per cent compared with the Australian average of 16 per cent contribution from partial incapacity cases).

APPENDIX 3. SENSITIVITY ANALYSIS

During the process of estimating the total costs of work-related injury and illness, a number of assumptions concerning key parameters and distributions are required. In some cases, these are guided by available data or studies but it is not always possible to isolate parameters in this way.

This section of the report analyses the effects on the overall cost estimate from changes in key parameters and assumptions, including:

- average weekly earnings
- formulation of the discount rate for present value calculations
- retirement age
- average life expectancy
- medical costs of uncompensated cases compared with compensated cases
- level of earnings following return to work for severity category 3 (temporary incapacity and return to work with reduced capacity)
- average Tax revenue foregone from injured workers
- non-compensated disease fatalities, and
- definition of total cases.

Table A3.1 presents a summary of the possible range of estimates for key parameters that are used in the analysis.

Table A3.1: Parameter estimates

Parameter	Baseline estimate in study		Lower bound	Upper bound
Ordinary time earnings/Total earnings (AWE ABS 6306.0)	ABS AWOTE AWE	$1 313 pw $1 370 pw	$1 212 pw $1 265 pw (Adult non-managerial)	$1 400 pw $1 450pw (Adult full time)
Savings rate	Average investment rates, January 1990–2006 (RBA Bulletin)	6.0% pa	7.80% (Average investment rates, Jan 1982–2006)	5.80% (actuarial estimates for CPM project)
Inflation rate	Average quarterly CPI growth, March 1990–2006 (ABS CPI)	2.6% pa	2.50% (Average CPI growth March 2000–2009)	3.50% (Average CPI growth March 1982–2009)
Discount rate	Savings – inflation	3.4% pa	5.3%	2.30%
Retirement age	Median age of retirement, ABS 6238.0	64 years	n/a	67 years
Reduced life expectancy	Healthy life expectancy (AIHW)	73 years	70 years	75 years
Medical costs of uncompensated cases		100%	75%	n/a
Level of earnings following return to work		64%	75%	50%
Average tax rate for foregone revenue		25%	20%	50%
Non-compensated disease fatalities	NOHSC estimate of total work-related disease fatalities	2 087	0 (NDS data only)	7 500 (NOHSC estimate of upper bound for work-related disease fatalities)

Table A3.2 summarises the range of cost estimates by applying (where appropriate) the range of parameters value specified in Table A3.1, holding the values of all other parameters and estimates to their baseline values.

These results indicate that a reasonable range of cost estimates could be derived to lie between $47 billion and $78 billion. The results of this sensitivity analysis also indicate that the estimate of costs is reasonably robust to changes in the parameter estimates and assumptions. The parameter estimates that appear most crucial to the estimated level of costs are the definition of earnings, the discount rate used for present value calculations and the estimated average of pre-injury earnings following return to work.

The discount rate in these calculations is calculated by subtracting the inflation rate from the savings rate. The productivity rate (which is not varied in this analysis) is also applied for present value calculations involving real wages.

The results presented in Table A3.2 support the view that the level of total costs presented in Section 2 is a conservative estimate, since the **$60.6 billion** baseline estimate lies further towards the lower end of the estimated range.

Table A3.2: Cost estimate ranges for selected parameter changes

Parameter	Parameter range (baseline parameter)	Lower bound for total costs ($ million)	Upper bound for total costs ($ million)
Ordinary time and total earnings	$1 212 – $1 265 pw $1 400 –$ 1450 pw	56 200	63 900
Discount rate	2.3% – 5.3% pa (3.4% pa)	51 300	67.200
Retirement age	67 years (64 years)	n/a	66 400
Reduced life expectancy	70 – 75 years (73 years)	60 600	60 600
Medical costs of uncompensated cases	75% – 100% (100%)	60 500	n/a
Level of earnings following return to work	75% – 50% (64%)	47 100	77 700
Average tax rate for foregone revenue	20% – 50% (25%)	60 600	60 900
Non-compensated disease fatalities	0 – 7 500 (2 087)	58 200	66 700

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