WORK-RELATED INJURIES IN AUSTRALIA, 2005–06

The impact of shiftwork on work-related injuries in Australia

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safe work australia

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Foreword

Safe Work Australia principally uses workers' compensation claims data to measure occupational health and safety (OHS) performance in Australia. The claims data are collated in the *National Data Set for Compensation Based Statistics* (NDS) and are published annually in the *Compendium of Workers' Compensation Statistics*, *Australia*. This publication is a key reference documenting patterns of work-related injuries and diseases and their causes in Australian workers. For the purposes of this report, the expression 'work-related injury' will be used to represent all work-related conditions, including work-related diseases.

While the NDS is a valuable tool for monitoring OHS, it does not provide information on work-related injuries for groups not well covered by workers' compensation schemes, such as self-employed workers. It is estimated that workers' compensation schemes, and therefore the NDS, covered only 88%[1] of the workforce in 2005–06. The NDS is also unable to provide any information on work-related injuries where workers' compensation was not sought. Therefore, although the NDS generally provides a good picture of the characteristics of work-related injuries, it underestimates the true number of work-related injuries occurring each year.

To address this situation, the National Occupational Health and Safety Commission (now known as Safe Work Australia) agreed to contribute funding towards a national survey of work-related injuries run by the Australian Bureau of Statistics (ABS) as part of the Multi-purpose Household Survey. The *Work-Related Injuries Survey* (WRIS) was conducted for the period 2005–06 with results released in December 2006. In this survey, participants aged 15 years and over, were asked to recollect and relate a range of details about their most recent work-related injury or illness, no matter how minor, that occurred within the last 12 months. The survey also collected information on labour force characteristics (e.g. industry, occupation) and personal demographics (e.g. age, sex) which are useful when making comparisons to the NDS. The WRIS also collected information on employment arrangements, such as whether the worker worked under shift arrangements, worked part-time or had access to paid leave. This type of information is not collected in the NDS. Importantly, the WRIS survey also collected information about whether or not workers' compensation was sought, and if not, why not.

This report is one in a series of reports that explore specific topics related to work-related injuries.

[1] The percentage of employees is calculated from the Australian Bureau of Statistics, *Work-related Injuries Australia* (Cat. No. 6324.0)

Contents

Summary of findings

The main findings of this report are summarised below:

- In 2005–06, 16% of Australian workers worked under shift arrangements yet they had 27% of the work-related injuries.
- Shiftworkers had higher rates of work-related injury than non-shiftworkers.
  - o Incidence rates — Shiftworkers: 114 injuries per 1000 shiftworkers; Non-shiftworkers: 60 injuries per 1000 non-shiftworkers
  - o Frequency rates — Shiftworkers: 69 injuries per million hours worked; Non-shiftworkers: 35 injuries per million hours worked
- Female shiftworkers had higher frequency rates of work-related injury than male shiftworkers. This finding is counter to the rates of work-related injury in male and female non-shiftworkers.
  - o Shiftworkers — Female: 81 injuries per million hours worked; Male: 62 injuries per million hours worked
  - o Non-shiftworkers — Female: 31 injuries per million hours worked; Male: 37 injuries per million hours worked
- Female shiftworkers were particularly at risk of work-related injuries in Clerical, sales and service occupations, while male shiftworkers were particularly at risk in Labourer and related worker occupations.
- Both shiftworkers and non-shiftworkers were more likely to incur work-related injuries during their first six months of employment than after their first six months of employment. Furthermore, a greater proportion of injuries that occurred to shiftworkers occurred in the first 6 months of employment than occurred to non-shiftworkers in the same initial period of employment.
- The frequency rate of work-related injuries that occurred to shiftworkers is negatively related to normal working hours: Shiftworkers that worked only a few shifts per week had considerably higher frequency rates of work-related injury compared to shiftworkers (and non-shiftworkers) whose normal working hours were between 35 and 40 hours per week.
- Shiftworkers who worked less than 30 hours per week were typically young (less than 25 years old) and large proportions worked in Elementary clerical, sales and service worker, Intermediate clerical, sales and service and Labourer and related worker occupations.
- High incidence rates of injury were not due to lack of Occupational Health and Safety (OHS) training. More shiftworkers received OHS training than not, and a greater proportion of shiftworkers received OHS training than non-shiftworkers.

Introduction

Shift arrangements are defined as a system of working whereby the daily hours of operation at the place of employment are split into at least two set work periods (shifts), for different groups of workers. In 2005–06, over 1.6 million workers, 16% of the working population, worked under shift arrangements.

The effect of shiftwork on worker health and safety has been a focus of research for many decades. Shiftwork has been associated with detrimental effects on mental health, a variety of illnesses such as gastrointestinal disease and cardiovascular disease and also with higher rates of miscarriage and premature birth for female shiftworkers compared with female non-shiftworkers[2,3]. Worker safety declines over successive night shifts, with increasing hours of duty and between successive rest breaks[4]. Higher risks of work-related injury are usually attributed to fatigue and disturbances to circadian rhythms and young workers are considered to be more tolerant of shiftwork than older workers. However, much of the research is old, and has focussed on specific industries, night shiftworkers and/or has been conducted outside Australia. Information on general trends and a comprehensive picture of work-related injuries incurred by current Australian shiftworkers is therefore lacking.

In the ABS' *Work-related injuries survey* (WRIS) participants were asked whether or not they worked under shift arrangements in their current job and in the job where their work-related injury occurred. Data from the WRIS provides an opportunity to investigate factors associated with work-related injuries in Australian shiftworkers. The aim of this report is to identify any demographic factors (age, sex) or labour force characteristic (industry, occupation) that affected the likelihood of shiftworkers incurring a work-related injury. In addition, the report aims to identify which mechanisms of work-related injury (if any) were most likely to cause injuries amongst shiftworkers and whether or not particular types of injury were more or less common amongst shiftworkers compared with non-shiftworkers.

[2] Knutsson A. 2003. Health disorders of shift workers. *Occupational Medicine,* 53: 103-108
[3] Harrington J.M. 2001. Health effects on shift work and extended hours of work. *Occupational and Environmental Medicine,* 58: 68-72
[4] Folkard S. & Tucker P 2003. Shift work, safety and productivity. *Occupational Medicine,* 53: 95-101

General trends

In 2005–06, shiftworking arrangements were used in a wide range of industries and occupations, however just four of the 17 industries employed more than 60% of all shiftworkers. These were the Health and community services, Retail trade, Manufacturing and Accommodation, cafes and restaurants industries. Overall slightly under half (45%) of all shiftworkers were female, however in some industries shiftworkers were dominated by one sex. For instance, 80% of shiftworkers in the Health and community services industry were female whereas 83% of shiftworkers in the Manufacturing industry were male.

Although shiftworkers comprised 16% of the working population they incurred 27% of all work-related injuries. The 183 600 work-related injuries to shiftworkers reported in 2005–06 equates to 114 injuries per 1000 shiftworkers. This was nearly double the rate of injuries for all workers of 64 injuries per 1000 workers.

Sex

The data presented in Table 1 show that male and female shiftworkers had similar incidence rates of work-related injury; 115 and 112 injuries per 1000 shiftworkers respectively. This contrasts with non-shiftworkers where males had a noticeably higher incidence rate of injury than female non-shiftworkers. Shiftworker incidence rates were also considerably higher than the incidence rates of non-shiftworkers. Male shiftworkers had more than one and a half times the rate of male non-shiftworkers while female shiftworkers had two and a half times the rate of female non-shiftworkers.

Differences in the number of hours worked between men and women can be controlled by expressing work-related injuries as a frequency rate (number of work-related injuries per million hours worked). As can be seen in Table 1, female shiftworkers had approximately 20 more injuries per million hours worked than male shiftworkers. This equates to a 30% higher risk of injury per hour worked for female shiftworkers compared to male shiftworkers and is quite different to the pattern for non-shiftworkers, where females had a lower frequency rate of work-related injuries than males.

Table 1 Work-related injuries: number, incidence rate (injuries per 1000 workers) and frequency rate (injuries per million hours worked) by sex and shiftwork arrangements

Shift arrangements	Number of workers	Number of injuries	Incidence rate	Frequency rate
Male				
Shiftworkers	892 400	102 600	115	62
Non-shiftworkers	4 638 100	335 000	72	37
Female				
Shiftworkers	724 300	81 000	112	81
Non-shiftworkers	3 769 500	170 900	45	31
Total				
Shiftworkers	1 616 700	183 600	114	69
Non-shiftworkers	8 407 600	506 000	60	35

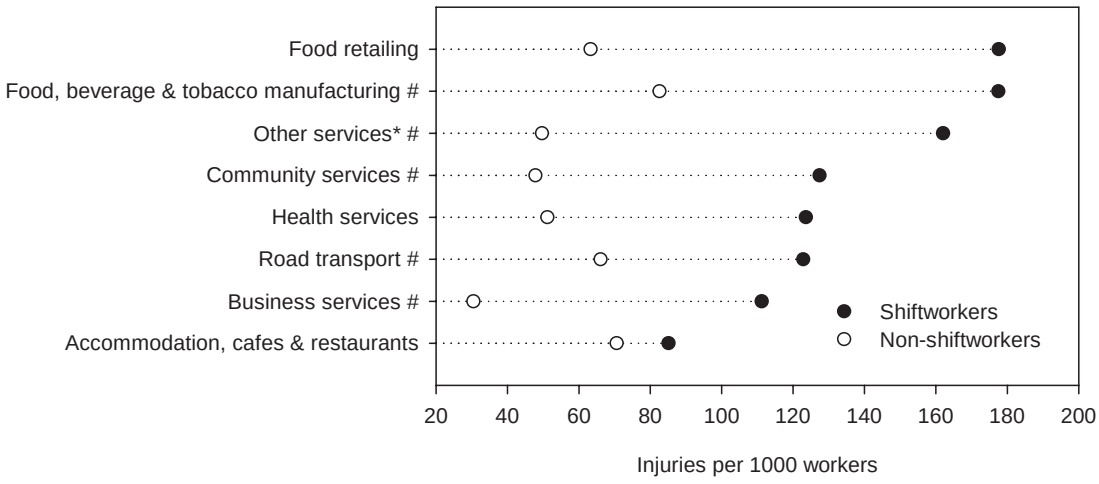
Industry

The Accommodation, cafes and restaurants industry and the Health and community services industry had the highest proportions of workers working under shift arrangements in 2005–06 (41% and 36% respectively). Of the 183 600 shiftworkers who reported an injury, the greatest numbers occurred in the Health and community services (45 700 injuries), the Retail trade (32 700 injuries) and the Manufacturing (24 200 injuries) industries, which together accounted for 56% of all work-related injuries occurring to shiftworkers.

It is difficult to compare incidence rates of injury between shiftworkers and non-shiftworkers at the broad industry classification level because shiftworkers and non-shiftworkers often occupy different types of jobs within each industry. However, Figure 1 shows the incidence rates of work-related injury in the top eight industry subdivisions based on the number of injuries incurred by shiftworkers. With the exception of workers in the Accommodation, cafe and restaurant industry, shiftworkers on average experienced twice the rate of injury of non-shiftworkers.

The different types of work undertaken by shiftworkers and non-shiftworkers can be controlled within the Health and community services and the Retail trade industries by examining and comparing incidence rates at the industry subdivision level; Health services and Food retailing. Both these industry subdivisions accounted for large percentages of the shiftworkers and non-shiftworkers within the broad industry classification (Health services: 83% of shiftworkers, 68% of non-shiftworkers; Retail trade: 65% of shiftworkers, 30% of non-shiftworkers). These industry subdivisions also accounted for 21% and 15% respectively of all the injuries that occurred to shiftworkers. In both these industry subdivisions the incidence rate was substantially higher in shiftworkers than non-shiftworkers despite these groups of workers being likely to undertake similar types of tasks.

Figure 1 Work-related injuries: incidence rates by shiftwork arrangements and industry subdivisions with the greatest number of injured shiftworkers**



** Other services are part of the Personal and other services industry. It includes people working in public order and safety such as the police, fire brigade and corrective centres.*
*** Industry subdivisions are presented in descending order of incidence rates of injuries. Health services and Food retailing accounted for the greatest proportions of shiftworker injuries.*
 # Due to these data having relative standard errors between 25% and 30% they should be interpreted with caution.

The proportion of shiftworkers by sex varied considerably between industries. Whereas 83% of shiftworkers in the Manufacturing industry were male, 80% of shiftworkers in the Health and community service industry were female. In contrast the Accommodation, cafes and restaurants and Cultural and recreational service industries had similar numbers of male and female shiftworkers.

Table 2 profiles four industries with large numbers of shiftworkers. This table shows that male shiftworkers in the Health and community services industry had considerably higher rates of work-related injury than female shiftworkers. In contrast, female shiftworkers in the Retail trade industry had higher rates of injury than male shiftworkers. This opposite to the pattern for non-shiftworkers, where females had a lower rate of injury than males.

Table 2 Work-related injuries: Incidence rates by shift arrangements, sex and selected industries

Industry	% Male shiftworkers	Incidence rates (injuries per 1000 workers)			
		Male shiftworkers	Male non-shiftworkers	Female shiftworkers	Female non-shiftworkers
Health & community services	20	166#	61	112	48
Retail trade	45	130	68	135	57
Manufacturing	83	120	92	n.p.	45#
Accommodation, cafes & restaurants	52#	n.p.	n.p.	122#	84
Other*	72	114	70	84	39
Total – all industries	**55**	**115**	**72**	**112**	**45**

 # These data should be interpreted with caution due to high relative standard errors (between 25% and 30%)
n.p. Data not published due to high relative standard errors
** Other includes all remaining industries*

Occupation

Shiftworkers were more common in certain occupations. Table 3 shows the occupations (ASCO sub-major group) with the greatest number of shiftworkers and the greatest number of injuries that occurred to shiftworkers. Intermediate service workers accounted for both the greatest number of shiftworkers (13% of all shiftworkers) and the largest number of injuries that occurred to shiftworkers (13% of all shiftworker injuries). Large numbers of injuries were also recorded by Elementary sales workers and Health professionals. These occupations recorded incidence rates similar to the average for all shiftworkers of 114 injuries per 1000 shiftworkers.

Even when comparing the data by occupation, shiftworkers tended to have higher rates of injury than non-shiftworkers. Of the occupations shown in Table 3, Factory labourers had the highest rate of injury, with shiftworkers incurring around 50 additional injuries per 1000 workers than non-shiftworkers. Likewise, Other labourers and related workers, which include workers in mining, construction, agriculture and food preparation, also had a very high rate of injury amongst shiftworkers (152 injuries per 1000 shiftworkers) compared to non-shiftworkers (95 injuries per 1000 non-shiftworkers).

Table 3 Work-related injuries: number, percentage of total, number of injuries to shiftworkers and incidence rate by sub-major occupation group

Occupation (sub-major group)	Percentage of total shiftworkers	Number of injuries to shiftworkers	Incidence rate (injuries per 1000 workers)	
			Shiftworkers	Non-shiftworkers
Intermediate service workers	13	24 700	119	48
Elementary sales workers	9	17 800	117	49
Health professionals	11	16 600	94	53
Other labourers and related workers*	5	12 300	152	95
Factory labourers #	4	11 100	173	119
Road and rail transport drivers#	4	9 800	137	99
All occupations	**100**	**183 600**	**114**	**60**

* *Other labourers & related workers includes mining, construction & related labourers, agricultural & horticultural labourers and elementary food preparation & related workers.*

\# *The relative standard errors of the data for shiftworkers are between 25% and 29% and therefore the data should be interpreted with caution.*

The proportion of shiftworkers by sex varied considerably between the major occupation groupings. For instance, only 30% of shiftworkers in Elementary clerical, sales or service workers occupations were male, compared with 92% of Intermediate production and transport shiftworkers.

Figure 2 shows that female shiftworkers had higher rates than male shiftworkers in the following occupations: Associate professionals, Intermediate clerical, sales and service workers and Elementary clerical, sales and service workers. This is a different pattern to non-shiftworkers where female rates were lower than male rates except for Professionals and Elementary clerical, sales and service workers.

Figure 2 Work-related injuries: Incidence rates by shift arrangements, sex and Occupation*

* *Some occupations are not presented due to high relative standard errors as a result of small sample size. Furthermore, some of the shiftworker rates of injury are affected by high relative standard errors (between 25% and 33%). The data therefore should be interpreted with caution and considered as indicative of trends only.*

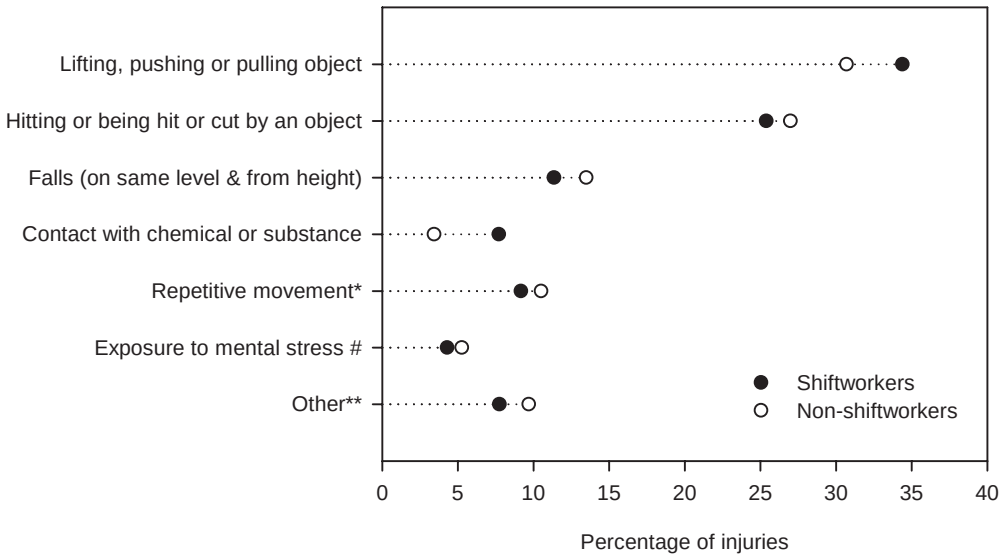
Figure 2 also shows that Labourers and related workers recorded the highest incidence rate for male shiftworkers. Almost one in five male shiftworkers were injured in this occupation, which is approximately double the rate for male non-shiftworkers (187 injuries per 1000 male shiftworkers compared to 99 injuries per 1000 male workers). Shiftworkers in the Elementary clerical, sales and service occupation had the highest rate of injury amongst female shiftworkers, a rate more than double that of female non-shiftworkers

Mechanism of work-related injury

As can be seen in Figure 3, the most common mechanism of work-related injury for both shiftworkers and non-shiftworkers was *Lifting, pushing or pulling objects*. This mechanism accounted for 34% of injuries incurred by shiftworkers and 31% of injuries incurred by non-shiftworkers. The incidence rate of injury for this mechanism in shiftworkers (39 injuries per 1000 shiftworkers) was more than twice the rate for non-shiftworkers (18 injuries per 1000 workers). Overall, there was very little difference between shiftworkers and non-shiftworkers in terms of the proportional composition of the mechanisms that caused work-related injuries.

However, one noticeable difference between shiftworkers and non-shiftworkers was the prevalence of shiftworker injuries caused by *Contact with a chemical or substance*. This mechanism includes single contact or long term exposure to chemicals or substances such as acids, cigarette smoke or asbestos, contact dermatitis, caustic or corrosive substances in the eyes and immediate or acquired allergic reactions. *Contact with a chemical or substance* caused 8% of the injuries incurred by shiftworkers but only 3% of the injuries incurred by non-shiftworkers. Male and female shiftworkers had similar incidence rates due to this mechanism and overall, 9 shiftworkers in every 1000 had injuries due to *Contact with a chemical or substance* compared with 2 non-shiftworkers in every 1000.

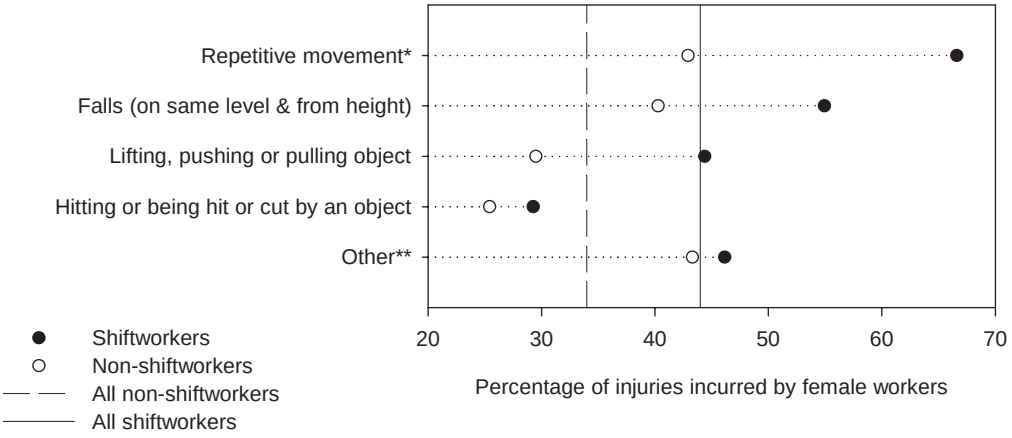
Figure 3 Work-related injuries: Percentage of injuries by shift arrangements and mechanism of injury



** Includes Prolonged standing, cramped or unchanging position*
*** Includes Vehicle accident and Long term exposure to sound*
 # The data for shiftworkers are subject to high relative standard errors (approximately 30%) and therefore should be treated with caution

Figure 4 shows for female workers the percentage of injuries caused by each mechanism. Female shiftworkers incurred 67% of shiftworker injuries caused by *Repetitive movement* (which includes *Prolonged standing / working in a cramped or unchanging position*) and 55% of shiftworker injuries due to *Falls* (on the same level or from height). In non-shiftworkers, these mechanisms of injury were much more male biased. Male shiftworkers incurred the majority of injuries caused by *Hitting or being cut by an object* (71%).

Figure 4 Work-related injuries incurred by female workers: Percentage of injuries by shift arrangements and mechanism of injury

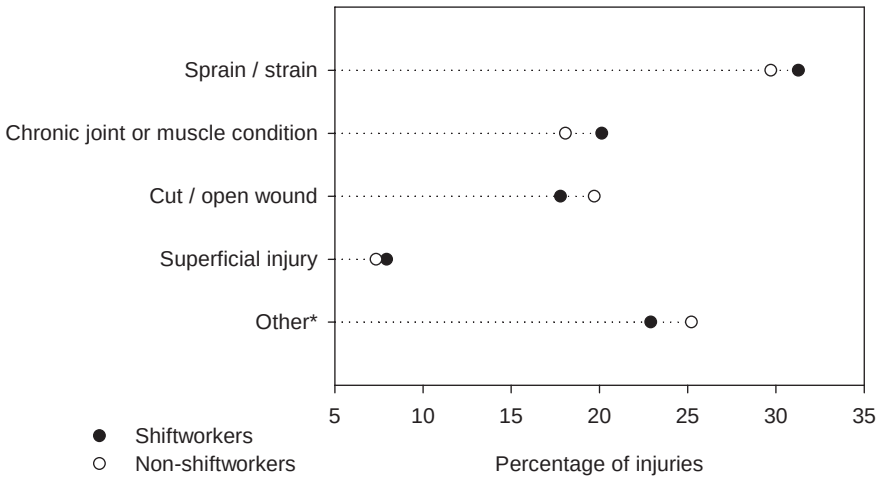


* *Other includes the Contact with a chemical or substance, Vehicle accident, Exposure to mental stress and Long term exposure to sound*

Type of work-related injury

There was very little difference between shiftworkers and non-shiftworkers in terms of the proportional composition of the types of work-related injuries they incurred. Figure 5 shows that the most common types of injuries were *Sprains and strains* (31% of injuries for shiftworkers compared to 30% of injuries for non-shiftworkers) followed by *Chronic joint and muscle conditions* and *Cuts or open wounds*. The incidence rates of work-related injury for shiftworkers were approximately double those of non-shiftworkers for each injury type. Therefore, shiftworkers as a whole did not incur different types of injuries to non-shiftworkers, but instead incurred them in greater numbers.

Figure 5 Work-related injuries: Percentage of injuries by shift arrangements and type of injury

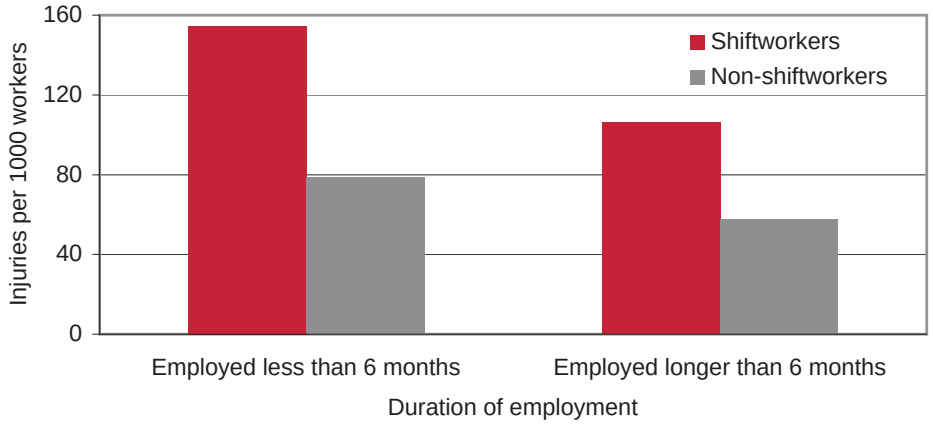


** Other includes Fracture, Crushing injury/internal organ damage/amputation, Stress or other mental condition.*

Duration of employment

Participants in the WRIS survey were asked how long they had worked in their position before their work-related injury occurred. As is shown in Figure 6, shiftworkers and non-shiftworkers had similar patterns of injury based on employment duration. Although shiftworkers had higher rates overall, inexperienced workers (those employed less than six months prior to incurring an injury) in general had approximately one and a half times the rate of work-related injury of workers who had been employed for longer than six months.

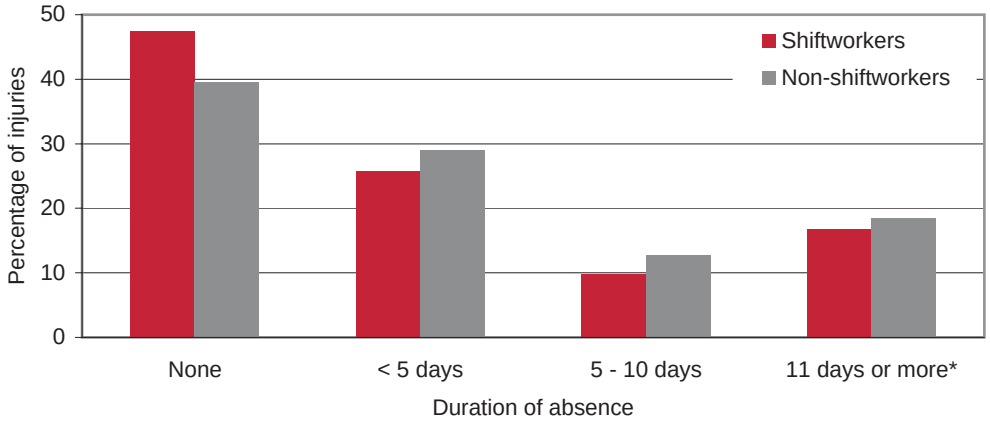
Figure 6 Work-related injuries: Incidence rates of injury by duration of employment prior to incurring a work-related injury and shift arrangements



Duration of absence from work

When the duration of absence from work following a work-related injury was compared between shiftworkers and non-shiftworkers, it was clear that the severity (as estimated by duration of absence) of the work-related injuries was not substantially different between shiftworkers and non-shiftworkers (Figure 7). The data showed that 48% of shiftworker's injuries involved no time off work compared to 40% of non-shiftworker injuries.

Figure 7 Work-related injuries: Percentage of injuries by duration of absence from work and shift arrangements



** 11 days or more includes people who had not returned to work following their work-related injury*

However, these data need to be treated with caution because they are influenced by working hours: people who work fewer days/shifts per week may report fewer days' absence from work because they may be injured/ill on days they would not normally work. On average, shiftworkers worked approximately 2 hours per week fewer than non-shiftworkers (Shiftworkers: 34 hours per week, Non-shiftworkers: 36 hours per week) and 29% of shiftworkers worked less than 30 hours per week compared to 25% of non-shiftworkers. It is therefore unlikely that normal working hours fully account for the slightly higher proportion of shiftworkers who reported no absence from work.

Normal working hours

Male and female workers differed in the number of hours they normally worked per week. As is shown in Figure 8, female workers were more likely to work less than 35 hours per week than male workers, while male workers were more likely to work 40 or more hours per week than females. This is true of both shiftworkers and non-shiftworkers.

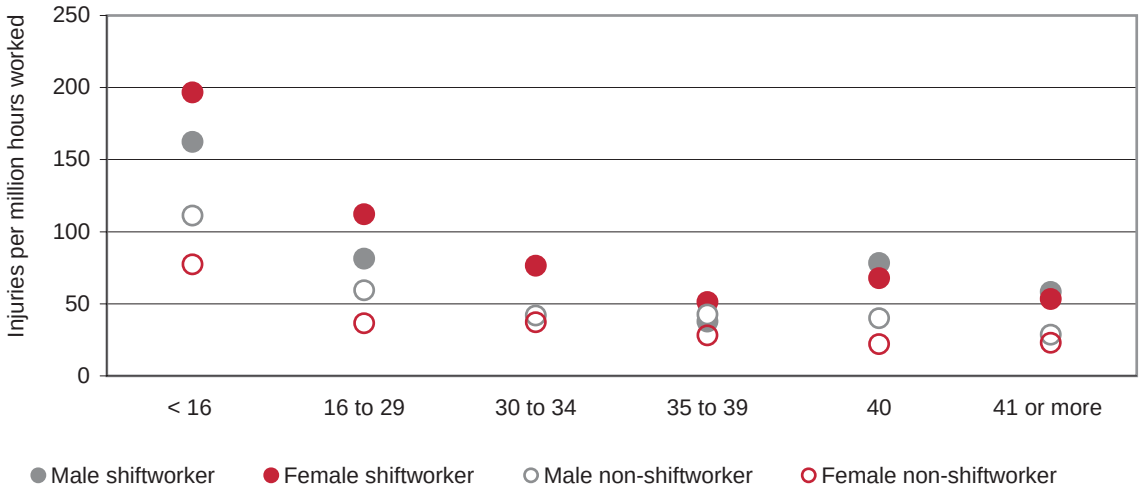
Figure 8 Percentage* of workers by shift arrangements, sex and normal working hours

** percentages sum to 100 within each sex / shift arrangements category)*

In order to control the differences in normal working hours between the sexes when examining work-related injuries, the data are presented as frequency rates (injuries per million hours worked). As can be seen in Figure 9, the number of hours normally worked per week affected the frequency rate of work-related injury of the sexes and of shiftworkers and non-shiftworkers. The biggest differences between male and female shiftworker frequency rates occurred when normal working hours were less than 30 hours per week, with female shiftworkers having considerably higher rates of injury per million hours worked than male shiftworkers and all other non-shiftworkers.

Figure 9 also shows that the frequency rates of shiftworkers and non-shiftworkers converged when people worked 35 to 39 hours per week. This bracket of normal working hours recorded the lowest frequency rate of injury for shiftworkers. This suggests that, at least for shiftworkers, working 35 to 39 hours per week is associated with lower risks of work-related injury. It is possible that shiftworkers working 35 to 39 hours per week work in set routines as opposed to changing weekly shifts, as may be the case with those working less than 30 hours per week. This may result in fewer fatigue-related injuries for these workers as opposed to shiftworkers working fewer hours per week on changing rosters.

Figure 9 Work-related injuries: Frequency rates (number of injuries per million hours worked) by shift arrangements, sex and normal working hours*

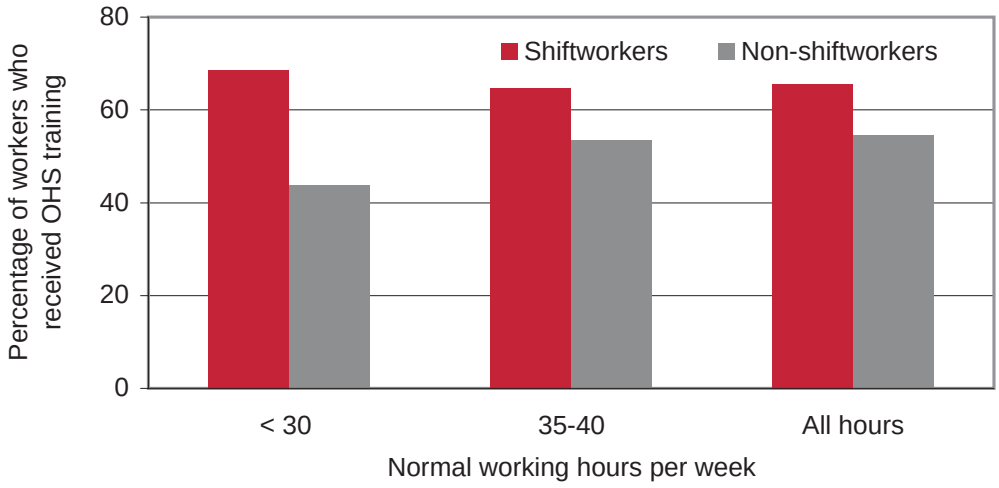


** Some data have been supressed due to high relative standard errors. Male shiftworkers with less than 30 normal weekly working hours have high relative standard errors and the data should be treated with caution, as do the data for female shiftworkers who worked 41 or more hours per week. This is a result of the relatively small number of males and females working these weekly hours.*

OHS training

The high frequency rates and incidence rates of work-related injuries in shiftworkers were not related to whether or not workers received Occupational Health and Safety (OHS) training prior to their injury occurring. As can be seen in Figure 10, a greater percentage of shiftworkers received OHS training than non-shiftworkers. The data show that 69% of shiftworkers who worked less than 30 hours per week received OHS training compared to 44% of non-shiftworkers who worked the same number of hours per week. The same pattern is found for workers who worked 35–40 hours per week and for all hours of work. Therefore, despite most shiftworkers having received OHS training, it appears to have been ineffective at preventing work-related injuries, particularly for shiftworkers who worked less than 30 hours per week.

Figure 10 Work-related injuries: The percentage of workers who received OHS training prior to incurring their work-related injury by shift arrangements



Working hours comparison

A comparison was made of the work-related injuries that occurred to shiftworkers and non-shift workers with different normal weekly hours of work (< 30 hours or 35 to 40 hours) in an effort to identify the causes of the extreme disparity in the frequency rates of injury across normal working hours.

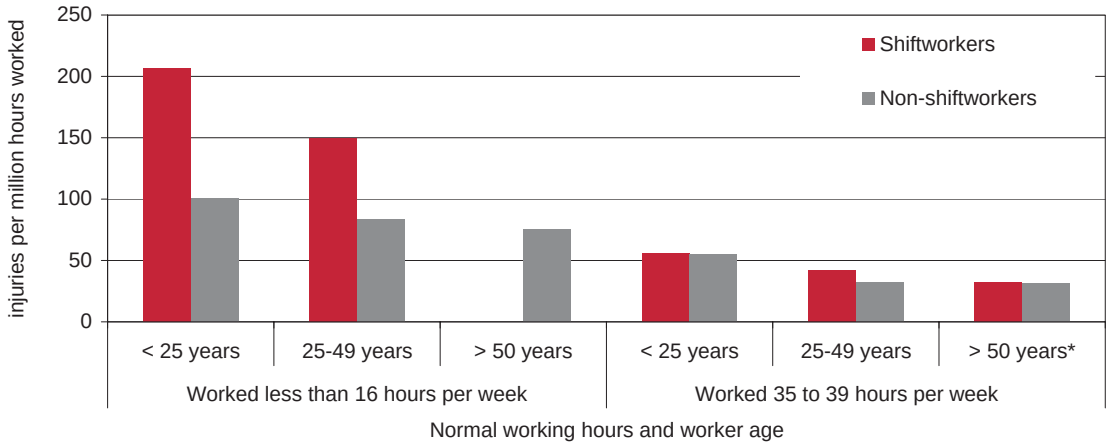
Age

One major difference between the groups working less than 30 hours per week and those working 35–40 hours per week is worker age: 50% of shiftworkers who worked less than 30 hours per week were under 25 years of age compared with 24% of non-shiftworkers.

Figure 11 shows that young shiftworkers working less than 30 hours per week were most at risk of work-related injuries. They experienced 168 injuries per million hours worked, which is more than double the rate for non-shiftworkers of the same age and same working hours. The rate of injury declined with increasing age for both shiftworkers and non-shiftworkers who worked less than 30 hours per week. In contrast, there was less difference in the frequency rates of shiftworkers and non-shiftworkers working 35–39 hours per week, and there was no evidence of a decline in the frequency rate of injury with increasing age for shiftworkers but there was for non-shiftworkers.

It is clear from the WRIS data that age had an effect on the rate of work-related injury. Young workers had more injuries relative to their proportion in the working population and per million hours worked than older workers. Furthermore, working under shift arrangements magnified this effect. Young shiftworkers were disproportionately more likely than young, non-shiftworkers to incur a work-related injury when they worked less than 30 hours per week.

Figure 11 Work-related injuries: frequency rate by shift arrangements, age and selected working hours



** The frequency rate of shiftworkers aged > 50 years and worked less than 30 hours per week has a high relative standard error of approximately 38%. It should therefore be interpreted with caution.*

Occupation

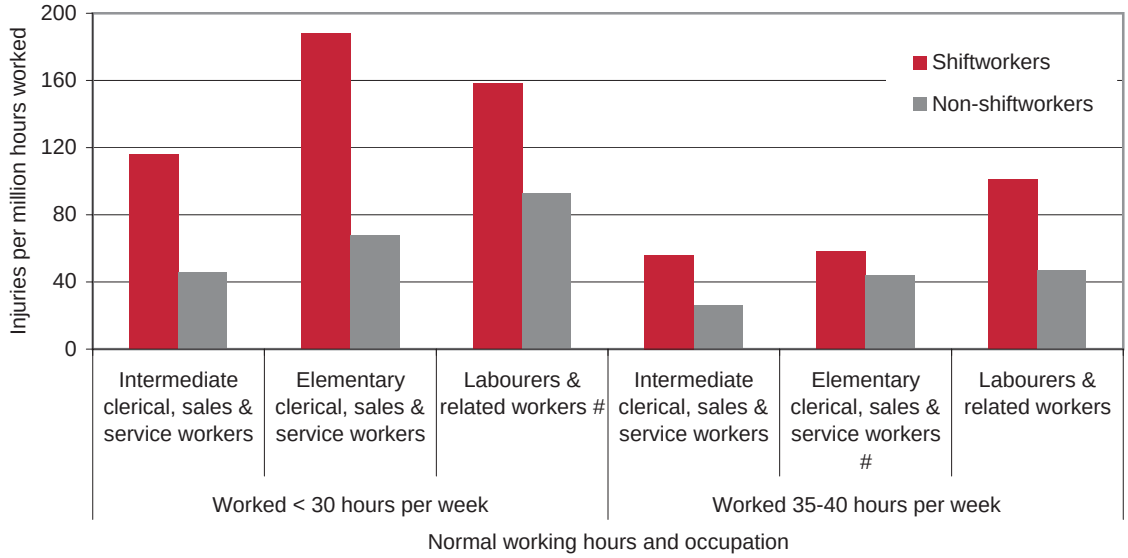
There were two occupations in which shiftworkers who worked less than 30 hours per week incurred large percentages of work-related injuries: Elementary clerical, sales and service workers (31% of injuries) and Intermediate clerical, sales and service workers (27% of injuries). As can be seen in Figure 12, shiftworkers in these occupations recorded extremely high rates of injury per million hours worked. Labourers and related workers who were shiftworkers also recorded a very high rate of injury and accounted for 17% of the work-related injuries that occurred to shiftworkers who worked less than 30 hours per week.

Just over 90% of shiftworkers within the Elementary clerical, sales and service workers occupation group were elementary sales workers, which included sales assistants in retail and wholesale establishments, checkout operators and service station attendants.

Shiftworkers within the Labourers and related workers group were essentially either cleaners (53% of shiftworkers) or other labourers and related workers (39% of shiftworkers), which included labourers in mining and construction, agriculture and horticulture and elementary food preparation.

The highest frequency rate of injury was recorded by Elementary clerical, sales and service workers with 188 injuries per million hours worked. This was more nearly three times the frequency rate of injuries that occurred to non-shiftworkers who worked the same hours and in the same occupation. Almost the same difference in rates was seen between Intermediate clerical, sales and service shiftworkers and non-shiftworkers who worked less than 16 hours per week. Although shiftworkers who worked 35–40 hours per week had higher frequency rates than non-shiftworkers who worked 35–40 hours per week, the magnitude of the difference was not as great.

Figure 12 Work-related injuries: Frequency rates for selected occupations* by shift arrangements and selected working hours



** Occupations were selected based on the number of injuries that occurred to workers. These occupations encompass the top three occupations in each combination of shift arrangements and normal working hours.*
 # The relative standard errors for shiftworkers are high (between 30% and 34%). Therefore these data should be interpreted with caution.

Conclusion

Shiftworkers had higher rates of work-related injury than non-shiftworkers. Furthermore, female shiftworkers incurred more injuries per million hours worked than male shiftworkers. The rate of work-related injuries was negatively related to the number of hours shiftworkers normally worked per week: shiftworkers who less than 30 hours per week had considerably higher frequency rates of work-related injury than non-shiftworkers who worked the same number of hours per week and to shift and non-shiftworkers who worked 35–40 hours per week. Shiftworkers who worked only a few shifts per week were typically young and working in Elementary, clerical and sales, Intermediate clerical, sales and service or Labourer and related worker occupations. The high rates of injury amongst shiftworkers were not due to a lack of OHS training.

Explanatory notes

Definitions

ABS	Australian Bureau of Statistics
Incidence rate	The number of injuries per 1000 workers
Frequency rate	The number of injuries per million hours worked
Mechanism of injury	The mechanism of injury is the action, exposure or event that was the direct cause of the injury, or how the injury was sustained
Type of injury	The type of work-related injury refers to the nature of the injury sustained
Non-shiftworkers	Workers who did not work under shift arrangements
OHS	Occupational Health and Safety
Shift arrangements	A system of working whereby the daily hours of operation at the place of employment are split into at least two set work periods (shifts) for different groups of workers
Shiftworkers	Workers who worked under shift arrangements
WRIS	ABS Work-related injury survey

Confidentiality

The numbers of injuries presented in this publication have been rounded to the nearest 100 in adherence with the practice of the ABS Work-related Injuries publication (ABS Cat. No. 6324.0)

Industry classification

The industry of the worker has been classified in accordance with the Australian and New Zealand Standard Industrial Classification (ANZSIC), 1993 edition (ABS Cat. No. 1292.0).

Mechanism of injury classification

The mechanism of injury classification is based on the *Type of Occurrence Classifications System* (TOOCS) developed by Safe Work Australia. Refer to Appendix 1 in ABS Cat. No. 6324.0 for a detailed breakdown of each mechanism of work-related injury.

Type of injury classification

The type of injury is based on the Nature of injury classification in the *Type of Occurrence Classifications System* (TOOCS) developed by Safe Work Australia. Refer to Appendix 1 in ABS Cat. No. 6324.0 for a detailed breakdown of each nature of work-related injury.

Occupation classification

The occupation of the worker has been classified in accordance with the Australian Standard Classification of Occupations (ASCO), Second Edition, July 1997, (ABS Cat. No. 1222.0)

Relative Standard Errors (RSEs)

All data presented in this report conform with the ABS guidelines regarding data quality. Unless otherwise marked (#), all data presented have RSEs below 25%. Data with RSEs above 38% have not been published. Comprehensive information about RSEs can be found in the ABS *Work-related Injuries* publication (ABS Cat. 6324.0)

Rounding

Data have been rounded to the nearest 100. Due to the rounding process, discrepancies may occur between sums of the component items and totals.

Inquires

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