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Alcohol and work

Patterns of use, workplace culture and safety

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Ann M Roche, Tim R Driscoll, Rachel S Newson

AIHW

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Alcohol and work

Patterns of use, workplace culture and safety

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Executive summary

Overview

Little is known regarding the alcohol consumption patterns of Australian workers and the impact these patterns have on workplace safety, workplace productivity, and worker[1] well-being.

To address this issue:

1. a comprehensive review of relevant literature was conducted, and
2. existing data concerning Australians' alcohol consumption and alcohol-related workplace injury and other adverse workplace events were subjected to secondary analysis.

The results reported in this document represent a comprehensive overview of:

1. the relationship between the workplace and alcohol use,
2. current alcohol consumption patterns of the Australian workforce, using NHMRC guidelines for both short- and long-term risk (see Table 3.1, p 24 for definitions), and
3. evidence of the extent of alcohol-related injury in the workplace.

This investigation yielded fruitful analyses and findings from previously unexamined aspects of the 2001 National Drug Strategy Household Survey (NDSHS). The analysis found high levels of risky drinking in particular occupational groups. It also identified strong associations between risky levels of drinking and adverse workplace events such as high levels of absenteeism and attending work under the influence of alcohol.

High levels of workplace abuse or intimidation by persons affected by alcohol were also found in certain occupations and industries, with highest prevalence among health and welfare professionals in particular, and workers in the health and hospitality industries in general.

In terms of alcohol and workplace injuries, few studies have adequately examined this issue. Injury is an important adverse event associated with risky patterns of drinking, however, no specific items addressed this in the NDSHS.

This report provides an essential building block upon which to develop relevant policies and interventions related to workplace alcohol consumption. The report provides both a comprehensive database from which to move forward as well as a new conceptual frame, with a focus on *workplace culture*, which will allow for innovative, broader and more flexible approaches to work-related alcohol use.

The report is also important from a workforce development perspective. Specific workforce development implications have emerged from this investigation that are relevant to 1) occupational, health and safety and 2) prevention interventions and policy developments. A set of key strategies are identified which address work-related alcohol problems from a workforce development perspective.

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[1] Throughout this document the term 'worker' and 'employee' are used interchangeably.

Report structure and key findings

The report comprises seven chapters. These are:

1. Introduction
2. Alcohol and workplace culture
3. Prevalence and patterns of alcohol use in the workplace (NDSHS data)
4. Alcohol and workplace safety
5. Assessment of other data sources
6. Workplace interventions
7. Implications

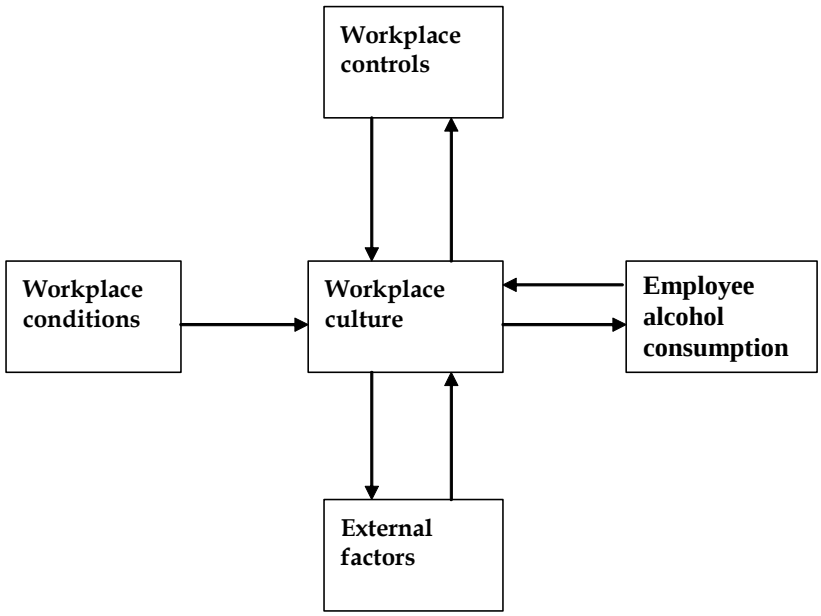
The content of each chapter is briefly outlined below.

Chapter 1 Introduction, provides a brief overview of key changes in the patterns of alcohol consumption by Australians over the last few decades. To fully grasp these changes a more precise understanding of the role that work plays in the ways Australians use, or misuse, alcohol is necessary. It also locates the examination of alcohol and work within a workforce development context.

Chapter 2 Alcohol and workplace culture, reviews research concerning the relationship between the workplace and employees' alcohol consumption and uses this research to develop a new conceptual model of the relationship (see Figure 2.1). The focus of this new model is on the role *workplace culture* plays in the relationship between work and alcohol consumption.

The model represents a paradigm shift in thinking on alcohol use and the workplace. It acknowledges the role of individual perceptions and beliefs, however, the model shifts the emphasis from the role of individual factors to the role of environmental factors. This perspective proposes that one of the most important determinants of workers' alcohol consumption patterns is not individual beliefs, attitudes, and intra-psychic factors, rather, it is the alcohol-related culture of the wider work organisation which predominately shapes drinking behaviour.

The cultural perspective outlined by the model has important implications for workplace interventions designed to minimise alcohol-related risk in the workplace. From this perspective, workplace culture can play a central, bi-directional role in the development of workplace norms regarding alcohol use. Importantly, the workplace processes that influence the development of 'risky' alcohol-related norms can be used to influence the development of 'low risk' alcohol-related norms. That is, while alcohol use is the result of multiple factors, the potential for alcohol-related harm could be reduced, or minimised, by facilitating and supporting norms that promote responsible alcohol use, especially within the context of the workplace.



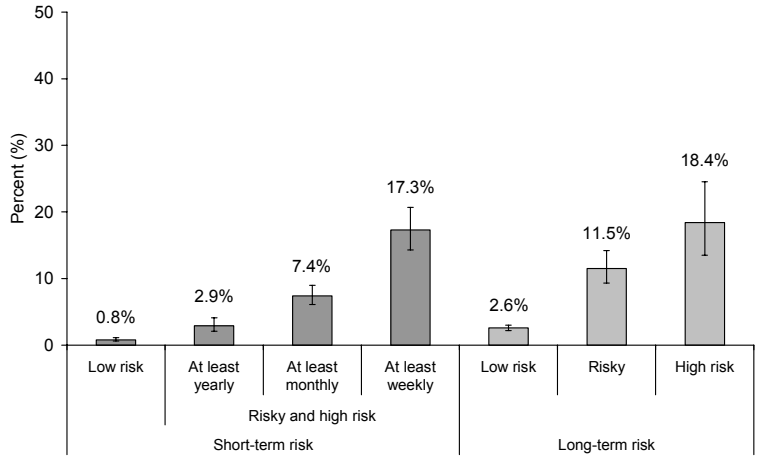
A hypothetical model of the key relationship between the workplace environment and alcohol use (Pidd, 2003a) (Figure 2.1, p 17)

Chapter 3 Prevalence and patterns of alcohol use in the workplace, reports on analyses of 2001 National Drug Strategy Household Survey (NDSHS) data undertaken to determine the alcohol consumption patterns of the Australian workforce. The findings from the NDSHS analyses form the core of this report. Key findings are as follow:

- 90% of the workforce were drinkers and half these workers drank, at least occasionally, at levels associated with risk of harm,
- one in 10 employed drinkers frequently (at least weekly) drank at short-term risky or high risk levels,
- one in three drank at short-term risky or high risk levels at least monthly or at least yearly,
- 11% drank at long-term risky or high risk levels,
- risky patterns of consumption were most prevalent among young workers (14–29 year olds),
- country employed drinkers were more likely than capital city workers to drink at short- and long-term risky or high risk levels,
- consumption patterns varied between male and female employees. In particular:
    - a larger proportion of males drank at short-term risky or high risk levels compared to females,
    - a larger proportion of females drank at long-term risky levels compared to males
    - a larger proportion of males drank at long-term high risk levels compared to females,

- consumption patterns varied between occupational categories and between industry groups. In particular:
    - tradespersons and unskilled workers were occupational groups with the largest proportion of workers that drank at levels associated with risk of harm,
    - the hospitality, agricultural, and mining industries had the largest proportion of workers that drank at at levels associated with risk of harm.
- differences in consumption patterns were also found between:
    - specific occupational sub-categories,
    - more narrowly defined industries within industry groups, and
    - males and females employed in the same industries and occupations.

  These differences may be due to a range of factors including workplace environment differences associated with work stress, workplace controls, and workplace cultures regarding alcohol use.
- a larger percentage of employed female drinkers (13.4%) compared to female drinkers not in the workforce (10.5%) drank at long-term risky and high risk levels.
- workers' risky alcohol consumption patterns had negative consequences for the workplace. Risky patterns of alcohol consumption were associated with a higher prevalence of self-reported:
    - negative work-related behaviours (e.g. attending work under the influence of alcohol), and
    - work absences. The figure below shows the proportion of respondents (categorised by alcohol consumption risk level) who had missed a work day solely due to their alcohol use in the three months prior to the survey.



Percentage of employed recent drinkers who have missed one or more workdays because of alcohol use in the last 3 months, by drinking risk category (Figure 3.6a, p 52)

Compared to workers who drank at low levels of short-term risk, workers who drank at short-term risky or high risk levels at least weekly were:

- 19 times more likely to have missed a work day in the past three months due to their alcohol use, and
- 6 times more likely to have attended work under the influence of alcohol.

Those who drank at short-term risky or high risk levels at least monthly were:

- 7 times more likely to have missed a work day in the past three months due to their alcohol use, and
- 3 times more likely to have attended work under the influence of alcohol.

Those who drank at short-term risky or high risk levels at least yearly were:

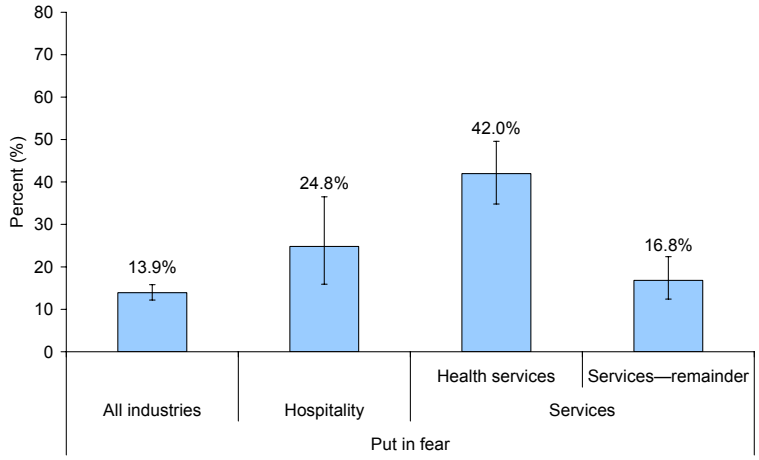
- 3 times more likely to have missed a work day in the past three months due to their alcohol use, and
- 2 times more likely to have attended work under the influence of alcohol.

Compared to those who drank at long-term low risk levels, long-term high risk drinkers were:

- 8 times more likely to have missed a work day in the past three months due to their alcohol use, and
- 5 times more likely to have attended work under the influence of alcohol.

Approximately one in five workers reported being put in fear, verbally abused, or physically abused by a person affected by alcohol and/or drugs. Over three-quarters of these incidents involved alcohol. While the majority of these incidents occurred in public places, 13% to 17% of all reported incidents occurred in the workplace. In most cases, perpetrators of workplace incidents were not co-workers, but customers, clients, or other persons encountered in the work context.

For some industries and occupations, the proportion of alcohol- and/or drug-related abuse and intimidation that occurred in the workplace was much larger compared to other industries and occupations. For example, across all industries and occupations, 13.9% of all reported incidents of being put in fear by a person affected by alcohol and/or other drugs occurred in the workplace. In comparison, nearly half (42.0%) of such incidents reported by employees in the health services sector of the services industry and a quarter (24.8%) of such events reported by hospitality industry employees occurred in the workplace (Figure 3.7).



Proportion of all reported incidents of alcohol- and/or drug-related intimidation (put in fear) in the past 12 months that occurred in the workplace, by type of industry (Figure 3.7, p 59)

Occupational groups with disproportionately high percentages of workers reporting alcohol- and/or drug-related intimidation and abuse in the workplace were health professionals, health and welfare associate professionals and managing supervisors (sales and services). Industry groups with disproportionately high percentages of workers reporting this type of incident in the workplace were the hospitality industry and health services sector of the services industry.

Chapter 4 Alcohol and workplace safety, reviews evidence concerning alcohol use and injury in the Australian workplace. This review indicates that alcohol use is associated with workplace traumatic injury. However, evidence of the extent of alcohol-related injury in the Australian workplace, especially with respect to non-fatal workplace injury, is scarce. Methodologically rigorous studies are needed to determine the extent and nature of alcohol-related injury that occurs within the context of the workplace.

Chapter 5 Assessment of other data sources, examines existing data from a variety of sources including hospital Emergency Department data, hospital separations data, and National Coroners Information System data. These analyses are important given the dearth of data on alcohol-related injury in the Australian workplace.

Overall, these data sources indicated that the prevalence of alcohol-related workplace injuries is relatively low. Hospital Emergency Department (ED) data indicated that between 4% and 15% of all workplace non-fatal injuries treated at hospital EDs were likely to be alcohol-related, while hospital separations data indicated that less than 7.5% of all work-related hospital admissions were likely to be associated with alcohol use. Similarly, National Coroners Information System (NCIS) data indicated that alcohol was likely to be involved in between 2% and 4% of all workplace deaths.

However, these percentages need to be treated with caution. All of the data sources examined (i.e. ED data, hospital separations data, and NCIS data) were limited in their ability to accurately determine the extent of alcohol-related workplace injuries. All were constrained by the data collection methods utilised, and the inherent limitations in

determining work-related injury by sub-group analysis of larger injury data sets. To accurately determine the extent of alcohol-related workplace injury specifically designed studies that incorporate more refined measures of work and alcohol 'relatedness' are required. To date, no study of this type has been undertaken in the context of the Australian workplace.

Chapter 6 Workplace interventions, describes the most commonly utilised responses to alcohol-related harm in the Australian workplace and briefly reviews evidence for the effectiveness of these responses. While there is some evidence that these responses show promise, overall there is no strong evidence that any single response is more effective than any other in reducing alcohol-related harm. The evidence reviewed in this chapter indicates that workplace responses are likely to be most effective when a comprehensive and integrated approach is adopted that incorporates best practice policy, treatment, and prevention elements.

However, the ability of workplaces to select, adapt, and implement comprehensive and integrated responses to alcohol-related harm in the workplace is limited by the lack of research concerning the effectiveness of different intervention strategies and their applicability to individual workplaces. More research is required to identify the types of responses that are likely to be suitable for different workplaces, and to examine the efficacy of these responses.

Chapter 7 Implications, concludes that this review of literature and data concerning the relationship between alcohol, workplace culture and safety has important implications for three areas; 1) concepts and theory, 2) data and research methods, and 3) policy and practice. The key implications and suggested steps forward are outlined below.

Implications of this work

This body of work is unique in several respects. Firstly, it represents one of the most comprehensive examinations of the role of alcohol in the Australian workplace undertaken to date.

Secondly, the data sources examined and the types of analyses undertaken yielded the most fruitful and meaningful findings yet identified in relation to alcohol and work.

Thirdly, the conceptual frame of this investigation (i.e. a workplace culture perspective) allowed for a wider examination of the role of alcohol in the workplace than hitherto possible. This widened perspective provides a more meaningful and utilitarian approach which moves beyond just describing the relationship between alcohol and work, to the identification of effective strategies for the prevention and amelioration of associated problems.

This work has important implications for three areas:

1. concepts and theory
2. data and research methods, and
3. policy and practice.

Concepts and theory

Previous conceptual models have focused solely on alcohol consumption and intoxication at work (or while working). Such models are limited and yield little meaningful data. An alternative model is presented here that pivots around the concept of the culture of the workplace. This alternative model allows for examination of factors that facilitate and support norms that promote 'low risk' versus 'risky' alcohol consumption, within the context of the workplace or elsewhere. This broader model incorporates consideration of drinking behaviour:

- both while at work and,
- related to work (e.g. after work drinks and social functions, or outside of work).

The model involves a bi-directional relationship whereby workplace culture impacts on drinking patterns and safety, and in turn, workplace culture modulates drinking behaviour. Thus, workplace culture plays a central role in this model and suggests that workplace culture is an important determinant of employees' alcohol consumption patterns both at, and away from, the workplace.

For young workers, who are relatively new entrants to the workforce, workplace culture may play a particularly important role in shaping emerging consumption patterns. As new entrants to the workplace, young adults and adolescent workers undergo a socialisation process whereby they adopt the norms, rules, and values of the workplace in order to become valued and effective members of the workforce. These rules, values, and norms extend to alcohol use and in particular to consumption patterns that are sanctioned as acceptable and encouraged or deemed unacceptable and discouraged.

In addition, this socialisation process occurs not only at a time when adolescents may be particularly susceptible to social influence processes concerning alcohol (and other drug) use, but the source of this influence may be particularly salient. Adolescent new workforce entrants are embarking on career paths that will, to a large extent, determine their identity or self-concept. Through the processes of workplace socialisation and skills acquisition, these young workers will become plumbers, electricians, nurses, doctors, etc, with all the attendant behaviours and attitudes associated with a given work role and identity. Thus, workplace rules, values, and norms concerning alcohol use may be particularly important in determining the subsequent consumption patterns of new entrants to the workforce.

Data and research

The 2001 National Drug Strategy Household Survey (NDSHS) proved to be a rich source of new information on employee levels and patterns of alcohol consumption and work-related behaviours. The NDSHS is a large data set that has been under-utilised in respect to alcohol and drug use and the workplace. Scope exists for further investigations of the NDSHS data. In particular, the current analyses should be also undertaken for drugs other than alcohol. In addition, continuation of the types of analyses undertaken in the present study with subsequent NDSHS data sets (e.g. the 2004 data set) would allow for trends to be identified and would offer verification of the findings identified here. Such analyses would also provide a firm basis upon which to design workplace interventions and policies.

This study also identified significant gaps and limitations in existing data sets. In particular, surprisingly little is known regarding the extent and nature of alcohol-related injury that occurs in the context of the Australian workplace. However, there are several ways in which this lack of knowledge could be rectified. For instance, the NDSHS contains no items that address alcohol and injury. This could be easily remedied by inclusion of a limited number of relevant questions in future surveys.

Similarly, Australia's national collection of hospital separations data has considerable potential to provide useful information on alcohol and work-related injury. Tapping into this potential is currently constrained by two gaps in information:

(i) lack of Attributable Proportions (APs) specific to work-related injury

- these could be developed by a similar method to that used to produce the existing APs that are applicable to the general population

(ii) incomplete flagging of cases involving alcohol,

- the extent of under-identification, reasons for it and potential solutions could be determined by reviewing a sample of hospital records.

In addition, an ED and hospital in-patient study that specifically examines the extent and nature of work-related injury would provide substantial new knowledge on how and to what extent it is due to alcohol. This study could adopt a broader perspective on workplace culture by focusing on the relationship between identified work-related injury and workplace *safety* cultures. This broader perspective on workplace safety could incorporate the concept of workplace *alcohol* cultures and thus be consistent with the theory and concepts outlined in this document.

Policy and practice

A number of important, if diverse, policy and practice implications were identified from this study. To a large extent these are workforce development issues; some with important occupational, health and safety implications and others which highlight the need for better informed management and the need for the implementation of appropriate policies and prevention strategies.

1. Target non-dependent risky drinkers

An important finding to emerge from this work was the elevated risk of negative workplace outcomes due to occasional heavy drinking. In contrast to the previous emphasis on identifying the relatively small number of alcohol-dependent workers, the data presented in this report are consistent with the notion of a 'prevention paradox' and highlight that most adverse alcohol-related events in the workplace are likely to stem from numerous workers who only occasionally or intermittently drink heavily, rather than the smaller number of frequent heavy drinkers.

Previous work suggests that drinking heavily less frequently (as opposed to more frequently) appears to carry a particular penalty and can leave the individual more vulnerable to injury. The 2001 NDSHS lacked a question specific to alcohol-related injury which limited such investigations. However, findings from this report indicate that infrequent heavy drinkers are numerous, and are at elevated risk of other adverse events, such as alcohol-related absenteeism and attending work under the influence of alcohol, compared to low risk drinkers. Hence, there is a strong case to be made for the

application of universal preventive interventions directed to all workers and designed to minimise risky drinking per se.

2. Occupational, Health and Safety

Infrequent or periodic high-level consumption is common behaviour engaged in by over a third of employed males and females. Individuals who engage in such patterns of drinking appear to represent the highest level of risk to safety, and compromise workplace productivity through high numbers of associated work absences and attending work under the influence of alcohol. The extent of the problem of infrequent high-level consumption by workers has previously been under-recognised, yet has important implications for the occupational health and safety of employees and warrants greater attention.

In addition, the drinking of others encountered in the workplace, apart from employees and their co-workers (e.g. customers and clients), also has important occupational health and safety implications. This is particularly the case for workplaces where alcohol is sold or consumed (e.g. hotels) or which deal with clients with acute or chronic alcohol problems (e.g. hospitals and other health services).

3. Duty of care

Employers owe a duty of care to all workers. Only part of the impact of alcohol on work and workplaces is directly related to employees' alcohol consumption. Large numbers of employees were found to be exposed to intimidation, verbal abuse and physical abuse as a result of intoxicated patients, clients, and customers. This was particularly prominent in the health and hospitality industries. Intervention strategies are needed to reduce the risk to which many workers are exposed.

A particular duty of care is owed to adolescents and young adult workers, as the evidence suggests that the culture of particular working environments is influential in shaping the drinking patterns of young people. The shaping of such patterns can be a potent factor in the development of either positive or negative drinking patterns.

A duty of care is also highlighted in relation to women, and especially young women, in regard to their alcohol use and the extent to which it may be adversely affected by workplace influences. This report highlights risky levels of alcohol use by employed women in general, and women in various occupational categories. Workplace drinking cultures appear to play a prominent role in the development of such risky patterns of consumption.

4. Workplace productivity

This report highlights the substantial impact that high levels of risky drinking have on the workplace in terms of absenteeism and, to a lesser extent, working under the influence of alcohol. The data provided in this report can assist employers to gauge the impact of risky drinking on workplace efficiency and productivity.

5. Efficacious and cost-effective workplace alcohol policies and interventions

The report also underscores the need for the implementation of effective and appropriate workplace polices to address risky work-related drinking. Chapter 6 outlines the evidence base for low cost strategies that can be implemented with relative ease across all workplaces. The workplace can be seen in two ways: (i) as a setting in which it is possible to identify and help individuals whose pattern of alcohol consumption is potentially

harmful, both at work and elsewhere; and (ii) as a setting in which there are organisational reasons to take pro-active steps concerning risky patterns of consumption that can negatively impact on workplace health, safety and productivity.

The potential for the workplace to implement highly cost effective strategies to prevent and address risky drinking patterns has been largely overlooked in Australia. Substantial scope exists to redress this and to fully utilise the workplace as an ideal location to implement primary and secondary prevention strategies. Within Australian workplaces, substantial occupational health, safety and welfare legislation and structures already exist that can readily accommodate alcohol- and other drug-related interventions.

The positive impact of workplace interventions of known efficacy for individual workers would be substantial. There would also be a significant knock-on effect on workplace productivity. Moreover, the theory of social contagion would suggest that any improvements to an individual worker's risky drinking patterns would also extend to positively impact on their families, friends and associates. That is, changes in workplace drinking cultures and norms could have a significant impact on community wide drinking norms.

6. General Practitioners' role in identification and brief interventions

The high level of alcohol-related absenteeism among regular and intermittent risky or high risk drinkers suggests that there is scope for better preparation of general practitioners (GPs) in this regard. While many/most workers do not require sick leave certificates for a single day off work, there is nonetheless, a very high presentation of alcohol-related health problems to GPs (e.g. on Monday mornings, as well as in other instances). The data provided in the report are some of the most definitive available, and will be useful to underscore the potential role for GPs and early interventions.

7. Workplace culture

Policy and practice measures need to incorporate a broader perspective to reduce alcohol-related harm in the workplace. Interventions that integrate policy, treatment and prevention strategies and target workplace culture to influence behaviour are more likely to be effective in reducing alcohol-related harm. Addressing issues related to the culture of drinking within a working environment may also contribute to the reduction in the uptake of risky patterns of drinking by young Australians who have recently joined the workforce. These are an especially vulnerable group who with an increase in expendable income are subject to strong behaviour-shaping influences such as those found in the workplace.

An implication of this cultural approach and of the evidence concerning infrequent high consumption and the impact of customer and client drinking, is that approaches to managing or reducing adverse workplace consequences that focus solely on preventing intoxication while working, or drinking during actual working hours, will overlook much, perhaps most, of the problem. What is required is a wide scale application of policies and preventative strategies designed to cultivate low risk drinking cultures in all workplaces.

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ANZSIC	Australian and New Zealand Standard Industrial Classification
AP	Attributable Proportion
ASCO	Australian Standard Classification of Occupations
AUDIT	Alcohol Use Disorders Identification Test
BAC	Blood Alcohol Concentration
CATI	Computer-Assisted Telephone Interview
CCD	Census Collection District
CI	Confidence Interval
DHA	Department of Health and Ageing
EAP	Employee Assistance Program
ED	Emergency Department
EST	Eastern Standard Time
GP	General Practitioner
ICD-9	9th Revision of the International Classification of Diseases
ICD–10–AM	10th Revision of the International Classification of Diseases, Australian Modification
MUNCCI	Monash University National Centre for Coronial Information
NCCH	National Centre for Classification in Health
NCETA	National Centre for Education and Training on Addiction (Flinders University)
NCIS	National Coroners Information System
NDSHS	National Drug Strategy Household Survey
NHMD	National Hospital Morbidity Database
NHMRC	National Health and Medical Research Council
NISU	AIHW National Injury Surveillance Unit
NOHSC	National Occupational Health and Safety Commission (from 2005, Australian Safety and Compensation Council)
OR	Odds Ratio
PSU	Primary Sampling Unit
RCIS	Research Centre for Injury Studies (Flinders University)
REM	Rapid Eye Movement
SECU	Standard Error Calculating Unit
SLA	Statistical Local Area
TAFE	Technical and Further Education

1 Introduction

> *"The workplace, as a distinct cultural environment within the larger community, can support or inhibit the development of problem drinking among workers. An understanding of workplace cultural factors is essential for minimizing risks of drinking problems among workers"* (Ames & Janes 1992).

Workplace and work-related alcohol consumption has received relatively little attention in Australia. Previous work undertaken in this area has been comparatively narrow in its orientation and has not yielded a wealth of meaningful data for either the clinician or policy maker. This report however, and the approach taken herein, is substantially different to work that has preceded it. In addition to being one of the most comprehensive Australian reports produced on this issue to date, there are a number of unique aspects to the approach taken that distinguish it from earlier efforts.

Fundamental to the present examination of the place and location of alcohol in the Australian psyche and its manifestation in relation to work and work roles is the role of culture. As outlined in more detail in Chapter 2, an appreciation and understanding of the impact of different workplace cultures in relation to alcohol is fundamental. Such an appreciation is not only pivotal to grasping the descriptive epidemiology of alcohol use, it is also germane to any subsequent efforts that may be directed to ameliorating risky patterns of alcohol consumption.

It is well recognised that Australia has had a long, close, and affectionate relationship with alcohol. It is perhaps less well understood that there are important and dynamic patterns of consumption that have emerged in recent decades, and that continue to change with increasing rapidity. These changing patterns of consumption are particularly apparent in different patterns of alcohol use by young people and women and also in substantially changed preferences in beverage types and drinking locations. Until the last two to three decades, the consumption of alcohol was largely the domain of Australian males and the preferred beverage was beer. The dominant and pervasive image of alcohol use in Australia until the 1970's was of copious amounts of beer consumed in male-only domains (pubs) that were characterised by their stark, sterile and tiled interiors. The latter allowed for the ready and frequent hosing down of floors and walls of spit, spillage and not infrequently spew.

Consumption of beer, as a male-dominated past time, increased in prevalence from the 1930's until the late 1970's. Thereafter its popularity declined considerably, being displaced by a growing preference for wine and spirit-based drinks (the latter most notably comprising pre-mixed drinks—some of which could be referred to as 'alco-pops'). Over the past one to two decades, mean consumption (as measured in litres of pure alcohol) has decreased by 24% (Stockwell 2004). However, mean measures are often deceptive and can readily mask some important changes that have occurred in the drinking levels and patterns of particular segments of the population.

While beer remains the most popular alcohol beverage, preferred by 52% of Australian drinkers, 29% of the population drink wine as their preferred alcohol beverage and 19% spirits (Chikritzhs et al, 2003). Among beer drinkers there have been other important changes: the amount of full strength beer consumed has decreased by 14% and light alcohol beer has increased by 25% over the past one to two decades (Stockwell 2004). As the age profile of the Australian population changes, so too does our pattern of alcohol consumption. Traditionally we drink less as we get older. This can have important implications for industries that employ a high proportion of younger people.

Other important changes to our gustatory and general consumption patterns have occurred in parallel with changes to the types of alcohol beverages preferred. Since the late 1970's, there has been a three-fold increase in the consumption of sweet aerated and carbonated drinks (Australian Bureau of Statistics 2000). Similarly, we have seen parallel patterns in the consumption of a wide range of pre-prepared foods that are often heavily laced with sugar (McDonald's hamburger buns had been, until very recently, a prime example of this phenomenon). Recent data from the Australian Secondary Schools Survey of Alcohol and Drug Use reports a shift in the consumption of pre-mixed spirits by girls aged 14–17 from 23% in 1999 to 47% in 2002 (White & Hayman 2004): importantly, pre-mixed spirit drinks tend to have a high alcohol content and be extremely sweet tasting. Such a large percentage shift in consumption patterns is exceptional over such a short time span and further highlights the need for regular and detailed monitoring of patterns of consumption.

Another change in Australians' relationship with alcohol has been increasing awareness of its safety implications. Knowledge of the high proportion of road deaths attributable to driving after drinking, which emerged in the 1970's, led to world-leading policies and enforcement strategies to reduce drink-driving, notably wide-spread random breath testing of drivers. More recently, awareness has increased about other adverse effects of alcohol on safety, particularly interpersonal violence.

Policy responses to harmful effects of alcohol have influenced community attitudes and patterns of drinking. Drink-driving, once widely tolerated, is now socially disapproved of. 'Booze buses' and other anti-drink driving enforcement measures have prompted changes in where and when many people drink.

Clearly, important changes in the patterns of alcohol consumption by Australians are occurring. It is increasingly important therefore to develop a better and more precise understanding of the role that work plays in the ways Australians use, or misuse, alcohol. Patterns of alcohol use are essentially culturally determined and culture bound. They are learned behaviours that are shaped by influential members of our social sphere and especially by those most valued to us e.g. our parents, friends and peers (Roche 2001). Social and professional expectations in relation to a wide range of behaviours can be extremely potent. This is also true in regard to the way we use alcohol. Work-related shapers of drinking behaviour can be subtle or overt. They can also be negative or positive influences and can have a significant impact on safety and injuries incurred.

Previous perspectives challenged

Recent revisions to the Australian Alcohol Guidelines, produced by the National Health and Medical Research Council (NHMRC 2001), incorporated an important paradigm shift. That shift involved a broadening of the criteria for risky or harmful drinking to include not only chronic long-term consumption patterns, but also acute or short-term consumption patterns. This was an important and dramatic shift from the way problematic drinking had previously been conceptualised.

Similarly, the present report also entails a major paradigm shift in the way we have conceptualised the relationship between work and alcohol use. The approach taken here is not to restrict examination to the period one is actually at work and to determine how much, if any, alcohol is consumed during work hours. Such a narrowly defined perspective will yield limited findings—in Australia it appears relatively little alcohol is actually consumed during working hours. What is more significant is the drinking that occurs before and after work that is related to, or impacts upon, the work environment.

Data sources

In undertaking this examination of the impact of work-related drinking on a range of health factors a diverse array of data sources was scrutinised. Examination of a variety of different data sources allowed maximum opportunity to identify the extent of the impact of work-related drinking. The data sources included available studies from hospital Emergency Departments, hospital separations data, the National Coroners Information System and the National Drug Strategy Household Survey (NDSHS) data. Unexpectedly, the secondary analysis of the NDSHS data proved most fruitful for the purposes of this study. The NDSHS data analysis revealed specific patterns of risk for alcohol by occupational and industry groups. It further provided meaningful data on the relationship between particular patterns of consumption including regular short-term risky drinking, infrequent short-term risky drinking and long-term risky drinking. In undertaking the latter analyses, we employed the new NHMRC levels that differentiate risky patterns of consumption by short- and long-term risky drinking. It revealed important new findings previously not detected when only long-term (or chronic) levels of harm were assessed.

A Workforce Development perspective

A further important aspect of this comprehensive body of work is its workforce development perspective. The concept of workforce development is one that is gaining increased currency (Roche 2002). In essence:

> *Workforce development is a broad term used to encapsulate a number of key factors pertaining to individuals, the organisations within which they operate and the systems that surround them. Workforce development is a multifaceted approach which addresses the range of factors impacting on the ability of the alcohol and other drug workforce to function with maximum effectiveness* (Skinner et al, 2003, p.5).

In the generic workplace, there are important workforce development related issues that particularly pertain to alcohol and its potentially adverse consequences in a work setting. Relevant workforce development issues include developing managements' understanding of the issues, the need for occupational, health and safety training, and the necessity to implement a range of appropriate policies and intervention programs designed to ameliorate the negative workplace consequences of risky drinking.

A workforce development perspective is similar to the wider focus presented here in relation to workplace culture, and its impact on the development and maintenance of certain types of drinking behaviours. Both are focussed on systemic issues that extend beyond the individual and both involve an examination of complex interacting factors that need to be addressed.

Overall, this study has explored the impact of work-related drinking on a wide range of health and occupational outcomes. It employed a new paradigm—the concept of workplace culture—from which to undertake this examination. Further, it utilised the new NHMRC levels to distinguish between short-term risky and long-term risky drinking and associated harms. These approaches have resulted in a new baseline of workplace drinking data. This document will now allow further studies to be undertaken in the future and the establishment of trend data that was previously not possible.

2 Alcohol and workplace culture

Over the past 25 years, a growing body of research has examined the relationship between work and alcohol consumption patterns. This research has largely been driven by concerns regarding the safety and productivity of the workplace and recognition that factors within the workplace environment are associated with the alcohol consumption patterns of workers. Despite substantial research endeavours, however, the aetiology and nature of alcohol-related harm in the workplace, especially in the context of the Australian workplace, is not well understood (Allsop & Pidd 2001).

This report commences with a review of relevant research in order to describe the relationship between the workplace and alcohol consumption. To provide a clearer understanding of this relationship, a new conceptual model is presented which extends traditional understanding of the interplay between relevant factors (see Figure 2.1 p 17). A clearer understanding of the complex relationship between alcohol consumption and the workplace is essential for developing interventions designed to minimise the risk to workplace safety and productivity.

A paradigm shift

While there are different theoretical explanations of the way workplace factors impact on the consumption patterns of workers, a unifying and consistent explanation is workplace culture. The emphasis in this document is on the role workplace culture plays in the relationship between work and alcohol consumption. The potential role of workplace culture in exacerbating or inhibiting alcohol problems is highlighted.

Culture (conceptualised as the shared and learned norms, values, and practices that distinguish social groups) plays an important role in defining and influencing alcohol consumption patterns and alcohol-related problems. In most societies, drinking is essentially a social act that is embedded in a context of values and norms (Heath 1987). These norms and values prescribe who may or may not drink, in what contexts drinking should occur, and the amounts that should be consumed. The social norms and legal requirements that concern who can or cannot drink, in what contexts this drinking should occur, and how much should be consumed vary from country to country and from context to context. Thus, the cultural norms approach proposes that drinking is a behaviour that is learned within the cultural context of a social group and can be functional or dysfunctional (Trice & Sonnenstuhl 1990).

Social groups establish norms and social controls about how, when, and where to drink. From a cultural perspective, this drinking may serve useful functions such as enhancing relations between group members and relieving individual stress. However, drinking becomes dysfunctional when individuals exceed drinking norms, evade social controls and disrupt the group (Trice & Sonnenstuhl 1990). Therefore, cultural values and norms can not only influence individual consumption patterns, but can also define what constitutes 'problematic' and 'non-problematic' drinking.

A cultural norms approach to understanding how and why we drink the way we do extends the notion of social learning as the principal explanatory model of an individuals' drinking behaviour (e.g. Roche 2001). The social learning approach maintains that individuals learn how to drink by observing, and then imitating, the alcohol-related behaviours and expectations modelled by others in the social group. The

cultural norms approach expands on this and maintains that the social/cultural environment is a powerful influence that defines, shapes, or prescribes the alcohol-related behaviours and expectations of others in the social group. The cultural norms approach, while recognising the importance of individual factors, focuses on the wider cultural environment in which drinking occurs. Thus, this document presents a paradigm shift in relation to the workplace and alcohol consumption.

> *While there are different theoretical explanations of the way workplace factors impact on the consumption patterns of workers, a unifying and consistent explanation is workplace culture.*

Workplace culture and alcohol use

The concept of culture and its relationship to alcohol consumption also extends to work organisations. Organisational or workplace culture can be described as a set of shared understandings that:

- are learned,
- characterise a work organisation, and
- distinguish it from other work organisations (Bochner 2003).

These shared understandings are acquired through a process of socialisation in the work environment whereby workers acquire the skills, attitudes, values, and behaviours necessary to become valued and effective members of work organisations. The workplace is a distinct cultural environment within the larger community that can either support or inhibit the development of problem drinking among workers (Ames & Janes 1992). An understanding of the cultural environment is essential for minimising the risk of problem drinking among workers.

> *The workplace is a distinct cultural environment within the larger community that can either support or inhibit the development of problem drinking among workers.*

Workplace norms

All workplaces have formal and/or informal rules and norms regarding appropriate work behaviour. Workplaces also have procedures, developed from theses rules and norms, to regulate work behaviour. These rules, norms, and procedures extend to alcohol, including defining what constitutes problematic and non-problematic drinking in the workplace.

Workplace rules and norms may be inconsistent with the rules and norms of the wider community. For example, problematic drinking in the workplace may include drinking during lunchtime even though alcohol consumption with meals may be viewed as socially acceptable and even desirable in the wider community.

Similarly, drinking norms at work may differ from an individual worker's norms for drinking away from the workplace. For example, workers may be pressured to join co-workers in regular 'end of the working week' drinking rituals despite their normal social

drinking patterns. Normal social drinking patterns, for some individuals, may not involve any regular pattern of drinking. Thus, workers who don't normally drink in their own leisure time may find it expected of them at work. An example of this is evident in Ames and Janes' (1987) study of workers who were retrenched from the manufacturing industry. Before being laid off, a substantial proportion of these workers were heavy drinkers who engaged in regular drinking with co-workers during work breaks and after work. After being retrenched, however, their alcohol consumption decreased as this pattern of drinking was discontinued and not replaced in other social contexts. This reduction in alcohol consumption was not due to reduced income level as substantial company, union, and state unemployment benefits maintained income levels close to what they were before retrenchment. Rather, the drinking norms of work-related social networks played a central role in the development and maintenance of the workers' drinking practices prior to retrenchment (Ames & Janes 1987).

Work-related social networks are a particularly important component of workplace cultures regarding alcohol use. Due to the large amount of time workers spend together at work quite often significant social relationships develop, some of which extend off the job. The sharing of leisure activities off the job can lead to the development of work-based drinking networks that may establish and maintain norms for alcohol use. When workers socialise together after working hours, alcohol is often consumed and the level and pattern of consumption is generally affected by the expectations of group members (Martin et al, 1996).

Research evidence supports the proposition that workplace drinking networks impact on employees' alcohol consumption patterns. For instance, Parker and Farmer (1988) reported that time spent with co-workers away from work was significantly related to the alcohol consumption of male and female employees. Similarly, Casswell and Gordon (1984) examined employed New Zealand males and found a significant relationship between increased drinking problems and leisure time spent with co-workers who drink. Ames and Janes (Ames & Janes 1987; 1990; Janes & Ames 1989) found that employees who developed close-knit social networks with co-workers were those most likely to drink heavily. More importantly, regardless of where these workers socialised, drinking was the primary activity of the interaction (Ames & Janes 1990).

Work-related social networks are a particularly important component of workplace cultures regarding alcohol use.

Workplace subcultures

Employee participation in work-based drinking networks may result in the development of occupational drinking subcultures. Occupational drinking subcultures occur when workers share a common identity of themselves as a distinctive category of workers and form distinctive beliefs about drinking (Sonnenstuhl 1996). These subcultures engage in distinctive drinking practices that informally define appropriate and expected behaviours in certain circumstances (Cosper 1979). Drinking practices are defined by the subculture as appropriate and expected behaviours, because they serve a functional purpose. As Cosper (1979) states:

> *"…in certain occupational subcultures, drinking, rather than being seen as pathological, may be seen as communicative behaviour symbolising social solidarity and the situation, wealth, masculinity, identity, or superiority of the group"* (p. 886).

Similarly, Janes and Ames (1989) reported on a study that examined a workplace subculture involving a group of blue collar males employed in the manufacturing industry. Within this group drinking was a normal part of work life that served to improve social relationships, reduce boredom and dissatisfaction, and to express solidarity in defiance of management rules and working conditions. An example of an occupational subculture where drinking was a means of coping with unpleasant working conditions is provided in a descriptive study of American tunnel workers (Sonnenstuhl 1996) where drinking on and off the job was a culturally prescribed technique for coping with the stress of dangerous working conditions.

Australian research evidence also supports the proposition that occupational subcultures can develop through workplace drinking networks. Davey, Obst, and Sheehan (2000) surveyed 4,193 Australian police officers in a state police service and found 26% reported drinking at work, while 48% reported drinking with colleagues after work. These results demonstrated a strong norm for drinking and indicated a culture of alcohol consumption that was predictive of negative consequences associated with drinking and risk of alcohol dependency (Davey et al, 2000).

Davey and colleagues (Obst et al, 2001) also conducted a longitudinal study that followed a group of Australian police recruits through the first 12 months of training. The results of this study indicated that recruits' risk of harm from alcohol consumption, as assessed by the Alcohol Use Disorders Identification Test (Saunders et al, 1993), increased as their training progressed. According to Obst, Davey et al. (2001), these results indicate police service training introduced recruits into a culture of alcohol use that impacted on their consumption patterns. Earlier research also indicates that some Australian police workplaces involve drinking subcultures. In a study that examined alcohol and other drug consumption in the Australian workforce at large, Hagen, Egan, and Eltringham (1992) reported:

> *"… in many parts of the (police) service a cover up mentality exists. Officers hide co-workers with a drinking problem from senior officers to prevent colleagues being disciplined…"* (p. 68).

There is a range of factors that can influence the development of occupational drinking subcultures. Drinking subcultures can emerge as a result of factors such as:

- group solidarity, job identity and age group (Cosper 1979),
- conditions of the job that result in work stress (Sonnenstuhl 1996), and
- occupations where team work is an important part of work (Fillmore 1990).

However, whatever the factors are that lead to the development of drinking subcultures, what is important is that within these subcultures, drinking becomes normative behaviour that is interactive with the overall organisational culture of the workplace (Trice & Sonnenstuhl 1988; Janes & Ames 1989).

… within these subcultures, drinking becomes normative behaviour that is interactive with the overall organisational culture of the workplace.

The role of supervisors and management

Workplace management and supervision play a crucial role in regulating workers' alcohol consumption patterns that may directly affect workplace safety. In many safety sensitive occupations (e.g. airline pilots, bus drivers, heavy equipment operators) management have implemented zero tolerance policies concerning alcohol. The administrative culture within any work organisation can also indirectly impact on the overall workplace culture regarding alcohol use (Trice 1992; Trice & Sonnenstuhl 1990). In particular, the way in which management and supervisors deal with alcohol use in the workplace can influence the workplace culture regarding alcohol use. For example, workplaces that experience higher levels of work-related drinking are those:

- with poor management/union relations concerning the disciplining of alcohol affected workers,
- that rely on informal, as opposed to formal, measures for dealing with alcohol issues, and
- that emphasise the importance of production quotas over dealing with alcohol issues (Ames et al, 2000).

In some circumstances, management and administrative cultures can also actively facilitate work-related alcohol use. This facilitation may be in the form of:

- alcohol use at business lunches,
- alcohol use at conferences and office parties, and
- the use of alcohol for team or morale building in ritual ceremonies that celebrate work events.

Thus, in some workplaces, tensions may exist for management between the requirement for stringent control of workers affected by alcohol during work hours and pressure to tolerate or condone workplace norms for alcohol use at work-related social or celebration events that are important for team and morale building.

While managerial and administrative support for alcohol use can be appropriate and associated with non-problematic drinking that serves a useful function for the work organisation, in some cases this support is inappropriate and associated with dysfunctional problematic drinking. For example, managerial support for the use of alcohol to celebrate work-related events may be appropriate and functional if responsible serving of alcohol guidelines are enforced, low risk levels of consumption are encouraged, and there is a positive benefit for worker morale and camaraderie. However, if responsible serving guidelines are not enforced and workers engage in unsafe levels of consumption, worker camaraderie, worker morale, and worker safety may be negatively affected.

An example of how managerial and administrative support for alcohol use can influence consumption patterns and workplace safety is evident in the Australian building and construction industry. It has been acknowledged that alcohol has been a part of the culture of this industry for many years (Milne 1995). Alcohol has been used as currency for wages or bonus payments, and as a part of important industry rituals, such as site barbecues, traditionally used to mark completion of stages of the job and typically involved free supply of alcohol by the employer (Milne 1995). The introduction of a drug and alcohol program into this industry has altered managerial support and use of alcohol at on-site barbeques is no longer endorsed. Barbeques are still conducted to celebrate completion stages of the job, however, they are now either alcohol free or the worksite is

officially closed and a barbeque with alcohol is conducted away from the workplace (Sharp 2004).

Administrative and managerial support for other forms of potentially problematic work-related alcohol use is also evident in the construction industry. In a recent study that examined the alcohol use of 319 apprentices employed in the construction industry, Pidd (2003b) identified that a substantial number of apprentices engaged in alcohol use after work, but before going home. In general, over 20% of the apprentices surveyed frequently (at least weekly) drank after work, while more than 50% drank after work occasionally (less than weekly). More importantly, a majority of these apprentices perceived that supervisors would not only approve of but actively encourage alcohol use after work (Pidd 2003b). Supervisors may consider this form of support to be appropriate as they regard co-workers drinking together after work to be an effective method for team building and increasing worker morale. However, this support can become inappropriate if workers' drinking levels place their own safety and that of others at risk (e.g. if travelling home under the influence of alcohol).

> *…the way in which management and supervisors deal with alcohol use in the workplace can influence the workplace culture regarding alcohol use.*

Workplace culture and other influences on workers' alcohol consumption

Workplace cultures of alcohol use are not uniform. They can exist at different workplaces for different reasons and take different forms. However, in general, a workplace culture of alcohol use can be defined as the learned and shared norms that transmit information to workers about the benefits of alcohol use, the workplace tradition of use, the expectations of use, and the tolerance or support of alcohol use (Fine et al, 1982). While workplace culture plays a central role, a wide variety of other workplace factors have been identified as potential influences on the alcohol consumption patterns of workers. In general, the literature tends to explain the role of these factors in terms of their impact on work stress, work alienation, and workplace social control regarding alcohol use.

Work stress and alienation explanations argue that the physical conditions of the workplace can lead to stress and/or alienation, which in turn leads to increased alcohol consumption. Social control explanations argue that features of the workplace such as low worker visibility, lack of supervision, and lack of formal policies regarding alcohol use influence alcohol availability which in turn influences workers' alcohol consumption. The following sections examine each of these explanatory categories. The role workplace culture plays in determining whether workplace stress/alienation factors or workplace social controls influence the alcohol consumption patterns of employees is highlighted.

> *… a workplace culture of alcohol use can be defined as the learned and shared norms that transmit information to workers about the benefits of alcohol use, the workplace tradition of use, the expectations of use, and the tolerance or support of alcohol use.*

Work alienation, work stress, and alcohol use

Stress and alienation explanations of alcohol use are based on the premise that some aspects of the workplace environment can be stressful and/or alienating. While stress and alienation explanations are essentially two distinct approaches, they have a substantial degree of overlap. Both explanations view alcohol use as a coping strategy that individuals adopt to deal with the effects of stress and/or alienation.

Work alienation

The alienation perspective proposes that the workplace environment contains factors that can lead to alienation. For example, the type of work engaged in might be boring and monotonous, or the worker may have little control over the pace or planning of their work. This type of work can create a sense of dissatisfaction or powerlessness that is relieved by alcohol use (Trice & Sonnenstuhl 1990). Greenberg and Grunberg (1995) examined the relationship between alienation (defined as low autonomy, low use of capabilities, and lack of participation in workplace decision making) and negative consequences from heavy drinking. Controlling for background factors, the direct effects of alienation were minimal. Results indicated that alienating factors were indirectly associated with heavy drinking and drinking problems. Alienation influenced job satisfaction, which in turn influenced a set of beliefs about the utility of drinking as a means of coping with alienation (Greenberg & Grunberg 1995).

Work stress

The work stress perspective proposes that workplace stressors—such as dangerous or high-risk work, shiftwork, and task complexity—can result in increased risky patterns of alcohol consumption. Workplace experiences (such as physically or psychologically demanding work) and events (such as accidents or repetitive injury and disputes) can be translated into life strains that can be alleviated by alcohol use (Trice & Sonnenstuhl 1990). Davidson and Cooper (1981) identified numerous workplace factors that are stressful, including:

- skill under-utilisation,
- pay inequity,
- boredom,
- hazardous work,
- shiftwork,
- role conflict, and
- job insecurity.

Therefore, work stressors may arise due to the type of work engaged in and/or the physical environment where such work takes place. Work stressors may also exist in the organisational structure, for example poor management and worker relations, low pay, or poor job satisfaction. Recent research (Grunberg et al, 1998; Grunberg et al, 1999) has identified that the relationship between work stress and problematic alcohol use is similar to the relationship between alienation and alcohol use. That is, work stressors indirectly influence alcohol consumption. Work stress influenced job satisfaction, which in turn influenced beliefs about drinking as an effective method of coping with stress.

In general, research support for stress/alienation explanations of alcohol use is mixed. While there are a number of studies that demonstrate modest associations between stress/alienation and alcohol use (Bromet et al, 1988; e.g., Margolis et al, 1974; Martin et al, 1992; Seeman & Seeman 1992), other studies have found no association (Cooper et al, 1990; e.g., Harris & Fennell 1988; Mensch & Kandel 1988; Seeman et al, 1988). These mixed findings indicate that other factors may play a role and, therefore, the stress/alienation perspective is limited. In particular, the stress/alienation perspective does not explain why exposure to stress or alienation does not always impact on alcohol use. It appears that some workers are either not affected by stress and alienation, have different perceptions of stress and alienation, or have adopted alternative coping strategies.

Work stressors and factors in the workplace that contribute to alienation can result in alcohol consumption.

Work stress, alienation and alcohol use: An interaction with workplace culture

Workplace culture plays a role in determining the degree to which stress and alienation impact on alcohol use and, therefore, provides an alternative explanation that may account for inconsistent research findings. According to Trice and Sonnenstuhl (1990), stress at work is related to alcohol use because workers who feel stressed learn from other workers that drinking is an appropriate and socially sanctioned method for alleviating stress. That is, workers who are stressed are influenced by workplace cultural norms and model the behaviour of other stressed workers.

An example of how workplace culture impacts on the relationship between stress and alcohol use is evident in a recent study that examined the alcohol consumption of Australian police officers. Davey, Obst and Sheehan (2001) examined the degree to which work stress and workplace culture was associated with the alcohol consumption of serving police officers. Results indicated that while police officers rated social factors such as celebrating workplace events and socialising with peers after work as the most important factors for drinking with work colleagues, factors related to work stress were most predictive of alcohol consumption patterns. These findings indicate that a workplace culture of socialising with colleagues after work enabled workers to alleviate the effects of work stress with alcohol.

Workplace culture can also discourage the use of alcohol to alleviate the effects of work stress. Martin, Roman and Blum (1996) conducted a study that examined the relationship between work stress, workplace drinking networks, workplace social support, and employees' problem drinking. Results indicated that work stress influenced problem drinking via employees' attitudes toward drinking to escape or alleviate work stress. Participation in workplace drinking networks predicted problem drinking and influenced the development of beliefs about alcohol's effects. In particular, frequency of drinking with co-workers increased the probability that employees would report attitudes that supported drinking to escape or alleviate work stress. Despite a small effect size, the results also indicated that supervisory support reduced escapist reasons for drinking, and that co-worker support reduced problem drinking.

Similarly, Moore (2001) surveyed 673 municipal workers from various occupational categories and found that 68 respondents working as nurses reported significantly more work stress, yet drank no more that other employees in the study. Analysis of survey and ethnographic data indicated that nurses relieved stress by seeking social support from supervisors and co-workers. Other forms of stress relief included employers allowing nurses to take 'mental health days' off and encouraging nurses to actively overcome aspects of work that caused stress. Taken together, the results of Moore's study and the study of Martin, Roman and Blum (1996) indicate that workplace cultures that encourage supervisor and co-worker social support and other forms of stress relief can discourage the use of alcohol to relieve work stress and alienation.

Workplace culture plays a role in determining the degree to which stress and alienation impact on alcohol use.

Workplace alcohol availability, social control, and alcohol use

The social control explanation of alcohol use is based on the premise that structural features of the work environment can restrict or encourage alcohol availability, and therefore alcohol consumption. Trice and Roman (1978) identified several structural features that contribute to availability, including:

- low visibility (e.g. working alone, or away from the workplace),
- lack of supervision, and
- lack of formal policies regarding alcohol use.

The social control explanation of alcohol use is based on the premise that structural features of the work environment can restrict or encourage alcohol availability, and therefore alcohol consumption.

Physical and social availability of alcohol

There are two types of availability: physical and social (Ames & Grube 1999). 'Physical availability' refers to the extent of access to alcohol in a given environment and the costs or barriers to obtaining alcohol. Physical availability can be objective (e.g. legal, organisational and geographical factors affecting the cost of obtaining alcohol) or subjective (e.g. perceptions of physical availability, including beliefs about how easy or difficult it is to obtain alcohol). 'Social availability' refers to the degree of normative support for consuming alcohol, which can vary according to the situation. For example, while alcohol consumption at a work-related social function might receive significant normative support, there may be less normative support for consumption during working hours. 'Objective social availability' refers to the actual alcohol use and approval of use by family, friends and others in a given situation. 'Subjective social availability' refers to individual perceptions of alcohol-related norms in a given environment.

Social control and alcohol availability

The social control perspective has received substantial research support. For example, Ames and Janes (1987) found that low supervision and/or low visibility of workers on the job were important factors in the development of norms for heavy drinking among workers. Macdonald, Wells, and Wild (1999) examined the relationship between a number of workplace factors and the alcohol consumption patterns of workers employed in a range of industries and found that only availability and social drinking among co-workers distinguished between problem and non-problem drinkers.

Ames and Grube (1999) examined the relationship between alcohol availability and the work-related drinking of manufacturing industry employees. Results indicated that subjective social availability, in particular the perceived drinking of co-workers, was the strongest predictor of work-related drinking. Similar results were found in a study that examined on the job alcohol consumption in a population of young workers (Frone 2003). Results of this study indicated that workplace availability was related to alcohol use at work. However social availability, in the form of normative support for use, appeared to be more important than physical availability.

The social control perspective is important as it identifies structural features of the workplace that can restrict or encourage alcohol availability and therefore consumption. However, a major limitation of the social control perspective is that it does not explain the mechanisms that allow availability to translate into consumption. Several possibilities have been proposed to explain these mechanisms.

One explanation is that individual perceptions, attitudes, and beliefs relating to alcohol use may influence whether availability results in consumption. Workers may, for example, have easy access to alcohol in the workplace but conduct a cost/benefit analysis before deciding to consume alcohol. Garcia (1996) found factors that increase the cost of dismissal lower the probability of employee misconduct. In particular, employees were less likely to use alcohol or other drugs on the job if the industry in which they worked paid a wage premium or if they worked in an area with high unemployment. Similarly, Grube, Ames and Delaney (1994) found that work-related drinking was largely influenced by expectancies of how unlikely or likely it was that drinking would lead to personal consequences.

An alternative explanation proposed by some researchers is that employees who are heavy drinkers self select occupations with low levels of supervision and high levels of availability. For example, Plant (1979) reported that individuals who commenced work in the alcohol industry consumed higher levels of alcohol at commencement, compared to individuals who commenced work in other industries. However, the limitation of this proposition is that it assumes individuals have the opportunity to select from a range of occupations and also assumes individuals are aware in advance of the availability and supervision levels of particular workplaces. Quite often this is not the case.

The social control perspective is important as it identifies structural features of the workplace that can restrict or encourage alcohol availability and therefore consumption.

The interaction of culture with availability, social control, and alcohol use

A more plausible explanation of how alcohol availability in the workplace translates into alcohol consumption is that the relationship between availability, social control, and alcohol use is influenced by the workplace culture. Indeed, research concerning alcohol availability in the workplace supports this proposition. In the previously cited study of Ames and Grube (1999), one aspect of availability (i.e. the perceived drinking of co-workers) predicted work-related drinking, however, physical availability and perceptions of approval and disapproval of drinking at work did not. Despite this finding, ethnographic data indicated that alcohol was easy to obtain and consume at work. Reasons for drinking to occur regardless of formal rules against drinking at work and widespread disapproval included:

1. the union took a strong position against enforcing disciplinary action that affected workers' jobs and pay,
2. keeping up with daily production quotas influenced supervisors' responses to worker drinking. Removing a worker from the production line had to be weighed against the odds of finding a replacement worker to maintain production levels, and
3. group drinking provided purposeful functions. For some workers drinking was a shared response to job conditions that involved repetitive tasks, for others group drinking was an expression of union solidarity, and for others group drinking was part of a regular ritual for celebrating payday.

Thus, in the case of Ames and Grube's (1999) study, it appeared that the workplace culture concerning alcohol use influenced the degree to which social controls impacted on work-related alcohol use.

Similarly, Ames, Grube and Moore (2000) reported on a study that examined how social control:

> *"…mechanisms for controlling alcohol behavior at work are strengthened or weakened by the organizational culture and, thereafter, influence workplace drinking norms and employee drinking patterns"* (p. 203).

This study examined the alcohol consumption patterns of more than 1,700 employees working in the same United States of America (USA) industry with the same union, but in two different work environments. One work environment reflected an organisational culture that was based on traditional USA management methods, the other was based on a Japanese transplant management model. The results of this study indicated that while overall alcohol consumption rates were similar, significant differences were observed regarding work-related drinking between work sites. In the traditional USA work site, 25% of the workforce engaged in workplace drinking, while in the Japanese transplant work site only 3% of the workforce engaged in workplace drinking.

In both work sites, these drinking rates were influenced by formal and informal social controls. Alcohol policies, and the extent to which policies were enforced, predicted alcohol availability at work and drinking norms. Drinking norms predicted workplace drinking and accounted for differences in alcohol consumption between the two workplaces. The traditional USA work site was associated with more permissive norms regarding drinking at work and higher levels of alcohol consumption compared to the

Japanese transplant work site. An analysis of ethnographic data provided an understanding of aspects of the two cultures that disabled social control mechanisms in one workplace and enabled these mechanisms in the other.

While an alcohol policy was in place in the traditional USA work site, the ability of supervisors to enforce it was compromised due to the policy's incompatibility with other higher priorities of the union and management. Organisational barriers to policy enforcement included:

- conflicts with union representatives that usually involved the reversal of any disciplinary action,
- the lack of skilled replacements for workers removed from the production line due to drinking, and
- fear of reprisal from management if productivity slowed.

As a result, supervisors often utilised informal, and less effective, processes for handling alcohol problems including:

- ignoring the problem,
- referring the worker to the employee assistance program rather than disciplinary action, and
- referring the worker to the union representative to be transported home.

In contrast, features of the Japanese transplant culture helped to promote an almost alcohol free work site. These included:

- non-adversarial union-management relations,
- cohesive work teams that promoted communication between team members and between teams and management,
- the emphasis placed on the role of team leaders in resolving team problems, and
- cooperation between workers and management in developing and implementing the alcohol policy.

> *…the relationship between availability, social control, and alcohol use is influenced by the workplace culture.*

Work stress and workplace social control as cultural dimensions of alcohol use

Ames and Janes (1992; Janes & Ames 1993) argue that much of what alcohol researchers term as work-related risk factors for problematic alcohol use are, in effect, best understood as dimensions of cultural processes that operate in complex organisations. As noted previously, Ames and Janes (1992) propose that the workplace is a distinct cultural environment that exists within the wider community, and as such can either support or inhibit alcohol use. According to Ames and Janes, cultural factors that influence alcohol use can be conceptualised as:

- the normative regulation of drinking,
- the quality and organisation of work,
- drinking subcultures,
- factors external to the workplace.

Normative regulation of drinking encompasses elements of the workplace that form and maintain beliefs, values and behaviours related to drinking. Normative regulation results from formal and informal social controls (including availability) relating to both the workplace and alcohol use. The quality and organisation of work encompasses factors that can contribute to either stress or alienation, or both. Factors external to the workplace refer to the interaction between work and social life, that is, the work and social culture regarding alcohol use. Drinking subcultures are defined as naturally occurring groups that share the same sets of beliefs in relation to alcohol use and the workplace, including values and expectations regarding use. Ames and Janes (1992) argue that these cultural dimensions play an important role in both the development and maintenance of work-related alcohol problems.

There is research support for Ames and Janes' (1992; Janes & Ames 1993) theoretical framework. This research indicates that the way in which these dimensions impact on alcohol use differs across workplaces, however, the most consistent factors appear to be those indicative of workplace cultures regarding alcohol use. For example, Macdonald et al., (1999) examined the relationship between the major elements of the framework and alcohol problems in a sample of 882 Canadian workers from a variety of occupations and found support for all the cultural dimensions proposed by Ames and Janes. The most important of these dimensions were those reflecting social controls (availability) and drinking subcultures (social drinking among co-workers). Similarly, Bacharach, Bamberger, and Sonnensthul (2002) examined worker drinking behaviour focusing on workplace drinking norms (culture), alienation, stress, and policy enforcement (social controls). Results indicated that perceived drinking norms were the strongest direct predictor of problem drinking among workers. These norms also both mediated and moderated the effects of stress and policy enforcement variables on problem drinking.

More importantly, the limited research that has examined the Australian workplace also provides some support for the importance of workplace culture in understanding the alcohol consumption patterns of employees. Bush, Smith, and Dawes (1992) examined the combined effects of stress, controls and culture on the alcohol consumption patterns of 737 train drivers employed by the Sydney urban rail system. Results indicated a culture of alcohol use where 53% of workers drank at work-related celebrations, 26% drank after workplace accidents, and 16% drank after workplace fatalities. Work stress, workplace controls, and workers' perceptions of these controls were not related to alcohol use. However, aspects of the workplace culture concerning drinking norms were significantly related to alcohol use. According to the authors, the results indicated that when workers were committed to a work based culture that valued drinking, their alcohol consumption levels were higher than the consumption levels of workers who did not support these workplace norms (Bush et al, 1992).

> *… much of what alcohol researchers term as work-related risk factors for problematic alcohol use are, in effect, best understood as dimensions of cultural processes that operate in complex organisations.*

Work stress, workplace social control, and workplace culture: An interactional model of alcohol use

The evidence reviewed above, concerning work stress/alienation and workplace social controls, indicates that workplace cultures and subcultures can interact with these factors to influence workers' alcohol consumption patterns. This suggests that the relationship between the workplace environment and consumption levels is best understood in terms of an interactional model of alcohol use. That is, the workplace contains stressors, controls, and sub-cultures that can interact to result in an overall culture that either supports or discourages risky alcohol use. One advantage of this approach is that it provides a broader understanding of the complex relationship between the workplace environment and alcohol use than the stress/alienation or workplace control explanations. This model is presented in Figure 2.1.

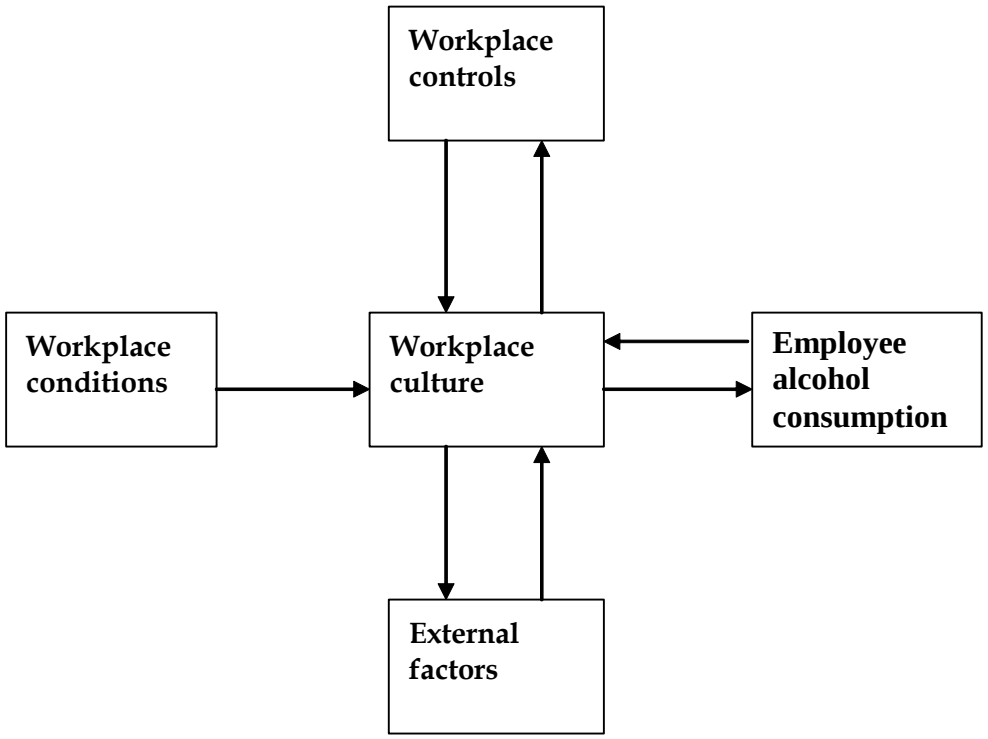


Figure 2.1: Hypothetical model of the key relationships between the workplace environment and alcohol use (Pidd 2003a)

Workplace conditions outlined in Figure 2.1 include all those factors evident in the workplace environment that can result in work stress and/or alienation such as:

- dangerous work,
- shiftwork,
- physical conditions of the workplace,
- task complexity, and
- lack of control over the pace or planning of work.

Workplace controls include all those factors that contribute to alcohol availability in the workplace including:

- physical and social availability,
- alcohol policy and procedures,
- supervision levels, and
- low visibility.

External factors include all those factors external to the workplace that can influence the workplace culture regarding alcohol use including:

- workers' pre-existing attitudes, beliefs, and behaviours regarding alcohol use,
- the values, behaviours, and expectations of family members, and
- the social and cultural norms of the wider community.

Workplace culture includes all those factors that make up the workplace culture regarding alcohol use including:

- drinking subcultures,
- drinking networks,
- drinking norms, and
- administrative/management culture.

> *…the workplace contains stressors, controls, and sub-cultures that can interact to result in an overall culture that either supports or discourages risky alcohol use.*

It is important to remember when examining this model, that culture is not a static or stable concept. Rather, culture is fluid and dynamic. Culture is determined by shared values, norms, behaviours and attitudes, which in turn are shaped by the existing or prevailing culture.

As can be seen from Figure 2.1, workplace culture plays a central role in the relationship between the workplace environment and alcohol use. The relationship between workplace conditions and alcohol use is mediated by culture, while culture can be influenced by workplace controls and factors external to the workplace. Workplace culture can in turn influence workplace controls such as availability and informal procedures for dealing with alcohol issues. Workplace culture can also influence external factors such as the expectations, attitudes and behaviours of employees' family members, and the social values and norms of the wider community. In addition, workplace culture not only influences the alcohol use of employees during work hours, but can also influence alcohol use that occurs outside of work hours. The alcohol consumption patterns of employees in turn, help shape the workplace culture regarding alcohol use.

For ease of presentation, the relationship between the workplace environment and alcohol use outlined in Figure 2.1 represents only the key relations between variables. As the relationship between the workplace environment and alcohol use is complex, it is likely that relations between variables will vary between individual workplaces and work situations. For example, in a workplace such as a licensed hotel where alcohol is readily available and consumption is actively promoted as part of the work organisation's core business, it is likely that there would be a direct relationship between

workplace conditions and workplace controls. Similarly, in a workplace that conducts regular alcohol testing, it is likely that there would be a direct relationship between workplace controls and employee alcohol consumption.

> *… Culture is determined by shared values, norms, behaviours and attitudes, which in turn are shaped by the existing or prevailing culture.*

Summary

Taken together, the research that has been reviewed here indicates that a cultural model, as depicted in Figure 2.1, offers a more comprehensive explanation of the relationship between the workplace and the alcohol consumption patterns of employees when compared to stress/alienation and control explanations. This cultural model:

- includes the effects of workplace stressors and controls,
- recognises that individual perceptions and beliefs regarding alcohol use can mediate these effects,
- explains the social psychological processes involved in the development and maintenance of workplace culture and norms that influence alcohol use.

While a cultural norms model acknowledges the role of individual perceptions and beliefs, it shifts the emphasis from the role of individual factors to the role of environmental factors. From a cultural norms perspective the most important determinant of workers' alcohol consumption patterns is not individual beliefs, attitudes, and intra-psychic factors, rather, it is the alcohol-related culture of the wider work organisation.

A cultural perspective has important implications for workplace interventions designed to minimise alcohol-related risk in the workplace. From this perspective, workplace culture plays a central role in the development of workplace norms regarding alcohol use. Importantly, the same processes that lead to the development of alcohol-related norms can be used to reduce or minimise alcohol-related risk. That is, while alcohol use is the result of multiple factors, by facilitating and supporting norms that promote responsible alcohol use, especially within the context of the workplace, the potential for alcohol-related harm could be reduced or minimised. The influence of these norms is likely to extend beyond alcohol use that occurs during work hours, to alcohol use that occurs outside of normal working hours.

Perhaps more importantly, the cultural norms approach also has implications for policy and interventions that target the wider community. From the model outlined in Figure 2.1, the workplace culture impacts not only on the alcohol-related behaviours of individuals and social groups within the workplace, but also on the alcohol-related behaviours and attitudes of other individuals and social groups external to the workplace such as workers' families and the immediate community. Thus, the workplace has as yet untapped potential as a setting for policies and interventions that target the wider social/cultural environment.

However, as evident in the research reviewed above, very few studies have examined the relationship between the workplace and alcohol consumption in the context of the Australian workplace. In addition, while there has been some limited international research that has examined the usefulness of cultural models similar to the one outlined in Figure 2.1, there has been no Australian research that has adopted this perspective. The data analyses that follow in the next chapters of this document represent initial attempts to undertake a comprehensive, descriptive examination of these relationships.

> *… the same processes that lead to the development of alcohol-related norms can be used to reduce or minimise alcohol-related risk.*

3 Prevalence and patterns of alcohol use in the workplace

Background

Identifying the alcohol consumption patterns of the workforce is important. Prevalence data on consumption patterns of the workforce can provide a quantitative measure of potential risk to workplace safety and personal wellbeing. Moreover, such data are also essential for the development of appropriate and effective policy and intervention strategies. However, there has been comparatively little research undertaken in Australia in this area.

The most recent review of published and unpublished Australian literature (Allsop et al, 1997) identified 27 studies that examined the prevalence of alcohol consumption within various occupational or industry groups. That review found that much of this research was limited and concluded that little could be determined about the prevalence of alcohol consumption in the Australian workforce. In particular, the review found that studies of the patterns and prevalence of alcohol consumption by the Australian workforce are limited in number, methodologically weak, and conceptually muddy. No systematic investigations of work-related drinking have been undertaken in Australia since that review.

A number of important factors need to be addressed when examining the nature of the association between work and drinking levels and patterns. Some of these considerations are methodological. Others are conceptual. Key issues are examined below. An initial consideration is that of measurement: both in terms of what is being measured and how it is being measured. One factor that restricts the usefulness of much of the existing prevalence data is inconsistency between studies in their measurements and definitions of alcohol use.

Drinking at work vs work-related drinking

Insufficient critical thought has been directed to the question of what should be measured in relation to the workplace. It is argued here that a pivotal, but overlooked, perspective is that of 'work-related' patterns of consumption. That is, consumption that may occur before or after work, and not necessarily within the working day or within the confines of the work setting. The broader concept of 'work-related' consumption allows consideration of patterns of consumption that are influenced by work culture and that are integral to the nature of a given work environment. The concept of 'work-related' consumption also encapsulates effects of and consequences from risky patterns of drinking that would be missed through the traditional and narrower conceptualisations of workplace drinking. The latter concept of 'workplace' drinking largely being defined by and confined to drinking within the working day and the work setting. However, very few studies have adopted the wider approach.

The importance of the concept of 'work-related' drinking is evident when one considers that a large proportion of workplace, personal, and community harms occur as a result of intoxication and its effects (e.g. hangover). Most drinking that contributes to intoxication

will not occur during working hours. Measurements that only assess alcohol consumption during work hours will not be able to detect problems associated with alcohol consumed prior to coming to work (either from intoxication or hangover). There is also a wider range of considerations associated with work-related drinking that occurs at the end of the working day. These are discussed below.

Patterns of drinking: Before, during, and after work

Current Australian data indicate a broadly consistent overall pattern in which it appears relatively little alcohol tends to be consumed before work and during work hours but a very large proportion of the workforce engage in work-related drinking at the end of the working day. For example, Bush et al. (1992) examined the consumption patterns of 337 Sydney urban train drivers. Only 3.1% drank in the one to three hours prior to starting work, 2% drank during actual work hours, but two thirds (66.5%) drank in the one to two hours immediately after work.

Similarly, Davey et al. (2000) examined the consumption patterns of 4,193 Australian police officers. While 26% of police reported occasionally drinking at work, nearly double that proportion (48%) reported drinking with colleagues after work. Pidd (2003b) examined 319 apprentices employed in the South Australian construction industry and found 2.6% of apprentices frequently (at least weekly) and 26.7% occasionally (less than weekly) drank during work hours, while 20.4% frequently and 51.7% occasionally drank after work but before going home. Further supporting the evidence that drinking at work is a relatively infrequent phenomenon is the survey of 1,200 Victorians employed in a variety of occupations and industries. Among this sample only 4% of respondents reported drinking at work (Kelly et al, 1996).

Although it appears that comparatively lower levels of drinking occur at work (relative to after work), knowledge of the patterns and prevalence of drinking during work hours is still vitally important. However, there are only a limited number of studies that have examined this issue. Most of the studies undertaken to date have involved relatively small sample sizes, have restricted their data collection to specific industries or occupations and did not include quantity measures to determine levels of consumption. Hence, variations in findings of consumption patterns between studies make it difficult to draw definitive conclusions that are applicable across all industries and occupations.

An important methodological limitation of many studies is the failure to assess quantity and frequency of consumption and rely on a dichotomous assessment of whether alcohol was consumed or not (i.e. the worker's drinking status). While useful, this approach is very limited and more specific detail and depth are required.

Assessing problem drinking

Assessing 'problem drinking' is an alternative approach to examining workers' alcohol use. Studies taking this approach use instruments such as the Alcohol Use Disorders Identification Test (AUDIT) or the Mortimer-Filkins questionnaire, both of which include items that detect problems and/or dependence. The emphasis in such studies is on assessing both quantity and frequency of consumption together with an assessment of adverse outcomes or consequences from particular patterns of consumption.

Using the Mortimer-Filkins questionnaire, Webb, Redman, Hennrikus, Rostas, and Sanson-Fisher (1990a) surveyed 833 regional Australian manufacturing industry employees and classified 5.7% of respondents as problem drinkers and 15.2% as

presumptive problem drinkers. Similarly, Davey et al. (2001) used the AUDIT measure to survey 749 Australian police officers and found 33% had scores indicative of harmful drinking and 3.5% with scores suggestive of alcohol dependency.

However, studies that have used the above measures, while useful, are still limited in terms of aiding our understanding of work-related drinking and its associated problems for a number of reasons. Firstly, as few studies have utilised this method, it is difficult to extrapolate findings to members of other industries and occupations. Secondly, measures designed to detect problem drinking do not usually assess the impact on, or implications for, issues such as workplace safety. Most of the items contained in the Mortimer-Filkins questionnaire and AUDIT, for example, relate to personal and social problems. However, no question in the AUDIT and only one question in the Mortimer-Filkins questionnaire specifically relate to problems at work. Thus, while these instruments may indicate social and personal problems associated with alcohol use, they may not be an effective method of determining work-related problems associated with alcohol use.

Quantity/Frequency measures

A number of studies have utilised quantity/frequency measures to determine levels of risky and high risk drinking as determined by National Health and Medical Research Council Alcohol Guidelines (NHMRC 2001). These guidelines set consumption levels for short- and long-term risk that are based on a large body of research indicating that drinking at, or above, these levels exposes the individual to risk of health and social problems including risk of injury or death (NHMRC 2001). The current guidelines, while developed in Australia, have been used in the World Health Organization's *International guide to monitoring alcohol consumption and related harms* (WHO 2000) and contributed to calculations utilised in the WHO Global Burden of Disease study (Rehm & Room 2005).

The NHMRC guidelines (2001), shown in Table 3.1, address consumption levels and risk associated with both short- and long-term harms. Prior to 2001, the emphasis of previous NHMRC guidelines (e.g. Pols & Hawks 1992; Pols & Hawks 1987) was on chronic consumption associated with long-term risk only, in contrast to the two levels of consumption and risk measurement in the new guidelines. Due to physiological differences between males and females, categories of risk consumption are defined differently according to gender.

Table 3.1: National Health and Medical Research Council Australian Alcohol Guidelines

	Low risk	Risky	High risk
Risk of short-term harm		**(Standard drinks)**	
Males	Up to 6	7 to 10	11 or more
	(on any one day, no more than 3 days per week)	(on any one day)	(on any one day)
Females	Up to 4	5 to 6	7 or more
	(on any one day, no more than 3 days per week)	(on any one day)	(on any one day)
	Low risk	**Risky (*Hazardous)**	**High risk (*Harmful)**
Risk of long-term harm		**(Standard drinks)**	
Males	Up to 4	5 to 6	7 or more
On average day	(per day)	(per day)	(per day)
Overall weekly level	Up to 28	29 to 42	43 or more
	(per week)	(per week)	(per week)
Females	Up to 2	3 to 4	5 or more
On average day	(per day)	(per day)	(per day)
Overall weekly level	Up to 14	15 to 28	29 or more
	(per week)	(per week)	(per week)

* Old terminology which only applied to long-term risk

Using the (old) NHMRC guidelines and quantity/frequency measures, Webb, Redman, Sanson-Fisher and Gibberd (Webb et al, 1990b) surveyed 630 regional Australian manufacturing industry employees and found 7.6% drank between 29 and 42 standard drinks per week (i.e. long-term risky drinking, or 'hazardous' use in the old terminology) and 10.2% drank more than 42 standard drinks per week (long-term high risk drinking, or 'harmful' use in the old terminology). In a related study, Webb, Redman, Hennrikus, Rostas, and Sanson-Fisher (1990a) surveyed 833 regional manufacturing industry employees and found that 8.8% drank more than 42 standard drinks per week.

Midford, Marsden, Phillips, and Lake (1997) surveyed employees at two separate West Australian remote mining sites, utilising quantity/frequency measures similar to the new NHMRC guidelines for risk of short-term harm. Results indicated that at one site 4.3% of males (total male n=490) usually drank more than 12 drinks per occasion and 8.5% of females (total female n=61) usually drank 7–12 drinks per occasion, while 17.6% of males usually drank 7–12 drinks per occasion, and 5.3% of females usually drank 5–6 drinks per occasion. At the second site, 2.1% of males (total male n=380) usually drank more than 12 drinks per occasion and no females (total female n=33) usually drank 7–12 drinks per occasion, while 13.0% of males usually drank 7–12 drinks per occasion and 9.8% of females usually drank 5–6 drinks per occasion.

One advantage of using quantity/frequency measures of alcohol consumption is that it is the method utilised by large national health surveys. This thereby allows comparison of findings from specific occupational groups to the population as a whole or to demographically matched representative samples. The large national surveys, however, do not usually specifically measure work-related consumption. Nonetheless, indications of overall risky alcohol consumption levels do give some indication of the potential impact on the workplace.

Quantity/frequency measures can provide an indirect indication of alcohol-related problems for the workplace. For instance, frequent high level consumption is likely to have an effect on the drinker when in the workplace, irrespective of when and where the consumption occurred. The constant rate at which alcohol is eliminated from the body[2] means that individuals who drink large quantities the night before work, may still be intoxicated when they arrive at work the following day. For example, an individual who consumes 12 standard drinks between 9 p.m. and 12 midnight is likely to still have a positive blood alcohol level at 7.00 a.m. the following day. Moreover, regardless of intoxication levels after a night of heavy drinking, there is evidence to indicate that post-alcohol consumption effects can continue to negatively impact on safety-related performance for several hours after blood alcohol levels have returned to zero (Newman 2004).

Hence, identification of the proportion of workers who consume alcohol at risky to high risk levels is important information in terms of workplace safety and optimal functioning.

This approach was taken in a previous study (Hagen et al, 1992) that utilised (old)[3] National Health and Medical Research Council (NHMRC) guidelines (Pols & Hawks 1987) to examine the alcohol consumption patterns of Australian workers using National Health Survey data collected during 1989–90. In general, Hagen et al. found that 16.4% of employed males and 9.6% of employed females drank at risky (hazardous) or high risk (harmful) levels. Highest prevalence of risky and high risk drinking was found among tradespeople (19%) and lowest among clerks (9.7%). There were substantial differences between more narrowly classified occupations, and men and women employed in the same occupations. For example, while less than 15% of workers employed in the agricultural industry drank at risky or high risk levels, over 32% of those employed in the fishing and hunting sector of the agricultural industry drank at these levels. Across all industries, more men generally drank at risky and high risk levels than women. However, for some occupations the reverse was true. For example, the percentage of female specialist managers who drank at risky and high risk levels (20%) was substantially higher than the percentage of male specialist managers (13.5%) who drank at risky or high risk levels.

While Hagen et al's (1992) report provides data concerning the prevalence of alcohol consumption within the Australian workforce, it is dated and problematic in several respects. First, while the data analysed by Hagen et al. was collected in a national survey involving approximately 56,000 respondents, it is unclear from the report how many of these respondents were employed. Second, while percentages of harmful and hazardous drinkers are provided by occupational and industry classifications, there is no indication of occupation and industry sample sizes. Finally, it is unclear from the report if sample data were weighted in order to ensure representativeness with the national population. Thus, it is difficult to determine if Hagen et al's data provide an accurate indication of variation in workers' alcohol consumption patterns according to industry and occupation.

As outlined, a number of studies have examined alcohol consumption patterns of workers employed in a variety of occupations and industries. However, in general, data concerning the consumption patterns of the Australian workforce is scarce, and work undertaken in this area to date is piecemeal, uses different and incompatible measurements of consumption, and is often methodologically flawed. Moreover, we have

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[2] It takes approximately one hour to eliminate one standard drink from the body.

[3] The 'old' NHMRC guidelines only applied to long-term risk levels of low, medium (hazardous) and high (harmful) risk.

established that workplace environment factors such as stress, workplace controls, and workplace culture are associated with alcohol consumption patterns of workers. However, little is known about the relationship between the Australian workplace environment and workers' alcohol use. Even less is known about the impact of Australian workers' alcohol consumption patterns on either workplace safety or safety away from the workplace. What is needed is a sound epidemiological database from which an accurate picture of the patterns of alcohol consumption across the Australian workforce can be determined.

The current study

In order to address these issues, a study was conducted that analysed selected data from the 2001 National Drug Strategy Household Survey (NDSHS) to determine demographic, individual, and occupational factors associated with alcohol use in the workplace.

During 2001, the NDSHS was administered to 26,744 randomly selected Australians aged 14 years or over. The focus of this survey was on awareness, attitudes and behaviour relating to drug use, including alcohol and tobacco as well as illicit drugs. Because most questions asked in this survey did not specifically relate to alcohol consumption that occurs *in* the workplace, an accurate assessment of work-related prevalence could not be determined. The analyses conducted allowed only approximate inferences to be made about potential links between alcohol use and selected demographic, individual, and occupational factors.

The main aim of the current study was to identify the alcohol consumption patterns of employed respondents to the 2001 NDSHS and to determine any association between these consumption patterns and demographic, individual, or occupational factors. The measurements of alcohol consumption patterns utilised in the survey allowed respondents to be classified according to 'risk levels' of consumption determined by NHMRC guidelines—short-term risk and long-term risk. In addition, respondents were further classified according to frequent (at least weekly) and infrequent or very infrequent (at least monthly or at least yearly) short-term risk consumption.

Infrequent short-term risk consumption was included in the current study, as this measure has not previously been incorporated in Australian workplace research. However, it can be argued that individuals who engage in this pattern of alcohol consumption may represent the highest level of risk to safety. Research has clearly demonstrated that risk of injury is evident at relatively low levels of alcohol consumption and increases as the level of consumption increases (e.g., Cherpitel et al, 1995). However, research also indicates that risk of injury increases more for individuals whose consumption patterns vary substantially and that the risk is highest for individuals who on occasion drink much more than usual (Gruenewald et al, 1996; Treno et al, 1995; Treno & Holder 1997).

Scope

A total of 26,744 Australians aged 14 years and over responded to the 2001 NDSHS, corresponding to a weighted number of 15,705,803 Australians aged 14 years and over. Fifty-one per cent (n=13,582) were employed either full time or part time, corresponding to a weighted number of 8,129,232 employed Australians. A recent drinker was defined as a person who consumed a full serve of alcohol in the last 12 months. Only recent

drinkers aged 14 years and over who also reported working either full time or part time for pay (unweighted n=12,213; weighted n=7,270,989) were included in the analyses reported here.

Method

An independent secondary analysis was undertaken of 2001 NDSHS data collected by Roy Morgan Research on behalf of the Australian Institute of Health and Welfare (AIHW) and the Department of Health and Ageing (Australian Institute of Health and Welfare 2002a). The principal investigators who undertook the original analysis and collection of the data bear no responsibility for the analysis and interpretation of the findings presented in this report.

Data obtained from items relevant to alcohol use and the workplace, that were in the NDSHS were included in the current study. The numbering of each item is consistent with the numbering utilised in the survey. A copy of the survey instrument is available as an appendix to the 2001 National Drug Strategy Household Survey: First results, Appendix 5 (Australian Institute of Health and Welfare 2002b). The measures utilised in the current study are as follows.

Measures

Demographic

Z1: Gender *(1 = male, 2 = female)*. Z2: Age *(years)*.

Location: 15 areas were included in the stratified sample procedure utilised by the Survey. With the exception of the ACT (capital city only), these areas were stratified as the capital city of each state or territory and other areas of the state or territory. For the purpose of the current study, regional location was coded as *1 = capital city, 2 = country*.

Occupation

Z8: Current employment status. This item was coded as *1 = working full time or part time for pay, 2 = others*. Only respondents who were coded as 1 (*working full or part time for pay*) were included in the analyses.

Z10: Industry employed in. This was an open-ended question that allowed the respondent to describe the industry in which they were employed. Responses were then coded utilising two digit Australian and New Zealand Standard Industrial Classification (ANZSIC) codes. These codes were grouped as follows:

Agriculture (codes 1–4);

Mining (codes 11–15);

Manufacturing (codes 21–29);

Construction (codes 36–42);

Wholesale (codes 45–47);

Retail (codes 51–53);

Hospitality (code 57);

Transport (codes 61–67);

Financial services (codes 73–78);

Administration (codes 81–82);

Education (code 84);

Services (codes 71, 86–96).

Z11: Occupation. This was also an open-ended question that allowed the respondent to describe their occupation. Responses were then coded utilising two-digit Australian Standard Classification of Occupation (ASCO) codes. These codes were grouped as follows:

Managers (codes 11, 12, 13, 33);

Professionals (codes 21–32, 34, 39);

Tradespersons (codes 41–45);

Skilled workers (codes 46–73);

Unskilled workers (codes 79–99).

Alcohol consumption

The 2001 survey included new alcohol consumption questions not included in previous National Drug Strategy Household surveys. To enable determination of short- and long-term harm using the NHMRC guidelines, a full graduated quantity frequency matrix (F13) was introduced, plus respondents gave a detailed report of the previous day's alcohol consumption (F15). The syntax used to generate the short- and long-term risk categories was provided by the AIHW.

Respondents who were lifetime abstainers (a person who had never had a full serve of alcohol) or recent abstainers (a person who had consumed a full serve of alcohol, but not in the past 12 months) were excluded from the analyses. When abstainers are included, percentages of the employed population drinking at short- and long-term risk differ slightly. Appendices B1 and B2 include abstainers in the employed population estimates to enable direct comparison with the proportion of the Australian population aged 14 years and over drinking at short- and long-term risk—see Tables 3.8 and 3.9 of the 2001 National Drug Strategy Household Survey: First results, Appendix 5 (Australian Institute of Health and Welfare 2002b).

F13: Frequency and level of consumption during the past 12 months. This item contained eight categories of frequency ranging from every day to never, and six levels of consumption ranging from 1–2 standard drinks to 20 or more standard drinks. Respondents were instructed to mark one response for each row of the matrix so their quantity and frequency of alcohol consumption over the past 12 months could be determined.

Item F13 was used to calculate short-term low risk, risky, and high risk drinking for males and females according to NHMRC guidelines (Table 2.1). Short-term risk was divided into three categories: at least yearly, at least monthly and at least weekly. These short-term risk periods are mutually exclusive—each respondent is classified into one category only. Throughout the report, combined results for short-term risky and high risk levels are presented. Appendix B3 to B6 presents separate results for short-term risky and high risk levels by age, gender, industry and occupation.

F15: Number of alcoholic drinks had yesterday. This item asked respondents to record the number of alcoholic drinks they had the previous day.

Data obtained from items F13 and F15 were utilised to calculate long-term low, risky, and high risk drinking for males and females according to NHMRC guidelines (Table 2.1). For question F13, where frequency of consumption involved a category with a range of numbers, the mid point of the category was used to calculate long-term risk (e.g. 5–6 days a week becomes 5.5 days a week). The average of the quantity measures was calculated using question F15 (alcoholic drinks had yesterday). The graduated frequency matrix was summed for each respondent to calculate total annual alcohol consumption and weekly consumption. The use of the mid point for frequency of consumption suggests caution should be applied when interpreting percentage of workers drinking at long-term risk levels.

F11: Number of standard drinks usually consumed on a drinking day. This item was coded as:

1 = 13 or more drinks;

2 = 11–12 drinks;

3 = 7–10 drinks;

4 = 5–6 drinks;

5 = 3–4 drinks;

6 = 1–2 drinks.

Item F11 was used to compare to quantity of alcohol typically consumed by males and females.

Alcohol-related workplace incidents

W10: This question asked respondents to report the activities they undertook in the last 12 months while under the influence of alcohol. Respondents could choose from 10 activities, however, for the purpose of the current study only the activity 'went to work' (coded *1 = Yes, 0 = No*) was included in the analyses.

X1: This question asked respondents to report the number of days from work, school, Technical and Further Education (TAFE), or university they had missed due to their personal use of alcohol in the last three months. This item was coded as *0 = missed no days, 1 = missed at least one day*.

F8: This question asked respondents where they usually drank alcohol and allowed the respondent to select one or more of 11 different locations. Only data concerning alcohol consumption at the workplace were utilised and the measure was coded as *1 = usually drink alcohol at my workplace, 0 = remaining cases*. The proportion of respondents usually drinking at the workplace may be underestimated or overestimated by this measure as there is ambiguity in the wording of this question. The question could be interpreted as 'where do you most frequently drink alcohol?' rather than 'what are the settings that you commonly drink alcohol in?' This may prompt respondents to choose only one location (e.g. licensed premises) instead of a number of locations that are applicable to them (e.g. licensed premises, home, workplace etc).

Alcohol or drug-related abuse and intimidation in the workplace

W1: This question asked respondents if, during the last 12 months, any person affected by alcohol verbally abused them, physically abused them, or put them in fear (coded as *0 = No, 1 = Yes*).

W2: This question asked respondents if, during the last 12 months, any person affected by illicit drugs verbally abused them, physically abused them, or put them in fear (coded as *0 = No, 1 = Yes*).

W4: This question asked respondents to select, from seven different locations, where the incidents reported in questions W1 and W2 occurred. Only data concerning the workplace were included and the measure was coded as *1 = incident occurred in the workplace, 0 = incident did not occur in the workplace*.

As there was only one question asking where the incident(s) reported in W1 and W2 occurred, it could not be precisely determined if the respondent was referring to an alcohol incident, an illicit drug incident, or both an illicit drug and alcohol incident. Thus Questions W1, W2 and W4 were utilised to determine incidents (verbal abuse, physical abuse, and fear) that had occurred in the workplace as the result of alcohol and/or illicit drug use.

Alcohol attitudes

F20: Alcohol attitudes. This question asked respondents if they considered themself to be a non-drinker, an ex-drinker, an occasional drinker, a light drinker, a social drinker, a heavy drinker, or a binge drinker.

Other variables used in the current study

X3: This question asked respondents to report the number of days they had missed (in the past 3 months) from work, school, TAFE, or university due to any illness or injury. This variable was coded as *0 = missed no days, 1 = missed at least one day*.

F18: This question asked respondents to record if they had wanted to, or tried to, cut down on their alcohol use in the past 12 months, but found that they couldn't. Responses were coded as *0 = No* and *1 = Yes*.

F19: This question asked respondents to record if they had ever drank much larger amounts of alcohol more often than they had intended. Responses were coded as *0 = No* and *Yes = 1*.

Analyses

The NDSHS utilised a multi-stage stratified sample design. Data were analysed using the 'svy' suite of commands in Stata version 8.2 statistical software (StataCorp 2003). These commands enable analyses to take account of the effects of complex sample designs.

The NDSHS used three methods, each of which had a different sample design: drop and collect questionnaires (n=22,649), face-to-face interviews (n=2,055) and computer-assisted telephone interviews (CATI) (n=2,040). The corresponding response rates were 68%, 39% and 46%, respectively. The survey was originally envisaged as being based on a sample design where the states and territories were the (eight) strata and Statistical Local Areas (SLAs) were the primary sampling units (PSUs) (Roy Morgan Research 2002). This design was revised, resulting in an expanded number of strata (fifteen). The variable 'areas' (one for the ACT and two—country and capital city—for the remaining states and territory) was used to identify these strata (Roy Morgan Research 2002).

Different clustering methods were used for different parts of the survey; Census Collection Districts (CCDs) were sampled directly for face-to-face interviews (conducted in capital cities only) and for the drop and collect questionnaires conducted in capital cities, but the sampling unit for country areas was SLA. The CATI telephone interviews sample (conducted Australia wide) was not subject to clustering.

This is an unusual design, which complicated analysis taking account of clustering and interpretation of the results of that analysis. We have opted to present variance estimates in this chapter that are based on an analysis that does not allow for clustering (see Appendix A for further details). It is important to note that the approach taken to dealing with clustering has no effect on point estimates, only on the variance of the point estimates which determines the width of confidence intervals. For most tables in this chapter, allowing for clustering would have only a small effect on variance for marginal cells and the average for body cells in a table (generally widening confidence intervals by no more than 10%) with little effect on tests of independence for those tables (i.e. p values).

To ensure proper balance between regions and to ensure that the data was representative of the national population, all the statistical findings were based on suitably *weighted* data. The derivation of suitable weights is outlined in the survey technical report (Roy Morgan Research 2002). The drop and collect questionnaire and the face-to-face interviews had equivalent numbers of questions. The CATI sample had fewer questions (it excluded questions Z10, Z11, X1, F8, W1, W2, W4, X3, F19). Questions that employed all three survey methods were weighted using the variable 'wts8', and questions that excluded the CATI sample were weighted using the variable 'wts9'. In the analysis, the data were weighted by age, sex and geographical region (SLA) to be representative of the total population of Australia. The population estimates were based on the June 2000 estimated total resident population published by the Australian Bureau of Statistics (ABS) and linearally extrapolated to the survey reference date using a method described in the technical report (Roy Morgan Research 2002).

Only employed recent drinkers aged 14 years and over who reported working either full time or part time for pay were included in the analyses (n=12,213). This subpopulation analysis was done using the 'subpop' option of the Stata 'svy' command suite. Descriptive analyses were used to determine the proportion of the sample population that consumed alcohol at short-term (at least yearly, at least monthly, at least weekly) and long-term risk levels. The proportion of respondents who fell into these risk categories were then categorised according to occupational, individual, and demographic variables. For all reported percentages, 95% confidence intervals (CIs) are provided. Statistical significance was determined by p values after calculating design-based F statistics for cross-tabulations of categorical variables. The terms 'significant differences', 'significant' and 'significantly' in the Results section refers to a test where the p value is less than 0.001. Where reference is made to a test resulting in a p value of 0.001 or larger, then the exact p value is included in the text. Respondents who did not provide a definitive answer for a particular question (e.g. answered don't know) were excluded from the analysis of that question. Associations between behaviours (e.g. missed work day due to alcohol use) and at risk levels of alcohol consumption were analysed using weighted logistic regression (the 'svylogit' command) and odds ratios (ORs) and associated t statistics and p-values are reported.

Results

All results are reported in terms of short-term and long-term risk levels of consumption (see Table 3.1, p 24) and for short-term risk, in terms of frequency (i.e. at least weekly, at least monthly, at least yearly).

Risk category by age and gender

Of all respondents to the 2001 NDSHS who were in paid employment, 89.4% (95% CI, 88.8%–90.1%) were recent drinkers (i.e. had consumed alcohol in the past 12 months). Half these employed recent drinkers drank at short-term and/or long-term risky or high risk levels (49.1%, 95% CI: 48.0%–50.1%). Overall, 8.7% (95% CI, 8.1%–9.3%) of the drinking workforce frequently (at least weekly) drank at short-term risky or high risk levels, 18.7% (95% CI, 17.9%–19.6%) infrequently (at least monthly) drank at short-term risky or high risk levels, and 20.4% (95% CI, 19.6%–21.3%) very infrequently (at least yearly) drank at short-term risky or high risk levels. Nine per cent (8.9%, 95% CI, 8.3%–9.5%) of the drinking workforce consumed alcohol at long-term risky levels, and 3.4% (95% CI, 3.0%–3.8%) drank at long-term high risk levels.

In general, younger employees were more likely than older employees to report drinking at levels indicative of at risk consumption (Table 3.2). The only exception to this was for very infrequently (at least yearly) drinking at short-term risky or high risk levels where the highest proportion of employees reporting this pattern of consumption were aged 30–39 years. For employed males, significant differences between age groups were observed in the percentage reporting short-term risky or high risk drinking and long-term risky or high risk drinking. For employed females, significant differences between age groups were also observed in the percentage reporting short-term risky or high risk drinking and long-term risky or high risk drinking.

In general, the proportion of employees who drank at risky or high risk levels tended to decrease with age (Figures 3.1 and 3.2). A significantly large percentage of males compared to females reported drinking at short-term risky or high risk levels. Significant gender differences were also observed for long-term risky and high risk consumption levels. A larger percentage of females compared to males reported drinking at long-term risky levels, while a larger percentage of males compared to females drank at long-term high risk levels.

Table 3.2: Age and gender by risk category for employed recent drinkers

		Short-term risk (risky and high risk combined)*			Long-term risk	
	n unweighted	At least yearly	At least monthly	At least weekly	Risky	High risk
Age	(n weighted)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)
			MALES			
14–19	193	21.0%	34.4%	16.6%	14.0%	4.0%
	(179,521)	(14.8%–28.8%)	(27.0%–42.7%)	(11.5%–23.2%)	(9.4%–20.2%)	(1.8%–8.5%)
20–29	1,148	24.3%	30.0%	14.8%	10.2%	4.8%
	(881,320)	(21.4%–27.5%)	(27.0%–33.2%)	(12.5%–17.5%)	(8.3%–12.5%)	(3.5%–6.6%)
30–39	1,774	26.2%	22.4%	7.9%	5.7%	3.0%
	(1,148,471)	(23.9%–28.6%)	(20.2%–24.8%)	(6.5%–9.5%)	(4.6%–7.1%)	(2.2%–4.1%)
40–49	1,622	20.1%	15.3%	7.4%	7.0%	2.8%
	(1,085,595)	(17.9%–22.4%)	(13.3%–17.5%)	(6.1%–9.1%)	(5.7%–8.6%)	(2.0%–3.9%)
50–59	1,210	14.5%	10.2%	8.6%	8.2%	4.3%
	(800,508)	(12.3%–17.0%)	(8.4%–12.4%)	(6.9%–10.7%)	(6.5%–10.4%)	(3.2%–5.8%)
60+	341	10.4%	5.3%	6.0%	7.0%	3.8%
	(186,687)	(7.1%–14.9%)	(3.2%–8.7%)	(3.6%–9.8%)	(4.5%–10.8%)	(2.0%–7.4%)
Total	**6,288**	**21.1%**	**19.7%**	**9.6%**	**7.8%**	**3.7%**
	(4,282,102)	**(20.0%–22.4%)**	**(18.5%–20.9%)**	**(8.8%–10.5%)**	**(7.1%–8.7%)**	**(3.1%–4.3%)**
			FEMALES			
14–19	172	12.7%	32.9%	27.9%	20.5%	10.8%
	(123,435)	(8.2%–19.2%)	(25.3%–41.6%)	(20.1%–37.4%)	(14.1%–28.9%)	(5.7%–19.7%)
20–29	1,289	23.4%	32.6%	11.0%	13.5%	4.9%
	(665,088)	(20.8%–26.2%)	(29.7%–35.7%)	(9.1%–13.3%)	(11.3%–16.0%)	(3.7%–6.6%)
30–39	1,693	25.4%	18.1%	5.4%	9.3%	1.9%
	(741,689)	(23.1%–27.9%)	(16.1%–20.4%)	(4.3%–6.7%)	(7.8%–11.1%)	(1.3%–2.8%)
40–49	1,567	18.3%	10.9%	5.4%	9.1%	2.0%
	(822,680)	(16.2%–20.6%)	(9.3%–12.8%)	(4.3%–6.9%)	(7.6%–10.9%)	(1.4%–3.0%)
50–59	1,038	12.3%	5.9%	4.5%	8.1%	2.1%
	(532,925)	(10.1%–14.9%)	(4.4%–7.7%)	(3.2%–6.3%)	(6.4%–10.1%)	(1.2%–3.5%)
60+	164	4.6%	5.3%	2.2%	8.1%	0.4%
	(101,766)	(2.3%–9.2%)	(2.4%–11.2%)	(0.8%–6.1%)	(4.5%–14.0%)	(0.1%–3.1%)
Total	**5,923**	**19.4%**	**17.4%**	**7.3%**	**10.4%**	**3.0%**
	(2,987,584)	**(18.3%–20.6%)**	**(16.3%–18.5%)**	**(6.5%–8.2%)**	**(9.5%–11.4%)**	**(2.4%–3.6%)**

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

Note

Row percentages do not equal 100% as low levels of risk are not included in the table.

Shading denotes age group with the highest proportion of risk consumption.

Table 3.2 indicates that for some age groups and risk categories a larger percentage of employed females consumed alcohol at risky or high risk levels compared to males. However, this does not imply that females consume more alcohol than males. Any observed difference between male and female consumption needs to be interpreted with caution as the higher percentage of females drinking at risky or high risk levels partly results from the lower number of standard drinks necessary to place females at risk when compared to male drinkers.[4]

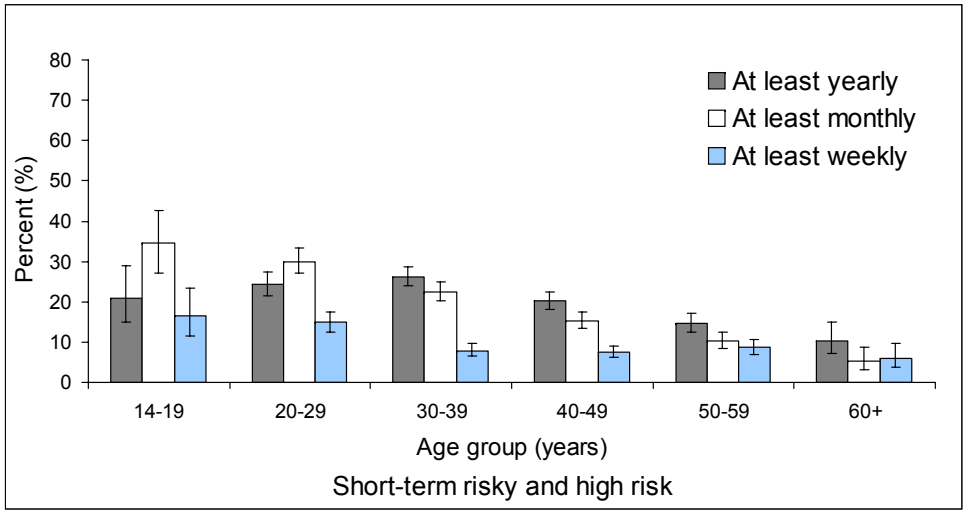
When the actual number of standard drinks male and female employees consume on a day they have an alcoholic drink are compared (Table 3.3 and Figure 3.3), females consume significantly less than males.

Table 3.3: Number of standard drinks consumed daily by gender for employed recent drinkers

		Gender		
Usual number of standard drinks consumed	n unweighted (n weighted)	Males (95%CI)	Females (95%CI)	Total (95%CI)
13 or more drinks	187	2.8%	0.7%	1.9%
	(138,408)	(2.3%–3.4%)	(0.4%–1.1%)	(1.6%–2.3%)
11–12 drinks	181	2.1%	1.2%	1.7%
	(122,270)	(1.7%–2.6%)	(0.9%–1.6%)	(1.4%–2.1%)
7–10 drinks	690	8.2%	3.6%	6.3%
	(448,287)	(7.4%–9.1%)	(3.0%–4.2%)	(5.8%–6.9%)
5–6 drinks	1,428	15.4%	8.5%	12.6%
	(893,453)	(14.3%–16.5%)	(7.7%–9.4%)	(11.9%–13.3%)
3–4 drinks	3,505	31.9%	25.5%	29.3%
	(2,080,469)	30.6%–33.3%)	(24.2%–26.9%)	(28.3%–30.3%)
1–2 drinks	5,953	39.6%	60.5%	48.2%
	(3,420,785)	(38.2%–41.1%)	(59.0%–62.0%)	(47.1%–49.2%)
Total	**11,944**			
	(7,103,672)	**100.0%**	**100.0%**	**100.0%**

[4] For example, to drink at short-term risky levels, females need to consume 5–6 standard drinks per day, compared to males who need to consume 7–10 standard drinks a day.

Figure 3.1: Risk category by age group for employed male recent drinkers



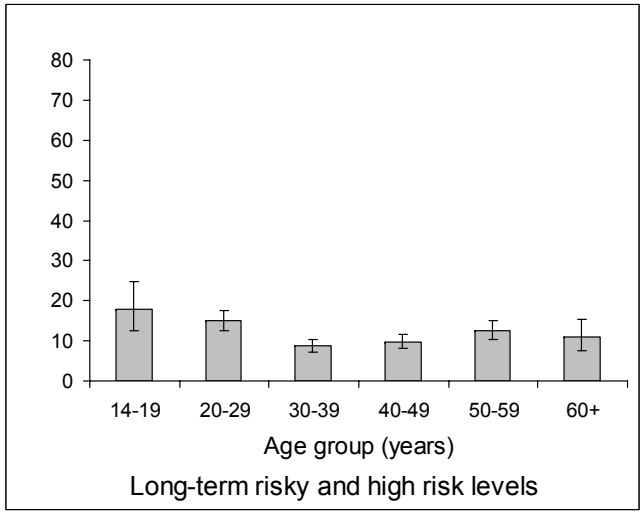
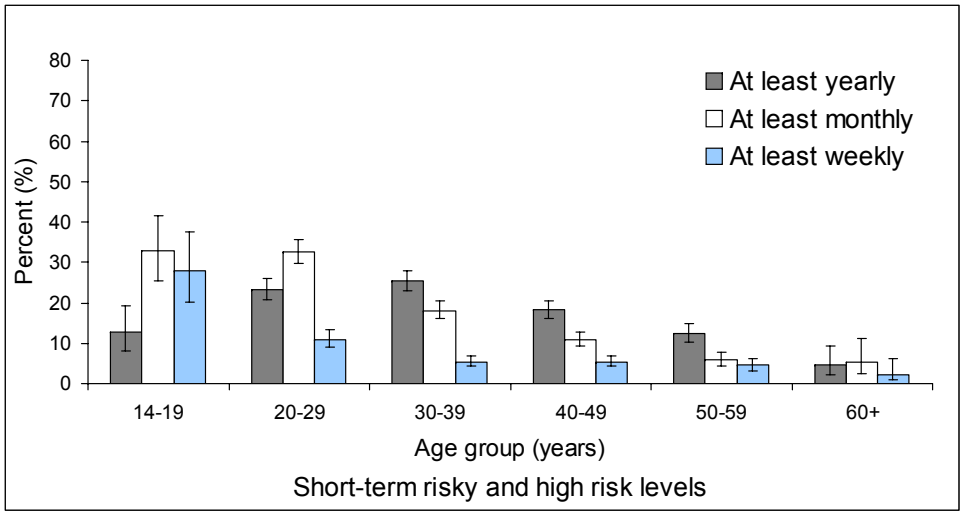
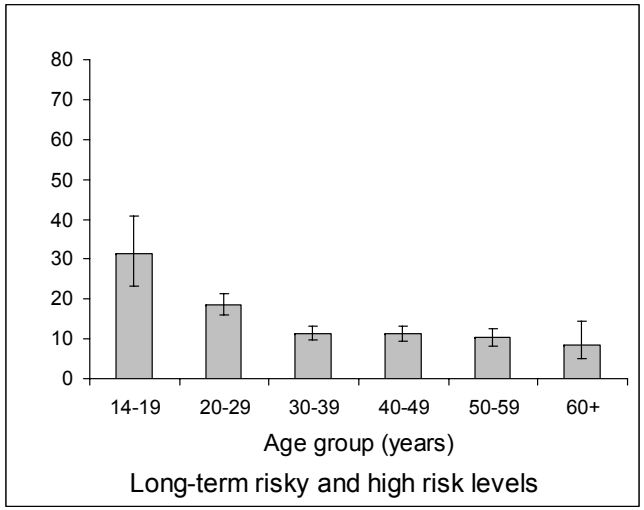


Figure 3.2: Risk category by age group for employed female recent drinkers





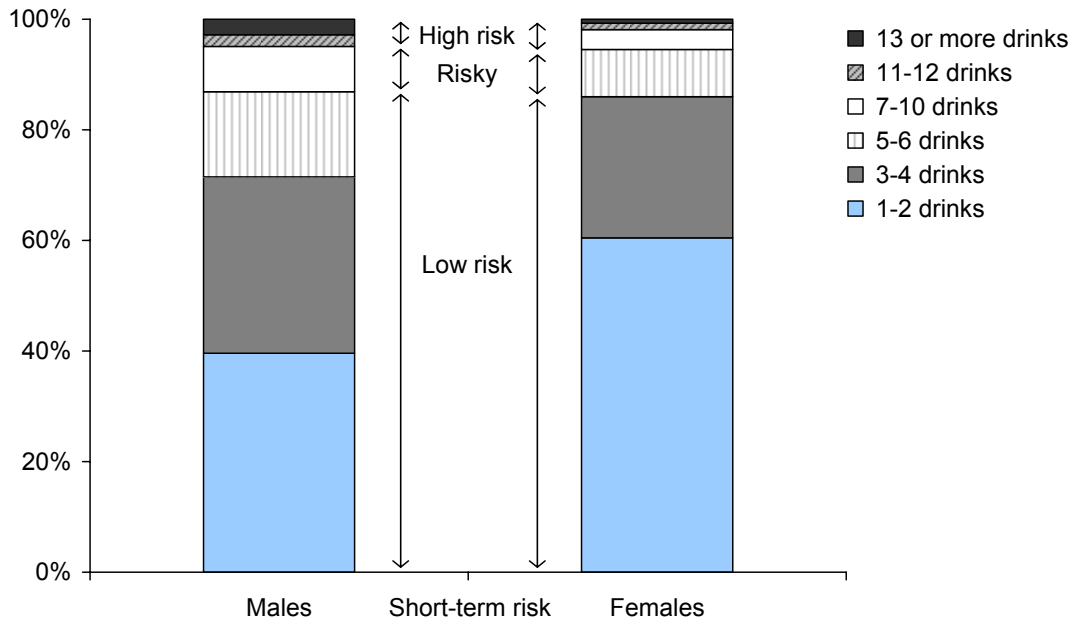


Figure 3.3: Number of standard drinks consumed daily by gender for employed recent drinkers

State and territory location by risk category

The percentages of employed recent drinkers reporting drinking at short-term risk levels differed significantly between the states and territories (Table 3.4 and Figure 3.4). Differences were of marginal significance for long-term risk.[5]

The largest percentages of employees reporting frequent (at least weekly) short-term risky or high risk drinking were located in Tasmania and the Northern Territory. The largest percentage reporting infrequent (at least monthly) short-term risky or high risk drinking was located in the Northern Territory. The largest percentage reporting very infrequent (at least yearly) short-term risky or high risk drinking was located in South Australia. The largest percentage of employees who drank at long-term risky levels was located in the Northern Territory, while the largest percentage who drank at long-term high risk levels was located in Tasmania.

[5] When sample clustering was not taken into account, state differences in long-term risk drinking levels were significant (F = 2.0, p = .025). When sample clustering was taken into account, differences approached significance (F = 1.8, p = .060). For more information on this issue see Appendix A.

Table 3.4: State and territory location by risk category for employed recent drinkers

State and territory	n unweighted** (n weighted)	Short-term risk (risky and high risk combined)* At least yearly (95%CI)	At least monthly (95%CI)	At least weekly (95%CI)	Long-term risk Risky (95%CI)	High risk (95%CI)
NSW	3,219	19.9%	16.4%	8.4%	8.6%	3.1%
	(2,443,831)	(18.5%–21.5%)	(15.0%–17.9%)	(7.4%–9.6%)	(7.5%–9.8%)	(2.4%–3.8%)
Vic	2,520	20.1%	18.9%	7.9%	8.3%	3.0%
	(1,825,034)	(18.4%–21.9%)	(17.2%–20.7%)	(6.8%–9.2%)	(7.2%–9.6%)	(2.3%–3.9%)
Qld	1,806	21.1%	20.3%	9.1%	9.1%	4.2%
	(1,327,284)	(19.0%–23.4%)	(18.3%–22.6%)	(7.6%–10.9%)	(7.7%–10.7%)	(3.2%–5.6%)
WA	1,473	19.8%	21.3%	9.5%	10.3%	3.0%
	(722,605)	(17.6%–22.3%)	(18.9%–23.9%)	(7.9%–11.4%)	(8.6%–12.2%)	(2.2%–4.1%)
SA	1,022	22.9%	20.9%	8.4%	8.6%	3.3%
	(577,638)	(20.2%–25.8%)	(18.3%–23.8%)	(6.6%–10.6%)	(6.8%–10.7%)	(2.3%–4.9%)
Tas	502	19.5%	17.1%	13.2%	9.7%	6.3%
	(148,429)	(15.9%–23.8%)	(13.6%–21.2%)	(10.0%–17.2%)	(6.9%–13.4%)	(4.2%–9.3%)
ACT	841	22.2%	17.7%	8.0%	9.0%	3.2%
	(138,254)	(19.2%–25.4%)	(14.9%–20.8%)	(6.0%–10.5%)	(7.1%–11.4%)	(2.0%–5.2%)
NT	830	19.0%	23.9%	11.9%	15.3%	4.8%
	(87,915)	(15.9%–22.5%)	(20.6%–27.6%)	(9.5%–15.0%)	(12.5%–18.5%)	(3.3%–6.8%)
Total	**12,213**	**20.4%**	**18.7%**	**8.7%**	**8.9%**	**3.4%**
	(7,270,989)	**(19.6%–21.3%)**	**(17.9%–19.6%)**	**(8.1%–9.3%)**	**(8.3%–9.5%)**	**(3.0%–3.8%)**

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

Note

Row percentages do not equal 100% as low levels of risk are not included in the table.

Shading denotes a state or territory with the highest proportion of risk consumption.

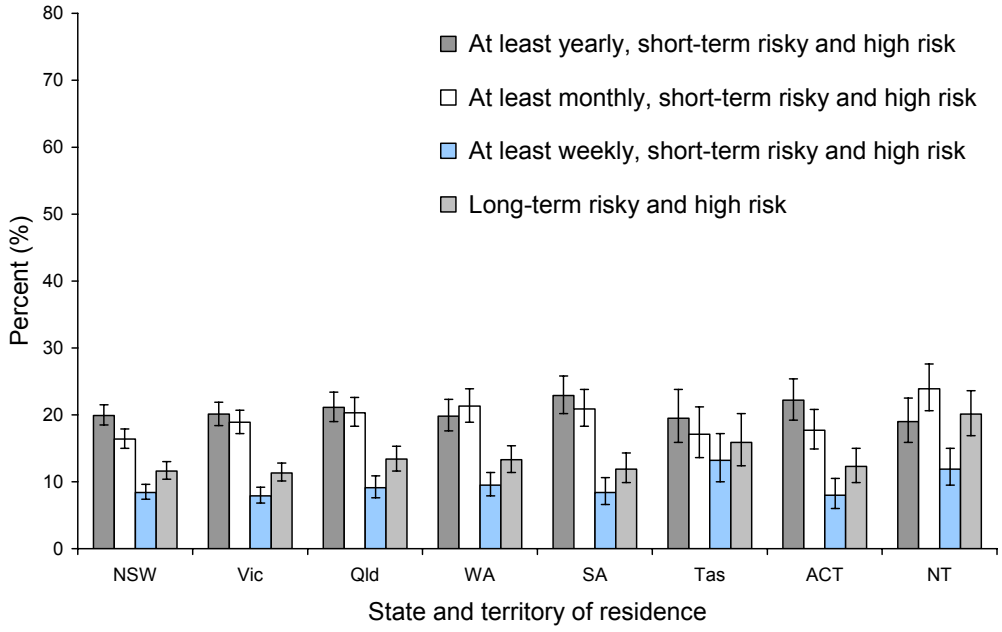


Figure 3.4: Drinking risk category* for employed recent drinkers by state and territory of residence

***Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.**

Regional location and gender by risk category

Country[6] employed recent drinkers were more likely than capital city workers to drink at risky or high risk levels. The percentage of country employees who frequently (at least weekly) drank at short-term risky or high risk levels (11.3%, 95% CI, 10.1%–12.6%), infrequently (at least monthly) drank at short-term risky or high risk levels (20.2%, 95% CI, 18.7%–21.8%), or very infrequently (at least yearly) drank at short-term risky or high risk levels (21.1%, 95%CI, 19.6%–22.7%) was significantly larger than the percentage of capital city employees who frequently (at least weekly) drank at short-term risky or high risk levels (7.3%, 95% CI, 6.7%–8.0%), infrequently (at least monthly) drank at short-term risky or high risk levels (18.0%, 95% CI, 17.0%–19.0%) levels, or very infrequently (at least yearly) drank at short-term risky or high risk levels (20.1%, CI, 19.1%–21.1%).

The percentage of country employees who drank at long-term risky levels (10.3%, 95% CI, 9.1%–11.5%) or long-term high risk levels (4.4%, 95% CI, 3.7%–5.3%) was significantly larger than the percentage of capital city employees who drank at long-term risky (8.2%, 95% CI, 7.5%–8.9%) or long-term high risk levels (2.8%, 95% CI, 2.4%–3.3%).

Significant differences were also observed between male and female country and capital city employees (Table 3.5 and Figure 3.5). For males, a significantly larger percentage of country employees drank frequently or infrequently at short-term risky or high risk levels compared to capital city employees. Similarly, a significantly larger percentage of male country employees drank at long-term risky or high risk levels compared to male capital city employees.

[6] Country is defined as respondents in non-capital city strata (i.e. rest of state or territory).

For females, a significantly larger ($p < .01$) percentage of country employees reported frequently or infrequently (at least monthly) drinking at short-term risky or high risk levels compared to capital city employees. Similarly, a significantly larger percentage of female country employees reported drinking at long-term risky or high risk levels compared to female capital city employees. The only exception to these trends was a larger percentage of female capital city employees who very infrequently (at least yearly) drank at short-term risky or high risk levels.

Table 3.5: Regional location and gender by risk category for employed recent drinkers

		Short-term risk (risky and high risk combined)*			Long-term risk	
Location	n unweighted** (n weighted)	At least yearly (95%CI)	At least monthly (95%CI)	At least weekly (95%CI)	Risky (95%CI)	High risk (95%CI)
			MALES			
Capital city	4,401	20.3%	18.8%	8.0%	6.6%	3.4%
	(2,784,497)	(18.9%–21.8%)	(17.4%–20.2%)	(7.1%–9.1%)	(5.8%–7.5%)	(2.8%–4.1%)
Country	1,887	22.7%	21.3%	12.5%	10.1%	4.1%
	(1,497,605)	(20.6%–25.0%)	(19.2%–23.6%)	(10.8%–14.4%)	(8.6%–11.9%)	(3.3%–5.3%)
Total	**6,288**	**21.1%**	**19.7%**	**9.6%**	**7.8%**	**3.7%**
	(4,282,102)	**(20.0%–22.4%)**	**(18.5%–20.9%)**	**(8.8%–10.5%)**	**(7.1%–8.7%)**	**(3.1%–4.3%)**
			FEMALES			
Capital city	4,049	19.8%	16.8%	6.3%	10.4%	2.0%
	(2,014,517)	(18.4%–21.3%)	(15.5%–18.2%)	(5.5%–7.3%)	(9.3%–11.5%)	(1.6%–2.6%)
Country	1,876	18.6%	18.5%	9.4%	10.5%	4.9%
	(974,371)	(16.6%–20.7%)	(16.5%–20.6%)	(7.8%–11.2%)	(9.0%–12.2%)	(3.7%–6.4%)
Total	**5,925**	**19.4%**	**17.4%**	**7.3%**	**10.4%**	**3.0%**
	(2,988,887)	**(18.3%–20.6%)**	**(16.3%–18.5%)**	**(6.5%–8.2%)**	**(9.5%–11.4%)**	**(2.4%–3.6%)**

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

Note

Row percentages do not equal 100% as low levels of risk are not included in the table.

Shading denotes region with the highest proportion of risk consumption.

Country is defined as regional and rural respondents.

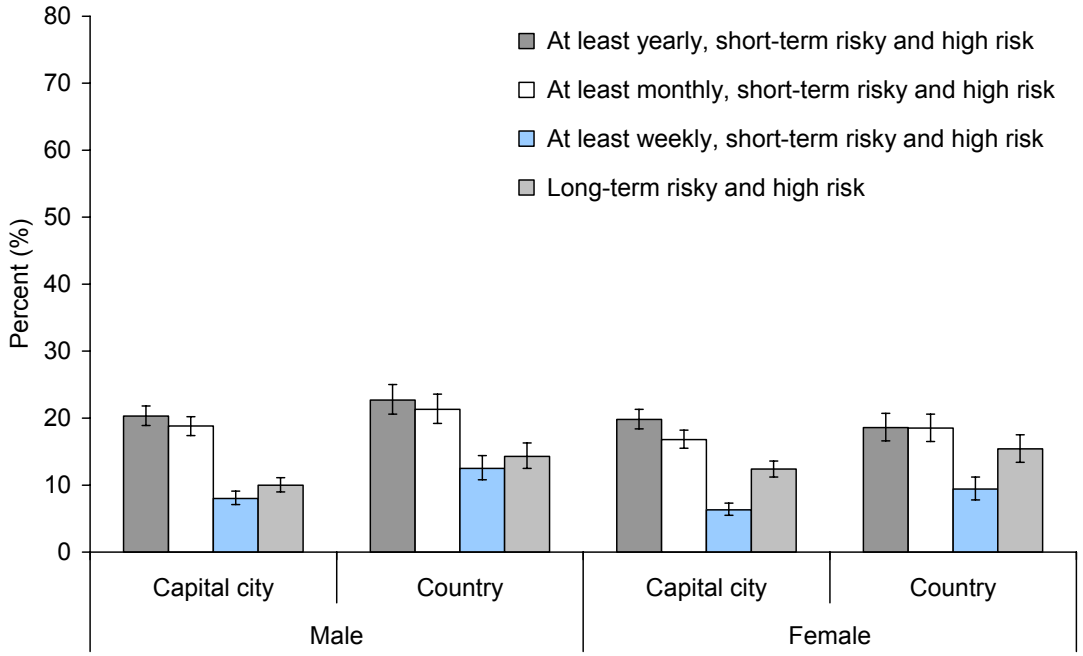


Figure 3.5: Drinking risk category* for employed recent drinkers by region and gender

***Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.**

Industry classification and risk category

There were significant differences between industry groups (Tables 3.6 and 3.7) in the percentage of employed recent drinkers reporting drinking at short-term risk levels and long-term risk levels.

The largest percentages of workers who frequently (at least weekly) drank at short-term risky or high risk levels were employed in the hospitality industry, while the largest percentage of workers who infrequently (at least monthly) or very infrequently (at least yearly) drank at short-term risky or high risk levels was employed in the mining industry. The largest percentage of workers who drank at long-term risky levels was employed in the hospitality industry, while the largest percentage of workers who drank at long-term high risk levels was employed in the agriculture industry.

Table 3.6: Industry classification by risk category for employed recent drinkers

		Short-term risk (risky and high risk combined)*			Long-term risk	
	n unweighted**	At least yearly	At least monthly	At least weekly	Risky	High risk
Industry	(n weighted)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)
Agriculture	273	16.4%	18.9%	13.3%	8.4%	7.0%
	(193,456)	(11.9%–22.1%)	(14.1%–24.9%)	(8.8%–19.5%)	(5.3%–13.2%)	(3.8%–12.3%)
Mining	127	24.1%	23.9%	9.4%	6.0%	4.0%
	(67,186)	(16.0%–34.6%)	(16.4%–33.3%)	(4.3%–19.3%)	(2.4%–14.0%)	(1.5%–10.4%)
Manufact	1,083	22.4%	16.3%	11.8%	8.1%	4.4%
	(764,712)	(19.6%–25.5%)	(13.8%–19.0%)	(9.7%–14.3%)	(6.4%–10.1%)	(3.2%–6.0%)
Construction	786	19.3%	21.3%	10.7%	12.0%	3.8%
	(500,855)	(16.3%–22.7%)	(18.0%–25.0%)	(8.3%–13.5%)	(9.5%–15.0%)	(2.5%–5.7%)
Wholesale	203	22.5%	21.0%	8.4%	7.3%	4.6%
	(130,285)	(16.5%–30.0%)	(15.4%–27.9%)	(5.1%–13.6%)	(4.4%–11.7%)	(2.2%–9.4%)
Retail	1,279	13.9%	22.9%	11.4%	11.1%	5.2%
	(821,988)	(11.9%–16.2%)	(20.2%–25.8%)	(9.4%–13.9%)	(9.2%–13.3%)	(3.8%–7.2%)
Hospitality	436	15.0%	22.5%	16.5%	14.6%	5.0%
	(245,074)	(11.3%–19.6%)	(17.9%–27.8%)	(12.6%–21.3%)	(11.0%–19.1%)	(3.1%–8.0%)
Transport	574	21.9%	20.0%	9.6%	9.4%	3.8%
	(357,325)	(17.8%–26.7%)	(16.4%–24.2%)	(7.0%–13.0%)	(6.9%–12.7%)	(2.3%–6.1%)
Financial	1,871	20.7%	20.1%	7.9%	8.8%	2.9%
	(1,076,369)	(18.6%–22.9%)	(18.1%–22.4%)	(6.6%–9.5%)	(7.5%–10.5%)	(2.1%–3.9%)
Education	1,000	16.7%	13.4%	4.3%	7.1%	0.9%
	(553,698)	(14.2%–19.7%)	(11.1%–16.1%)	(3.1%–6.0%)	(5.4%–9.2%)	(0.4%–1.8%)
Admin and Defence	752	21.8%	17.2%	7.6%	7.3%	2.3%
	(321,680)	(18.3%–25.7%)	(13.7%–21.5%)	(5.2%–11.0%)	(5.0%–10.5%)	(1.2%–4.5%)
Services	2,234	20.5%	15.0%	7.0%	9.5%	2.1%
	(1,188,199)	(18.6%–22.5%)	(13.3%–16.9%)	(5.8%–8.4%)	(8.1%–11.2%)	(1.5%–2.9%)
Total	**10,618**	**19.3%**	**18.5%**	**9.2%**	**9.4%**	**3.4%**
	(6,220,827)	**(18.5%–20.3%)**	**(17.6%–19.4%)**	**(8.5%–9.9%)**	**(8.7%–10.1%)**	**(3.0%–3.9%)**

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

Note

Row percentages do not equal 100% as low levels of risk are not included in the table.

Shading denotes the industry with the highest proportion of risk consumption.

Industry sector differences[7]

Differences in consumption patterns between more narrowly defined sectors of the industry groups outlined in Table 3.6 were observed. For example, while 11.8% of those employed in the manufacturing industry frequently (at least weekly) drank at short-term risky or high risk levels and 8.1% drank at long-term risky and 4.4% at long-term high risk levels, 17.1% (95% CI, 12.7%–26.8%) in the food, beverage, and tobacco manufacturing sector of this industry frequently drank at short-term risky or high risk levels, while 12.2% (95% CI 7.4%–19.4%) drank at long-term risky and 6.3% (95% CI, 3.1%–12.4%) at long-term high risk levels.

In the services industry, 7.0% of employees frequently (at least weekly) drank at short-term risky or high risk levels, while 9.5% drank at long-term risky levels and 2.1% drank at long-term high risk levels. However, 11.0% (95% CI, 7.6%–15.5%) of employees in the community services sector of the services industry frequently drank at short-term risky or high risk levels, while 12.2% (95% CI, 8.8%–16.7%) drank at long-term risky levels and 3.2% (95% CI, 1.6%–6.2%) drank at long-term high risk levels. In contrast, 4.4% (95% CI, 3.1%–6.2%) of employees in the health services sector of the services industry frequently drank at short-term risky or high risk levels while 6.4% (95% CI, 4.8%–8.3%) drank at long-term risky levels and 1.5% (95% CI, 0.8%–2.8%) drank at long-term high risk levels.

Gender differences between industry groups[8]

Overall, a larger proportion of males compared to females frequently (at least weekly) drank at short-term risky or high risk levels (Table 3.2). However, for some industries the reverse was true. For example, in the retail industry, a larger proportion of females (12.2%, 95% CI, 9.2%–15.9%) compared to males (10.8%, 95% CI, 8.2%–14.2%) frequently drank at short-term risky or high risk levels. Similarly, in the financial services industry, a larger proportion of females (8.6%, 95% CI, 6.6%–11.0%) compared to males (7.5%, 95% CI, 5.8%–9.7%) frequently drank at short-term risky or high risk levels.

A similar trend was observed for long-term high risk consumption. Overall, a larger proportion of males compared to females drank at long-term high risk levels (Table 3.2). However in the retail industry, a larger proportion of females drank at long-term high risk levels (6.5%, 95% CI, 4.2%–9.9%) compared to males (4.2%, 95% CI, 2.6%–6.5%). Likewise, in the hospitality industry, a larger proportion of females drank at long-term high risk levels (5.6%, 95% CI, 2.9%–10.4%) compared to males (4.3%, 95% CI, 2.1%–8.7%).

Unexpected gender differences in short- and long-term risk consumption levels were also observed in more narrowly defined sectors of industry groups. For example, in the food retailing sector of the retail industry, a larger proportion of females (16.4%, 95% CI, 9.8%–26.3%) compared to males (9.2%, 95% CI, 4.9%–16.3%) frequently (at least weekly) drank at short-term risky or high risk levels. In the food retailing sector, a larger proportion of females (7.9%, 95% CI, 3.1%–18.7%) drank at long-term high risk levels compared to males (3.3%, 95%CI, 1.5%–7.2% high risk), while in the business services sector of the financial services industry, a larger proportion of females (3.7%, 95% CI, 2.2%–6.1%) drank at long-term high risk levels compared to males (2.8%, 95% CI, 1.7%–4.7%).

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[7] Testing for statistical significance was not undertaken for industry sector comparisons.

[8] Testing for statistical significance was not undertaken for within industry gender comparisons.

Table 3.7: Summary of industry classification by risk category for employed recent drinkers

Industry	Frequent short-term risk drinking (risky and high risk combined)*	Infrequent short-term risk drinking (risky and high risk combined)**	Long-term risky and high risk levels (combined)
Hospitality	16.5%	37.5%	19.6%
Agriculture	13.3%	35.3%	15.4%
Manufacturing	11.8%	38.7%	12.5%
Retail	11.4%	36.8%	16.3%
Construction	10.7%	40.6%	15.8%
Transport	9.6%	41.9%	13.2%
Mining	9.4%	48.0%	10.0%
Wholesale	8.4%	43.5%	11.9%
Financial services	7.9%	40.8%	11.7%
Administration and defence	7.6%	39.0%	9.6%
Services	7.0%	35.5%	11.6%
Education	4.3%	30.1%	7.9%

*Frequent short-term risk drinking is drinking at short-term risk levels at least weekly.

**Infrequent short-term risk drinking is drinking at short-term risk levels at least monthly or at least yearly.

Note

Shading denotes the industry with the highest proportion of risk consumption.

Occupation classification and risk category

There were significant differences between occupation groups (Tables 3.8 and 3.9) in the percentage of employed recent drinkers reporting drinking at short-term risk levels, and long-term risk levels.

The largest proportions of employees who frequently (at least weekly) or infrequently (at least monthly) drank at short-term risky or high risk levels were tradespersons. The largest proportions of workers very infrequently (at least yearly) drinking at short-term risky or high risk levels were professionals and managers. The largest proportion of workers reporting drinking at long-term risky levels was for tradespersons, while the largest proportion of workers reporting drinking at long-term high risk levels was for unskilled workers.

Table 3.8: Occupation classification by risk category for employed recent drinkers

		Short-term risk (risky and high risk combined)*			Long-term risk	
	n unweighted	At least yearly	At least monthly	At least weekly	Risky	High risk
Occupation	(n weighted)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)
Managers	1,326	21.3%	19.4%	6.9%	8.4%	2.9%
	(778,316)	(18.9%–24.0%)	(17.0%–22.2%)	(5.4%–8.8%)	(6.8%–10.3%)	(1.9%–4.3%)
Profess'ls	3,615	21.4%	16.1%	6.1%	7.8%	1.8%
	(1,947,715)	(19.8%–23.0%)	(14.7%–17.6%)	(5.2%–7.1%)	(6.8%–8.9%)	(1.3%–2.4%)
Trades	879	19.7%	21.7%	14.0%	11.8%	5.1%
persons	(613,943)	(16.8%–23.0%)	(18.5%–25.2%)	(11.4%–17.0%)	(9.5%–14.6%)	(3.6%–7.1%)
Skilled workers	3,073	17.2%	19.3%	9.6%	10.3%	3.3%
	(1,788,252)	(15.6%–18.8%)	(17.7%–21.1%)	(8.4%–10.9%)	(9.1%–11.7%)	(2.6%–4.1%)
Unskilled workers	1,650	16.8%	19.5%	13.5%	9.5%	6.3%
	(1,055,035)	(14.7%–19.1%)	(17.3%–21.9%)	(11.5%–15.7%)	(8.0%–11.4%)	(4.9%–8.0%)
Total	**10,543**	**19.2%**	**18.6%**	**9.3%**	**9.3%**	**3.4%**
	(6,183,261)	**(18.3%–20.1%)**	**(17.7%–19.5%)**	**(8.6%–10.0%)**	**(8.6%–10.0%)**	**(3.0%–3.9%)**

- *Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

Note

- Row percentages do not equal 100% as low levels of risk are not included in the table.
- Shading denotes the industry with the highest proportion of risk consumption.

Specific occupational differences[9]

Differences in consumption patterns between more specific occupations than those outlined in Table 3.8 were observed. For example, while 6.9% of managers frequently (at least weekly) drank at short-term risky or high risk levels, 13.9% (95% CI, 6.7%–26.8%) of farm managers frequently drank at short-term risky or high risk levels. While 6.1% of professionals frequently drank at short-term risky or high risk levels, 10.6% (95% CI, 6.2%–17.6%) of science, engineering, and related associate professionals and 9.2% (95% CI, 4.9%–16.5%) of health and welfare associate professionals frequently drank at short-term risky or high risk levels. Similarly, while 21.7% of all tradespersons infrequently (at least monthly) and 19.7% very infrequently (at least yearly) drank at short-term risky or high risk levels, 34.3% (95% CI, 23.2%–47.2%) of food tradespersons infrequently (at least monthly) drank at short-term risky or high risk levels and 28.3% (95% CI, 21.4%–31.5%) of mechanical and fabrication engineering tradespersons very infrequently (at least yearly) drank at short-term risky or high risk levels.

Differences between more specific occupational groups were also observed in the percentage of workers drinking at long-term risk levels. For example, while 7.8% of all professionals drank at long-term risky levels, 18.3% (95% CI, 12.0%–27.1%) of health and welfare associate professionals drank at long-term risky levels. Similarly, 10.3% of all skilled workers drank at long-term risky levels, however, 24.6% (95% CI, 13.1%–41.5%) of skilled agriculture and horticultural workers drank at long-term risky levels. For unskilled workers, 6.3% drank at long-term high risk, whereas 9.4% (95% CI, 5.4%–15.8%) of other intermediate production and transport workers drank at this level.

[9] Statistical significance testing was not undertaken for comparisons between specific occupations.

Gender differences between occupational groups[10]

Overall, a larger proportion of males compared to females drank at short-term risky or high risk levels (Table 3.2). However, there were exceptions to this trend for particular occupations. For example, a larger proportion of female managers (8.0%, 95% CI, 5.4%–11.9%) frequently (at least weekly) drank at short-term risky or high risk levels compared to male managers (6.5%, 95 % CI, 4.7%–8.8%).

A similar trend was observed for long-term risk consumption. Overall, a larger proportion of females compared to males drank at long-term risky levels, while a larger proportion of males compared to females drank at long-term high risk levels (Table 3.2). However, for tradespersons a larger proportion of males (11.9%, 95% CI, 9.5%–14.7%) compared to females (10.2%, 95% CI, 4.2%–22.5%) drank at long-term risky levels, whereas a larger proportion of females (9.6%, 95% CI, 3.5%–23.9%) compared to males (4.9%, 95% CI, 3.4%–7.0%) drank at long-term high risk levels.

Unexpected gender differences in short- and long-term risk consumption levels were also observed between more specific occupations. For example, a larger proportion of female managing supervisors (12.0%, 95% CI, 7.0%–19.7%) compared to male managing supervisors (4.5%, 95% CI, 2.4%–8.5%) frequently (at least weekly) drank at short-term risky or high risk levels. Similarly, a larger proportion of female health professionals (4.1%, 95% CI, 2.4%–7.1%) compared to male health professionals (2.9%, 95% CI, 1.0%–8.0%) frequently drank at short-term risky or high risk levels. In addition, a larger proportion of female health professionals (0.9%, 95% CI, 0.3%–3.2%) drank at long-term high risk levels compared to male health professionals (0.4%, 95% CI, 0.1%–2.7% high risk).

Table 3.9: Summary of occupation classification by proportions drinking at each risk category level

Occupation	Frequent short-term risk drinking (risky and high risk combined)*	Infrequent or very infrequent short-term risk drinking (risky and high risk combined)**	Long-term risky and high risk levels (combined)
Tradespersons	14.0%	41.4%	16.9%
Unskilled workers	13.5%	36.3%	15.8%
Skilled workers	9.6%	36.5%	13.6%
Professionals	6.1%	37.4%	9.5%
Managers	6.9%	40.8%	11.2%

- *Frequent short-term risk drinking is drinking at short-term risk levels at least weekly.
- **Infrequent short-term risk drinking is drinking at short-term risk levels at least monthly or at least yearly.

Note

- Shading denotes the occupation with the highest proportion of risky or high consumption.

[10] Statistical significance testing was not undertaken for gender comparisons within specific occupations.

Risk category by work-related alcohol incident and work days missed due to illness or injury

The survey obtained information on self-reported consumption of alcohol, and on phenomena relevant to workplace risk and performance (e.g. went to work under the influence of alcohol in the past 12 months; usually drank alcohol at my workplace), or to absenteeism (e.g. missed a work day in the past 3 months due to personal alcohol use; missed a work day in the past 3 months due to any illness or injury). Table 3.10 cross-tabulates consumption (grouped according to levels of short-term and long-term risk) against responses to questions on work-related risk behaviours and absenteeism.

There were significant differences between short-term risk drinking levels and work days missed due to personal alcohol use, attending work under the influence of alcohol, usually drinking at work, and work days missed due to illness or injury.

Significant differences were also observed between long-term risk drinking levels and work days missed due to personal alcohol use, attending work under the influence of alcohol, and usually drinking at work ($p < .01$).

Riskier patterns of alcohol consumption were associated with a higher prevalence of self-reported negative work-related behaviours and work absences. This was evident for short- and long-term risk levels of drinking. Trends are evident in Table 3.10, indicating that work-related alcohol incidents and work days missed due to illness or injury rose with increasing levels of risk consumption. In general, as the level of drinking increased in each category of short-term risk and long-term risk (i.e. low, risky, and high risk), so did the percentage of employed recent drinkers who reported having missed at least one work day in the past 3 months due to their alcohol use, attending work under the influence in the past 12 months, usually drinking at work, and missing at least one work day in the past 3 months due to illness or injury.

As the frequency of drinking at short-term risky or high risk levels increased (i.e. from at least yearly, at least monthly, to at least weekly) so did the percentage of employed recent drinkers who reported:

- having missed at least one work day in the past 3 months due to their alcohol use,
- attending work under the influence in the past 12 months,
- usually drinking at work, and
- missing at least one work day in the past 3 months due to illness or injury.

The association between risky drinking and work-related incidents is examined more closely in the following sections.

Table 3.10: Risk category by work-related alcohol incident and work days missed due to illness or injury for employed recent drinkers

		Work days missed because of alcohol use in the last 3 months		Went to work under influence in last 12 months		Usually drink at work		Work days missed due to illness/injury in last 3 months	
	n unweighted* (n weighted)	0 days missed (95%CI)	≥1 day missed (95%CI)	No (95%CI)	Yes (95%CI)	No (95%CI)	Yes (95%CI)	0 days missed (95%CI)	≥1 day missed (95%CI)
Short-term risk									
Low risk	5,063–6215	99.2%	0.8%	97.2%	2.8%	92.9%	7.1%	64.9%	35.1%
	(3,261,254–3,773,411)	(98.9%–99.4%)	(0.6%–1.1%)	(96.6%–97.7%)	(2.3%–3.4%)	(92.1%–93.7%)	(6.3%–7.9%)	(63.3%–66.5%)	(33.5%–36.7%)
Yearly risky	1,190–1,467	97.5%	2.5%	95.5%	4.5%	89.1%	10.9%	59.1%	40.9%
	(753,038–863,408)	(95.8%–98.5%)	(1.5%–4.2%)	(93.8%–96.7%)	(3.3%–6.2%)	(86.9%–90.9%)	(9.1%–13.1%)	(55.7%–62.4%)	(37.6%–44.3%)
Yearly high risk	802–1,017	96.5%	3.5%	91.6%	8.4%	85.9%	14.1%	51.9%	48.1%
	(507,982–608,565)	(94.7%–97.7%)	(2.3%–5.3%)	(89.2%–93.6%)	(6.4%–10.8%)	(82.7%–88.5%)	(11.5%–17.3%)	(47.7%–56.1%)	(43.9%–52.3%)
Monthly risky	1,186–1,386	94.1%	5.9%	91.0%	9.0%	84.9%	15.1%	53.5%	46.5%
	(759,435–825,775)	(92.3%–95.6%)	(4.4%–7.7%)	(89.0%–92.6%)	(7.4%–11.0%)	(82.3%–87.1%)	(12.9%–17.7%)	(50.0%–57.0%)	(43.0%–50.0%)
Monthly high risk	719–862	90.0%	10.0%	83.2%	16.8%	84.0%	16.0%	49.2%	50.8%
	(457,470–515,621)	(87.1%–92.3%)	(7.7%–12.9%)	(80.0%–86.0%)	(14.0%–20.0%)	(80.8%–86.8%)	(13.2%–19.2%)	(44.7%–53.7%)	(46.3%–55.3%)
Weekly risky	557–632	87.4%	12.6%	85.5%	14.5%	88.4%	11.6%	56.0%	44.0%
	(345,198–389,103)	(83.3%–90.6%)	(9.4%–16.7%)	(81.9%–88.4%)	(11.6%–18.1%)	(85.1–90.9%)	(9.1%–14.9%)	(50.8%–61.0%)	(39.0%–49.2%)
Weekly high risk	329–372	75.7%	24.3%	75.3%	24.7%	84.7%	15.3%	45.4%	54.6%
	(228,768–257,170)	(69.5%–81.1%)	(18.9%–30.5%)	(69.4%–80.4%)	(19.6%–30.6%)	(79.8%–88.6%)	(11.4%–20.2%)	(38.7%–52.3%)	(47.7%–61.3%)
Total	**9,846–11,950**	**96.1%**	**3.9%**	**93.4%**	**6.6%**	**89.8%**	**10.2%**	**59.5%**	**40.5%**
	(6,313,145–7,110,019)	**(95.5%–96.5%)**	**(3.5%–4.5%)**	**(92.9%–94.0%)**	**(6.0%–7.1%)**	**(89.2%–90.5%)**	**(9.5%–10.8%)**	**(58.3%–60.7%)**	**(39.3%–41.7%)**
Long-term risk									
Low risk	8,518–10,428	97.4%	2.6%	95.0%	5.0%	90.2%	9.8%	60.1%	39.9%
	(5,507,727–6,247,321)	(97.0%–97.8%)	(2.2%–3.0%)	(94.4%–95.5%)	(4.5%–5.6%)	(89.5%–90.9%)	(9.1%–10.5%)	(58.8%–61.3%)	(38.7%–41.2%)
Risky	998–1,123	88.5%	11.5%	83.9%	16.1%	87.3%	12.7%	55.3%	44.7%
	(597,867–627,500)	(85.8%–9.7%)	(9.3%–14.2%)	(80.9%–86.5%)	(13.5%–19.1%)	(84.8%–89.4%)	(10.6%–15.2%)	(51.4%–59.1%)	(40.9%–48.6%)
High risk	330–399	81.6%	18.4%	78.4%	21.6%	86.9%	13.1%	56.7%	43.3%
	(207,551–235,198)	(75.5%–86.5%)	(13.5%–24.5%)	(73.0%–83.0%)	(17.0%–27.0%)	(82.5%–90.4%)	(9.6%–17.5%)	(49.7%–63.5%)	(36.5%–50.3%)
Total	**9,846–11,950**	**96.1%**	**3.9%**	**93.4%**	**6.6%**	**89.8%**	**10.2%**	**59.5%**	**40.5%**
	(6,313,145–7,110,019)	**(95.5%–96.5%)**	**(3.5%–4.5%)**	**(92.9%–94.0%)**	**(6.0%–7.1%)**	**(89.2%–90.5%)**	**(9.5%–10.8%)**	**(58.3%–60.7%)**	**(39.3%–41.7%)**

*The number of respondents that completed questions concerning work-related alcohol incidents varied, therefore, weighted and unweighted samples sizes vary from lowest to highest number of respondents for each risk category. The range of sample sizes is shown in this column.

Alcohol-related workplace incidents

Work days missed in the 3 months prior to the survey due to personal alcohol use

A total of 10,365 employed recent drinkers (weighted n=6,647,169) responded to this question. Of these, 5,315 (weighted n=3,930,532) were male and 5,050 (weighted n=2,716,637) were female. Overall, 3.9% (95% CI, 3.5%–4.5%) reported missing at least one work day in the 3 months prior to the survey due to their alcohol use. Significantly more males (4.7%, 95% CI, 4.0%–5.4%) than females (2.9%, 95% CI, 2.4%–3.5%) missed at least one work day due to their alcohol use. More capital city (4.3%, 95% CI, 3.7%–4.9%) than country employees (3.3%, 95% CI, 2.6%–4.2%) missed at least one work day, however, this difference was not significant.

While there were no significant differences by states and territories, the jurisdiction with the largest percentage of employees reporting missing a least one work day was the Northern Territory (6.3%, 95% CI, 4.4%–8.8%) and the jurisdiction with the smallest percentage missing at least one work day was Tasmania (3.0%, 95% CI, 1.7%–5.3%). Significant differences were observed between age groups, with the likelihood of missing a work day due to personal alcohol use declining with age. While 10.0% (95% CI, 6.8%–14.4%) of employees aged from 14–19 years had missed at least one work day, only 0.3% (95% CI, 0.0%–1.8%) aged 60 years and over had missed at least one work day due to their alcohol use.

There were significant differences ($p < .01$) between industry groups. The industry group with the largest percentage of employees reporting having missed at least one work day was the hospitality industry (7.9%, 95% CI, 5.0%–12.2%). The industry group with the smallest percentage to have missed at least one work day was the wholesale industry (2.0%, 95% CI, 0.8%–4.6%). There were also significant differences ($p < .01$) between occupation groups. The occupation group with the largest percentage of employees who missed at least one work day was tradespersons (6.8%, 95% CI, 4.9%–9.5%), while the occupation group with the smallest percentage was professionals (3.1%, 95% CI, 2.5%–4.0%).

Controlling for age and gender, employees who reported frequently (at least weekly) drinking at short-term risky or high risk levels were 19 times (Odds Ratio [OR], 18.9; 95% CI, 12.4–28.9) more likely ($t = 13.6$, $p < .001$) to report having missed at least one work day in the last three months due to their alcohol use, than those who reported drinking at short-term low risk levels. Employees who reported infrequently (at least monthly) drinking at short-term risky or high risk levels were seven times (OR, 6.9; 95% CI, 4.6–10.4) more likely ($t = 9.3$, $p < .001$), while those who very infrequently (at least yearly) drank at these levels were three times (OR, 2.9; 95% CI, 1.8–4.7) more likely ($t = 4.2$, $p < .001$) to report having missed at least one work day due to their alcohol use, compared to those who drank at short-term low risk levels.

Employees who drank at long-term risky levels were five times (OR 4.7, 95% CI, 3.5–6.4) more likely ($t = 10.0$, $p < .001$) to have missed at least one work day due to their alcohol use, compared to those who reported drinking at long-term low risk levels. Similarly, employees who drank at long-term high risk levels were about eight times (OR, 7.6; 95% CI, 5.0–11.5) more likely ($t = 9.4$, $p < .001$) to report having missed at least one work day due to their alcohol use, compared to those who drank at long-term low risk levels (Figure 3.6a).

Attending work under the influence of alcohol in the 12 months prior to the survey

A total of 11,950 employed recent drinkers (weighted n=7,110,019) responded to this question. Of these, 6,134 (weighted n=4,178,792) were male and 5,816 (weighted n=2,931,226) were female. Overall, 6.6% (95% CI, 6.0%–7.1%) reported attending work under the influence in the 12 months prior to the survey. Significantly more males (8.7%, 95% CI, 7.9%–9.6%) than females (3.4%, 95% CI, 3.0%–4.0%) reported attending work under the influence. More capital city (7.0%, 95% CI, 6.3%–7.7%) than country employees (5.7%, 95% CI, 4.8%–6.8%) reported attending work under the influence, however, this difference was not significant.

While there were no significant differences between states and territories, the largest percentage of employees reporting attending work under the influence was located in the Australian Capital Territory (8.3%, 95% CI, 6.4%–10.6%), while the smallest percentage was located in Tasmania (4.8%, 95% CI, 2.8%–7.9%). There were, however, significant differences between age groups in the percentages of employees reporting attending work under the influence. Overall, the likelihood of attending work under the influence decreased with age. While 12.9% (95% CI, 9.2%–17.8%) of employees aged from 14–19 years and 12.4% (95% CI, 10.8%–14.1%) of those aged from 20–29 years reported attending work under the influence, only 1.8% (95% CI, 0.8%–4.0%) aged 60 years and over had attended work under the influence of alcohol.

There were significant differences between industry groups in the percentage of employees who had attended work under the influence. The industry group with the largest percentage of employees attending work under the influence was the hospitality industry (14.5%, 95% CI, 11.0%–18.9%), while the industry groups with the smallest percentage were the mining industry (1.4%, 95% CI, 0.4%–4.5%) and the education industry (2.3%, 95% CI, 1.5%–3.7%). While there were no significant differences between occupation groups, the occupation group with the largest percentage of employees reporting attending work under the influence was tradespersons (8.9%, 95% CI, 6.8%–11.5%), while the occupation group with the smallest percentage was skilled workers (5.9%, 95% CI, 4.9%–7.0%).

Controlling for age and gender, employees who frequently (at least weekly) drank at short-term risky or high risk levels were six times (OR, 5.8; 95% CI, 4.4–7.7) more likely (t = 12.2, p < .001) to have attended work under the influence of alcohol, compared to those who drank at short-term low risk levels. Those who infrequently (at least monthly) drank at short-term risky or high risk levels were over three times (OR, 3.3; 95% CI, 2.6–4.3) more likely (t = 9.1, p < .001) to have attended work under the influence of alcohol, compared to those who drank at short-term low risk levels. Similarly, those who very infrequently (at least yearly) drank at short-term risky or high risk levels were twice (OR, 1.8; 95% CI, 1.3–2.4) as likely (t = 3.8, p < .001) to have attended work under the influence of alcohol, compared to those who reported drinking at short-term low risk levels.

Employees who drank at long-term risky levels were four times (OR, 3.8; 95% CI, 3.0–4.9) more likely (t = 10.5, p < .001) to have attended work under the influence of alcohol, compared to those who reported drinking at long-term low risk levels. Those who drank at long-term high risk levels were five times (OR, 4.9; 95% CI, 3.5–6.8) more likely (t = 9.4, p < .001) to have attended work under the influence of alcohol, compared to those who reported drinking at long-term low risk levels (Figure 3.6b).

Usually consume alcohol at the workplace[11]

A total of 11,083 (weighted n=7,098,763) employed recent drinkers responded to this question. Of these 5,713 (weighted n=4,206,905) were male and 5,370 (weighted n=2,891,857) were female. Overall, 10.2% (95% CI, 9.5%–10.8%) reported usually drinking alcohol at their workplace. Significantly more males (12.0%, 95% CI, 11.0%–13.0%) than females (7.5%, 95% CI, 6.7%–8.4%), and significantly more capital city (11.3%, 95% CI, 10.5%–12.1%) than country employees (7.9%, 95% CI, 6.9%–9.1%) usually drank at their workplace.

Significant differences between states and territories in percentages of employees who usually drank at their workplace were also observed. The jurisdiction with the highest percentage who usually drank at work was the Northern Territory (16.9%, 95% CI, 13.9%–20.5%), while the jurisdiction with the smallest percentage was New South Wales (8.3%, 95% CI, 7.3%–9.5%). There were significant differences between age groups in the percentages of employees who usually drank at their workplace. Overall, the likelihood of usually drinking at work rose from the ages of 14–19 years to the ages 20–29, and then declined with age. While 11.7% (95% CI, 8.0%–16.8%) of employees aged 14–19 years old and 14.4% (95% CI, 12.8%–16.2%) aged 20–29 years old usually drank at work, only 3.1% (95% CI, 1.9%–5.2%) of those aged 60 years and over usually drank at their workplace.

There were significant differences between industry groups in the percentage of employees who usually drank at work. The industry groups with the largest percentage of employees who usually drank at their workplace were the hospitality industry (17.7%, 95% CI, 13.6%–22.7%) and the financial services industry (16.4%, 95% CI, 14.5%–18.4%), while the industry group with the smallest percentage was the services industry (5.4%, 95% CI, 4.4%–6.6%). There were also significant differences between occupation groups. The occupation group with the largest percentage of employees who usually drank at their workplace was managers (15.7%, 95% CI, 13.6%–18.1%), while the occupation group with the smallest percentage was unskilled workers (5.7%, 95% CI, 4.5%–7.2%).

Controlling for age and gender, employees who frequently (at least weekly) drank at short-term risky or high risk levels were twice (OR, 1.7; 95% CI, 1.3–2.1) as likely ($t = 4.0$, $p < .001$) to usually drink at work compared to those who drank at short-term low risk levels. Employees who infrequently (at least monthly) drank at short-term risky or high risk levels were twice (OR, 1.9; 95% CI, 1.6–2.7) as likely ($t = 6.7$, $p < .001$) to usually drink at their workplace compared to those who drank at short-term low risk levels. Similarly, employees who very infrequently (at least yearly) drank at short-term risky or high risk levels were about twice (OR, 1.6; 95% CI, 1.3–1.9) as likely ($t = 4.3$, $p < .001$) to usually drink at their workplace compared to those who drank at short-term low risk levels.

Employees who drank at long-term risky levels were 1.4 times (OR, 1.4; 95% CI, 1.1–1.7) more likely ($t = 2.6$, $p < .01$), than those who drank at long-term low risk levels, to usually drink at their workplace. Employees who drank at long-term high risk levels were no more likely than those who drank at long-term low risk levels, to usually drink at their workplace (Figure 3.6c).

[11] There is some ambiguity in the wording of this question, see methods section.

Work days missed due to any illness or injury in the 3 months prior to the survey

A total of 9,846 employed recent drinkers (weighted n=6,313,145) responded to this question. A significantly larger percentage of females (43.6%, 95% CI, 41.9%–45.2%) reported missing at least one work day due to any illness or injury compared to males (38.4%, 95% CI, 36.8%–40.1%). Controlling for gender and age, employees who reported missing at least one work day due to their alcohol use were 3 times (OR, 3.0; 95% CI, 2.3–4.0) more likely ($t = 7.6$, $p < .001$) to also report missing work days due to any illness or injury when compared to those who reported missing no work days due to alcohol use.

Controlling for age and gender, employees who frequently (at least weekly) drank at short-term risky or high risk levels were 1.4 times (OR, 1.4; 95% CI, 1.1–1.6) more likely ($t = 3.3$, $p < .001$) to have missed a work day due to any illness or injury in the past 3 months, than those who drank at short-term low risk levels. Those who infrequently (at least monthly) drank at short-term risky or high risk levels were 1.3 times (OR, 1.3; 95% CI, 1.2–1.5) more likely ($t = 4.1$, $p < .001$) to have missed a work day due to any illness or injury, than those who drank at short-term low risk levels. Similarly, those who very infrequently (at least yearly) drank at short-term risky or high risk levels were 1.2 times (OR, 1.2; 95% CI, 1.1–1.4) more likely ($t = 3.2$, $p < .001$) to have missed a work day due to any illness or injury, than those who drank at short-term low risk levels.

Employees who drank at long-term risky or high risk levels were no more likely to have missed a work day due to any illness or injury, than those who drank at long-term low risk levels (Figure 3.6d).

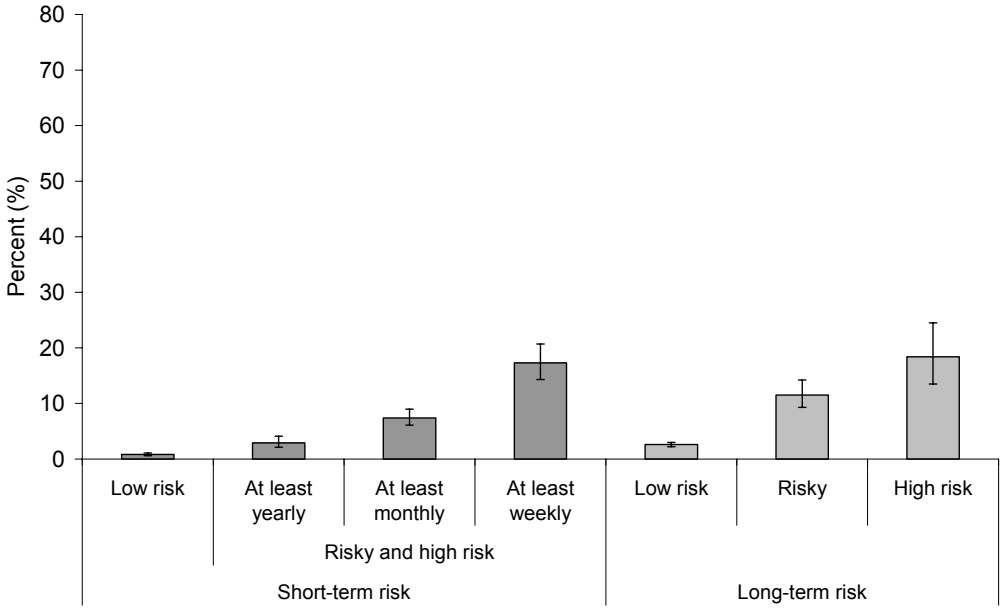

Figure 3.6a: Percentage of employed recent drinkers who have missed one or more workdays because of alcohol use in the last 3 months, by drinking risk category*

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

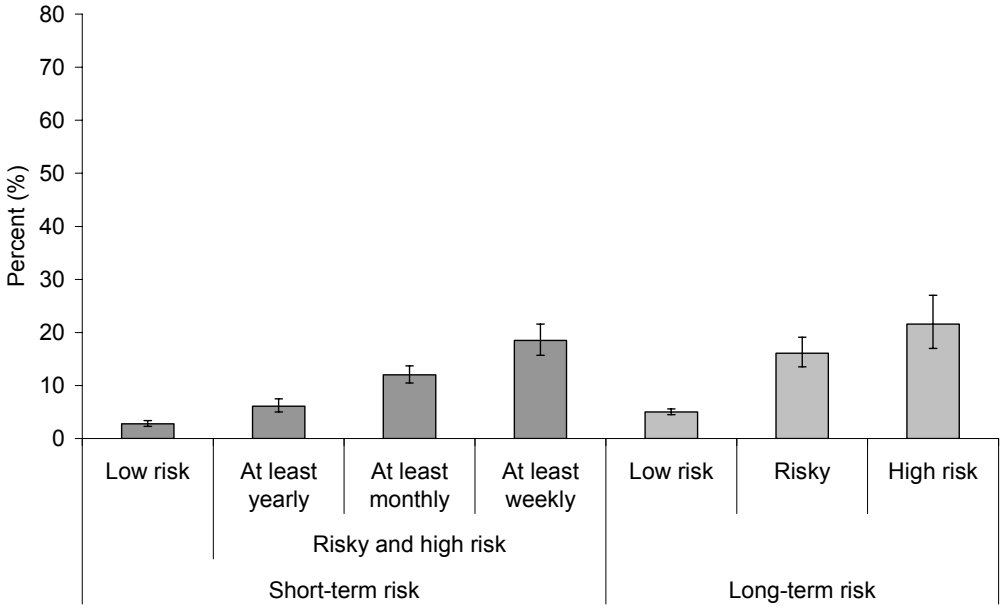

Figure 3.6b: Percentage of employed recent drinkers who went to work under the influence of alcohol in the last 12 months, by drinking risk category*

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

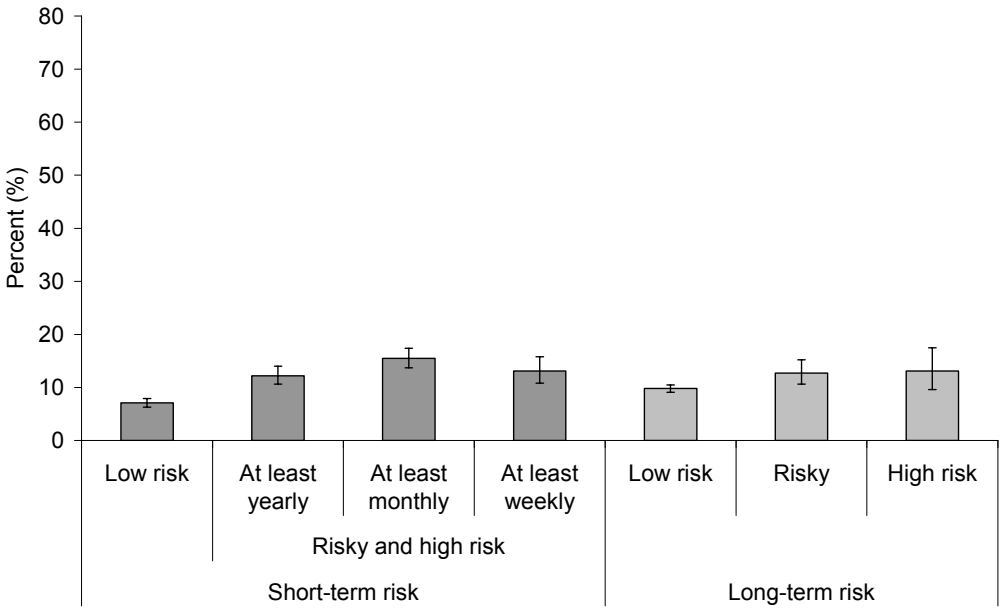

Figure 3.6c: Percentage of employed recent drinkers reporting the workplace as a usual place of consumption of alcohol, by drinking risk category*

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

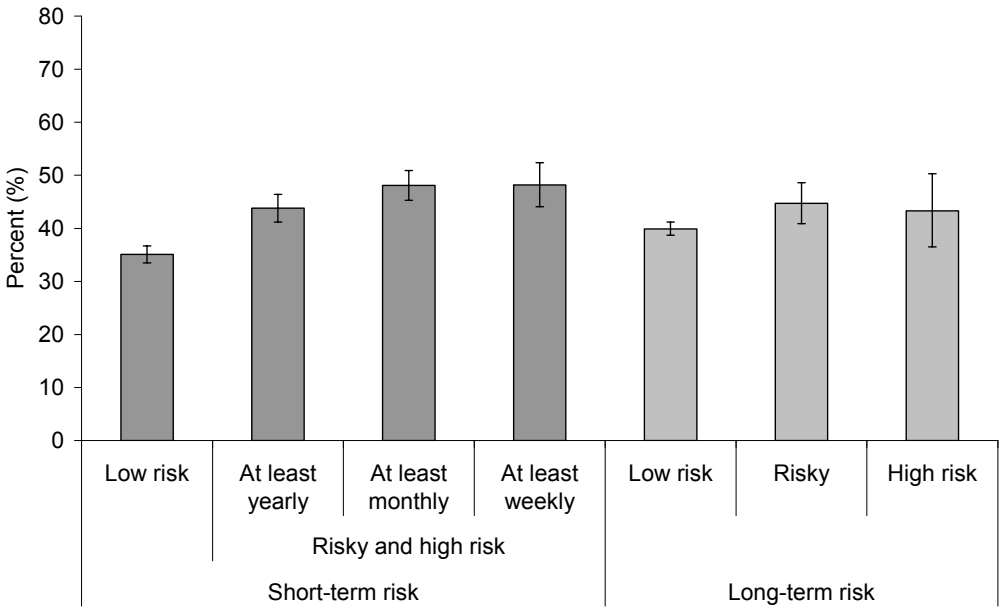

Figure 3.6d: Percentage of employed recent drinkers who have missed one or more workdays due to illness/injury in the last 3 months, by drinking risk category*

*Categories (at least yearly, at least monthly, at least weekly) are mutually exclusive.

Alcohol- and/or drug-related abuse and intimidation in the workplace

Table 3.11 shows the proportions of all employed recent drinkers aged 14 years and over who experienced being put in fear, or verbally abused, or physically abused by a person affected by alcohol and/or drugs and the proportion of these incidents that occurred in the workplace.

Table 3.11: Alcohol- and/or drug-related abuse or intimidation in the workplace experienced by employed recent drinkers, aged 14 years and over

Exposure to an alcohol or drug-related incident in the past 12 months	n unweighted (n weighted)	Proportion of employees reporting incidents (95% CI)	Proportion of incidents that occurred in the workplace (95% CI)
Responded to question on put in fear	12,012	–	–
	(7,747,177)		
Yes to put in fear	2,343	**18.7%**	–
	(1,445,917)	**(17.8%–19.5%)**	
Yes to put in fear in the workplace	303	**2.3%**	**13.6%**
	(180,265)	**(2.0%–2.7%)**	**(12.0%–15.5%)**
Responded to question on verbal abuse	12,175	–	–
	(7,852,900)		
Yes to verbal abuse	4,228	**33.8%**	–
	(2,656,098)	**(32.8%–34.9%)**	
Yes to verbal abuse in the workplace	618	**4.7%**	**14.5%**
	(369,690)	**(4.3%–5.2%)**	**(13.3%–15.9%)**
Responded to question on physical abuse	11,772	–	–
	(7,607,449)		
Yes to physical abuse	701	**6.1%**	–
	(464,285)	**(5.6%–6.7%)**	
Yes to physical abuse in the workplace	106	**0.9%**	**16.7%**
	(70,216)	**(0.7%–1.2%)**	**(13.5%–20.5%)**

Put in fear

A total of 12,012 employed recent drinkers (weighted n=7,747,177) responded to the question of whether they had been put in fear by a person affected by alcohol and/or drugs in the past 12 months, of which 18.7% (95% CI, 17.8%–19.5%) answered in the affirmative (unweighted n=2,343; weighted n=1,445,917). A location where the incident occurred was specified by 2,158 employees (weighted n=1,323,862), of whom 865 (weighted n=646,605) were male and 1,293 (weighted n=677,257) were female. Being put in fear most commonly occurred in the street (42.3%; 95% CI, 39.7%–44.9%). Nearly fourteen per cent (13.6%; 95% CI, 12.0%–15.5%) of the incidents occurred in the workplace (unweighted n=303; weighted n=180,265). Overall, 2.3% (95% CI, 2.0%–2.7%) of employees aged 14 years and over reported being put in fear in the workplace in the last 12 months by a person affected by alcohol and/or drugs.

Of the employees who reported being put in fear by a person affected by alcohol and/or drugs, there were no significant differences by gender, location (city/country or state/territory) in the proportion reporting the incident occurred in the workplace. There were, however, significant differences between age groups (p <.05). The age groups with the largest percentages of employees who reported the incident occurred in the workplace were 50–59 years old (19.8%, 95% CI, 14.3%–26.7%) and 60 years and older (21.7%, 95% CI, 9.3%–42.8%), while the age group with the smallest percentage who reported the incident occurred in the workplace was 14–19 years old (6.0%, 95% CI, 2.5%–13.7%).

There were significant differences between industry groups in the percentage of employees put in fear in the workplace by a person affected by alcohol and/or drugs. The industry groups with the largest percentages were the services industry (5.7%, 95% CI, 4.7%–6.9%) and the hospitality industry (5.6%, 95% CI, 3.5%–8.9%), while no employees in the mining or wholesale industries reported being put in fear in the workplace. Within the services industry, the health services sector had the largest percentage of employees (8.8%, 95% CI, 7.0%–11.0%) put in fear in the workplace.

Of the employees who reported being put in fear by a person affected by alcohol and/or drugs, there were differences between industry groups in the proportion of incidents that occurred in the workplace (Figure 3.7). Within the services industry, 27.1% (95% CI, 22.9%–31.8%) of all incidents of being put in fear by someone affected by alcohol and/or drugs occurred in the workplace, while in the hospitality industry, 24.8% (95% CI, 15.9%–36.5%) of all incidents occurred in the workplace. Within the health services sector of the services industry, 42.0% (95% CI, 34.8%–49.6%) of all incidents occurred in the workplace.

There were no significant differences between occupational groups in the percentage of employees put in fear in the workplace. However, occupation groups with the largest percentage reporting the incident occurred in the workplace were other associate professionals (13.3%, 95% CI, 8.1%–20.9%), health professionals (10.9%, 95%CI, 8.4%–14.1%), and health and welfare associate professionals (8.4%, 95% CI, 4.4%–15.5%). Differences were evident in the proportion of all incidents that occurred in the workplace. Occupations with the highest proportion of all incidents that occurred in the workplace were health professionals (50.4%, 95% CI, 40.8%–59.9%), other associate professionals (38.5%, 95% CI, 24.6%–54.6%), health and welfare associate professionals (34.1% 95% CI, 19.0%–53.3%), and managing supervisors (29.3%, 95% CI, 18.6%–43.0%).

Of those put in fear in the workplace, 55.2% (CI, 95% CI, 48.3%–61.8%) perceived the person responsible for the incident to be affected by alcohol and illicit drugs, while 20.9% (CI, 95% CI, 16.0%–26.8%) perceived the person to be affected by alcohol alone, and 24.0% (CI, 95% CI, 18.6%–30.4%) perceived the person to be affected by illicit drugs alone. In addition, 9.2 % (95% CI, 5.9%–14.1%) reported that a workmate was responsible, 7.2% (95% CI, 4.2%–12.3%) reported a current or ex-partner, family member, relative or friend, while 24.5% (95% CI, 19.1%–30.9%) reported another person known to them and 59.0% (95% CI, 52.1%–65.7%) reported another person not known to them was responsible.

Verbal abuse

A total of 12,175 employed recent drinkers (weighted n=7,852,900) responded to the question of whether they had been verbally abused by a person affected by alcohol and/or drugs in the past 12 months, of which 33.8% (95% CI, 32.8%–34.9%) answered in the affirmative (unweighted n=4,228; weighted n=2,656,098). A location where the incident occurred was specified by 4,066 employees (weighted n=2,543,893), of whom 2,154 (weighted n=1,534,047) were male and 1,912 (weighted n=1,009,846) were female. Verbal abuse most commonly occurred in the street (33.3%; 95% CI, 31.6%–35.2%) or in a pub or club (20.4%; 95% CI, 18.9%–22.0%). Fifteen per cent (14.5%; 95% CI, 13.3%–15.9%) of the abuses occurred in the workplace (unweighted n=618; weighted n=369,690). Overall, 4.7% (95% CI, 4.3%–5.2%) of employees aged 14 years and over reported being verbally abused in the workplace in the last 12 months.

Of those employees who reported being verbally abused by someone affected by alcohol and/or drugs, significantly ($p < .01$) more females (16.7%, 95% CI, 14.8%–18.8%) than males (13.1%, 95% CI, 11.5%–14.9%) reported the incident occurred in the workplace. There were no significant differences by location (city/country or state/territory) in the proportion of employees reporting the incident occurred in the workplace. There were, however, significant differences between age groups. Of those verbally abused by a person affected by alcohol and/or drugs, the age groups with the largest percentage who reported the incident occurred in the workplace were 50–59 years old (20.6%, 95% CI, 16.7%–25.2%) and 60 years and over (20.6%, 95% CI, 12.5%–31.8%), while the age group with the smallest percentage verbally abused in the workplace was 14–19 years old (5.2%, 95% CI, 2.7%–9.8%).

There were significant differences between industry groups in the percentage of employees verbally abused in the workplace by a person affected by alcohol and/or drugs. The industry groups with the largest percentage reporting verbal abuse in the workplace were the hospitality industry (11.3%, 95% CI, 8.3%–15.1%) and the services industry (10.4%, 95%CI, 9.1%–11.9%). Within the services industry, the health services sector had the largest percentage of employees (15.3%, 95%CI, 12.9%–18.1%) reporting verbal abuse in the workplace.

Of the employees verbally abused by a person affected by alcohol and/or drugs, there were differences between industry groups in the proportion of incidents that occurred in the workplace (Figure 3.7). Within the services industry, 28.8% (95% CI, 25.5%–32.4%) of all of all incidents of verbal abuse by someone affected by alcohol and/or drugs occurred in the workplace, while in the hospitality industry, 27.7% (95% CI, 20.8%–35.8%) of all incidents occurred in the workplace. Within the health services sector of the services industry, 41.9% (95% CI, 36.1%–47.9%) of all incidents of being verbally abused by someone affected by alcohol and/or other drugs occurred in the workplace.

Similarly, significant differences were observed between occupation groups in the percentage of employees verbally abused in the workplace by someone affected by alcohol and/or drugs. The occupation groups with the largest percentage of employees who were verbally abused in the workplace were other associate professionals (22.2%, 95% CI, 15.3%–31.0%), health professionals (19.8%, 95% CI, 16.1%–24.1%), and health and welfare associate professionals (19.1%, 95% CI, 13.0%–27.2%). Differences were also evident in the proportion of all incidents that occurred in the workplace. Occupations with the highest proportion of incidents that occurred in the workplace were health professionals (50.3%, 95% CI, 42.4%–58.2%) and health and welfare associate professionals (45.9%, 95% CI, 32.9%–59.5%).

Of those verbally abused in the workplace, 60.7% (95% CI, 55.9%–65.2%) perceived the person responsible for the abuse to be affected by alcohol and illicit drugs, while 28.6% (95% CI, 24.5%–33.2%) perceived the person to be affected by alcohol alone and 10.7% (95% CI, 8.2%–13.8%) perceived the person to be affected by illicit drugs alone. In addition, 11.0% (95% CI, 8.3%–14.6%) reported that a workmate was responsible, 10.2% (95% CI, 7.7%–13.3%) reported a current or ex-partner, family member, relative or friend, while 25.1% (95% CI, 21.2%–29.6%) reported another person known to them and 53.6% (95% CI, 48.8%–58.4%) reported another person not known to them was responsible.

Physical abuse

A total of 11,772 employed recent drinkers (weighted n=7,607,449) responded to the question of whether they had been physically abused by a person affected by alcohol and/or drugs in the past 12 months, of which 6.1% (95% CI, 5.6%–6.7%) answered in the affirmative (unweighted n=701; weighted n=464,285). A location where the abuse occurred was specified by 637 employees (weighted n=420,861), of whom 366 (weighted n=270,992) were male and 271 (weighted n=149,869) were female. Physical abuse most commonly occurred in the street (29.4%; 95% CI, 25.0%–34.2%) or in a pub or club (18.3%; 95% CI, 14.8%–22.4%). For females, physical abuse most commonly occurred in the home (36.3%; 95% CI, 29.7%–43.6%). Seventeen per cent (16.7%; 95% CI, 13.5%–20.5%) of the abuses occurred in the workplace (unweighted n=106; weighted n=70,216). Overall, 0.9% (95% CI, 0.7%–1.2%) of employed recent drinkers aged 14 years and over reported being physically abused in the workplace in the last 12 months.

Of the employees who reported being physically abused by someone affected by alcohol and/or drugs, there were no significant differences by gender, location (city/country or state/territory) in the percentage of incidents that occurred in the workplace. There were, however, significant differences between age groups. The age group with the largest percentage reporting physical abuse in the workplace was 50–59 years old (36.3%, 95% CI, 21.3%–54.6%), while the age group with the smallest percentage was 14–19 years (2.1%, 95% CI, 0.3%–13.9%).

There were significant differences between industry groups in the percentage of employees reporting physical abuse in the workplace by a person affected by alcohol and/or drugs. The industry groups with the largest percentage were the services industry (2.4%, 95% CI, 1.8%–3.3%) and the hospitality industry (2.4%, 95% CI, 1.1%–5.0%) while no mining or manufacturing industries employees reported physical abuse. Within the services industry, the health services sector had the largest percentage of employees reporting physical abuse in the workplace (2.9%, 95% CI, 1.8%–4.4%)

Of employees physically abused by a person affected by alcohol and/or drugs, there were differences between industry groups in the proportion of incidents that occurred in the workplace (Figure 3.7). Within the services industry, 36.3% (95% CI, 27.9%–45.6%) of all incidents occurred in the workplace, while in the hospitality industry, 20.3% (95% CI, 9.7%–37.7%) of all incidents occurred in the workplace. Within the health services sector of the services industry, 55.8% (95% CI, 39.2%–71.2%) of all incidents occurred in the workplace.

Significant differences ($p < .01$) were observed between occupation groups in the percentage of employees physically abused in the workplace. The occupation groups with the largest percentages reporting physical abuse were other associate professionals (13.1%, 95% CI, 7.9%–21.1%), health and welfare associate professionals (6.1%, 95% CI,

2.8%–12.6%), managing supervisors (sales and services) (3.3%, 95% CI, 1.8%–6.3%) and health professionals (3.0%. 95% CI, 1.8%–5.2%). These differences between occupation groups were also evident in the proportion of incidents that occurred in the workplace. Of the sample of all reported incidents of being physically abused by a person affected by alcohol and/or drugs, 58.9% (95% CI, 30.5%–82.5%) of health and welfare associate professionals, 57.6% (95% CI, 35.8%–76.8%) of health professionals, 46.4% (95% CI, 25.2%–69.0%) of managing supervisors (sales and services), and 39.6% (95% CI, 24.6%–56.9%) of other associate professionals reported the incident occurred in the workplace.

Of those physically abused in the workplace, 38.2% (CI, 28.2%–49.3%) perceived the person responsible for the abuse to be affected by alcohol and illicit drugs, while 35.8% (CI, 25.7%–47.5%) perceived the person to be affected by alcohol alone, and 26.0% (CI, 17.1%–37.4%) perceived the person to be affected by illicit drugs alone. In addition, 6.5 % (95% CI, 3.0%–13.5%) reported that a workmate was responsible, 5.5% (95% CI, 1.8%–15.8%) reported a current or ex-partner, family member, relative or friend, while 27.5% (95% CI, 18.4%–39.0%) reported another person known to them and 60.4% (95% CI, 48.7%–71.1%) reported another person not known to them was responsible.

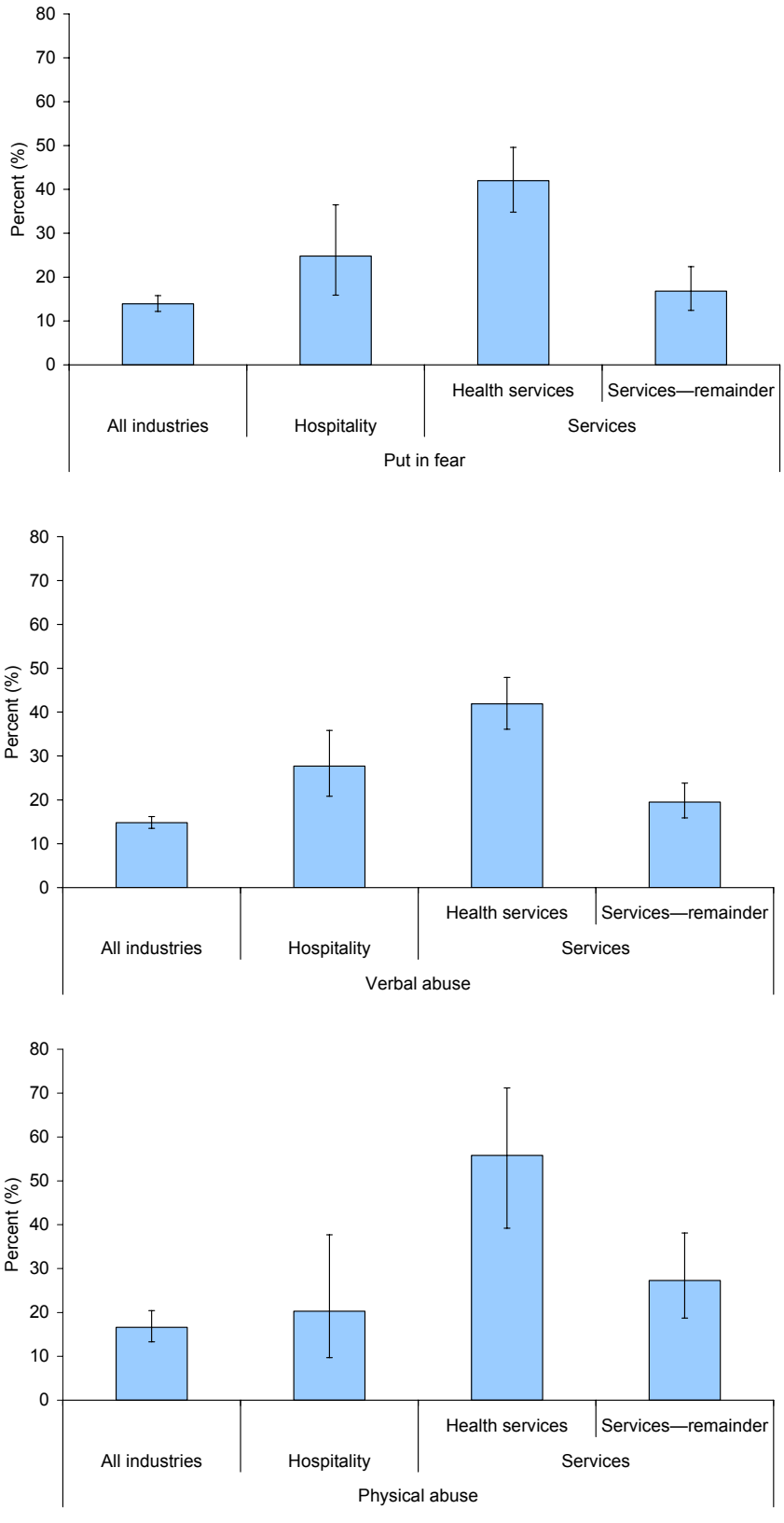

Figure 3.7: The proportion of all reported incidents of alcohol- and/or drug-related abuse or intimidation in the past 12 months that occurred in the workplace, by type of industry

A summary of the industries with the greatest numbers of workers reporting exposure to alcohol- and/or drug-related abuse or intimidation in the workplace is displayed in Figure 3.8. [12]

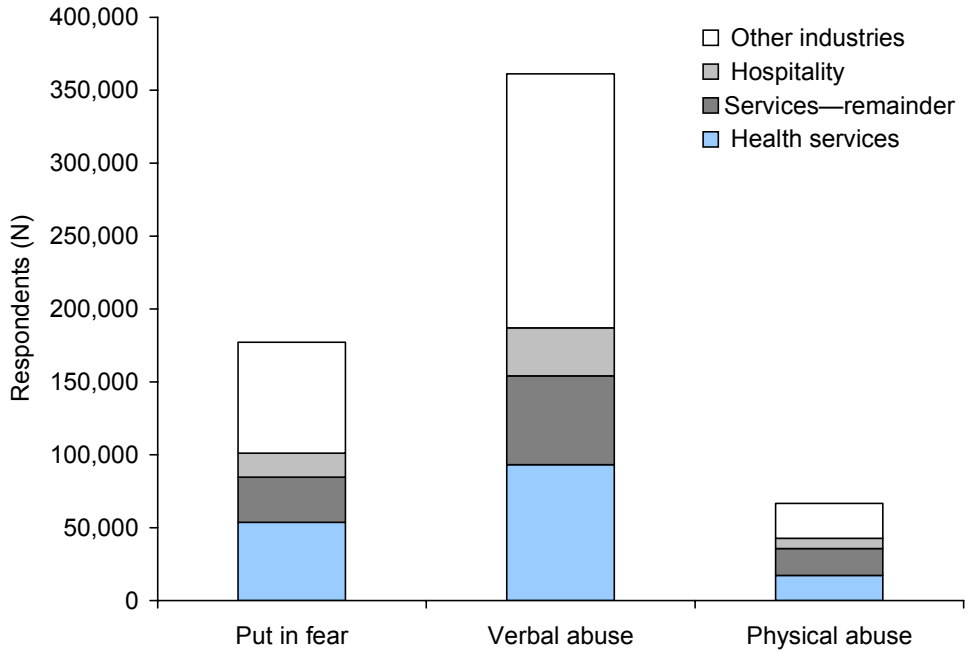

Figure 3.8: Number of employees reporting alcohol- and/or drug-related abuse or intimidation in the workplace in the past 12 months by type of industry

Alcohol attitude by short-term risk category

Respondents were asked to describe what sort of drinker they considered themselves to be. A substantial proportion of male and female employed recent drinkers, who frequently drank at short-term risky or high risk levels, considered themselves to be a social drinker (Table 3.12 and Figure 3.9). Few male or female employees who infrequently drank at short-term risky or high risk levels considered themselves to be binge drinkers (Table 3.12).

These patterns were evident across industry and occupational groups. Similar results were also observed for long-term risky or high risk levels, which indicate that a substantial number of employees appear not to be aware that their pattern of consumption constitutes risky drinking.

[12] The number of respondents reported here represents weighted estimates for the national population.

Table 3.12: Attitude by short-term risk category for employed recent drinkers

Type of drinker	n unweighted (n weighted)	Short-term risk			
		Frequent (risky and high risk)* (95%CI)		Infrequent (risky and high risk)** (95%CI)	
		Male	Female	Male	Female
Non-drinker	53	0.2%	1.3%	0.5%	1.6%
	(29,409)	(0.0%–1.5%)	(0.5%–3.1%)	(0.2%–0.9%)	(1.1%–2.4%)
Ex-drinker	16	0.5%	0.3%	0.2%	0.4%
	(10,376)	(0.1%–2.1%)	(0.1%–1.2%)	(0.1%–0.6%)	(0.1%–0.9%)
An occasional drinker	1,057	3.9%	8.2%	18.6%	26.1%
	(643,237)	(2.3%–6.6%)	(5.5%–12.0%)	(16.8%–20.6%)	(24.0%–28.3)
A light drinker	1,223	8.9%	13.6%	22.2%	23.6%
	(709,922)	(6.4%–12.2%)	(10.1%–18.2%)	(20.4%–24.1%)	(21.6%–25.7%)
A social drinker	2,941	57.7%	56.9%	52.7%	45.0%
	(1,766,568)	(52.8%–62.4%)	(51.0%–62.6%)	(50.4%–55.0%)	(42.6%–47.4%)
A heavy drinker	314	20.1%	12.4%	3.1%	1.4%
	(178,711)	(16.6%–24.1%)	(9.2%–16.7%)	(2.5%–3.9%)	(1.0%–2.1%)
A binge drinker	203	8.7%	7.2%	2.7%	1.9%
	(118,887)	(6.3%–12.0%)	(4.8%–10.8%)	(2.1%–3.5%)	(1.4%–2.7%)
Total	**5,807**				
	(3,457,110)	**100%**	**100%**	**100%**	**100%**

- *Frequent short-term risk drinking is drinking at short-term risk levels at least weekly.
- **Infrequent short-term risk drinking is drinking at short-term risk levels at least monthly or at least yearly.

Note

- Shading denotes drinking categories with the largest proportions of respondents.

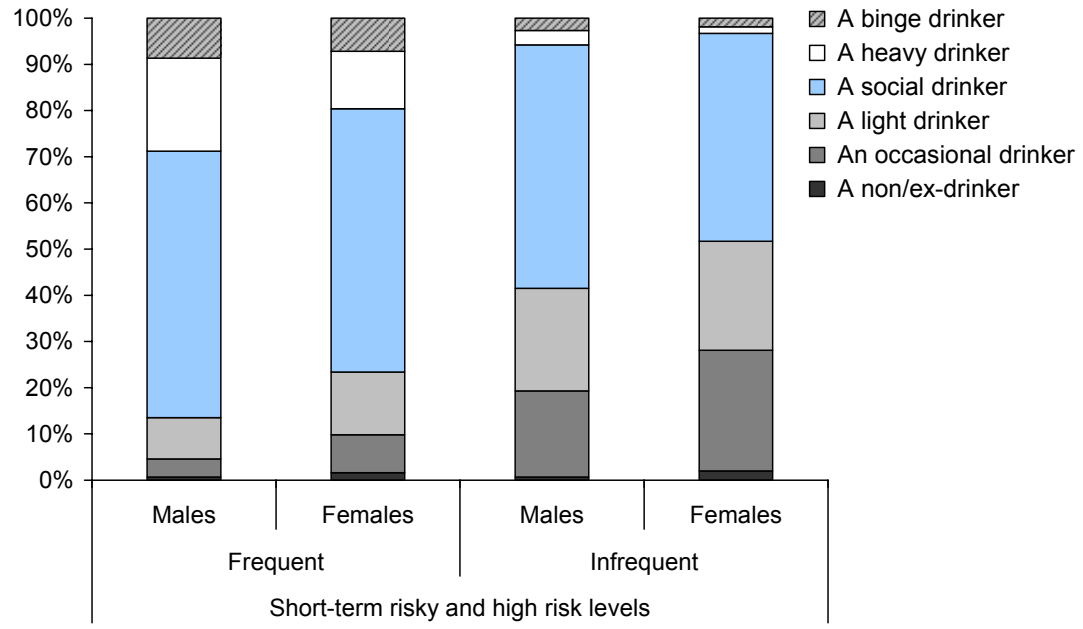

Figure 3.9: Attitude by short-term risk category for employed recent drinkers

Cutting down on alcohol use in the 12 months prior to the survey

A total of 9,799 employed recent drinkers (weighted n=6,314,656), who reported that they did not usually drink at their workplace, responded to the question regarding cutting down on alcohol use. Of these, 6.3% (95% CI, 5.7%–6.9%) reported that they had tried to stop or cut down on their alcohol use in the past 12 months, but found that they couldn't. A total of 1,185 employees (weighted n=716,710) who reported that they usually drank at their workplace also responded to this question. Of these, 8.1% (95% CI, 6.4%–10.3%) reported that they had unsuccessfully tried to stop or cut down on their alcohol use in the past 12 months, but found that they couldn't (Figure 3.10). There was a non-significant trend for employees who reported that they usually drank at their workplace to be more likely, than employees who did not usually drink at their workplace, to have tried to stop or cut down on their alcohol use in the past 12 months.

a: usually drank at the workplace **b: did not usually drink at the workplace**

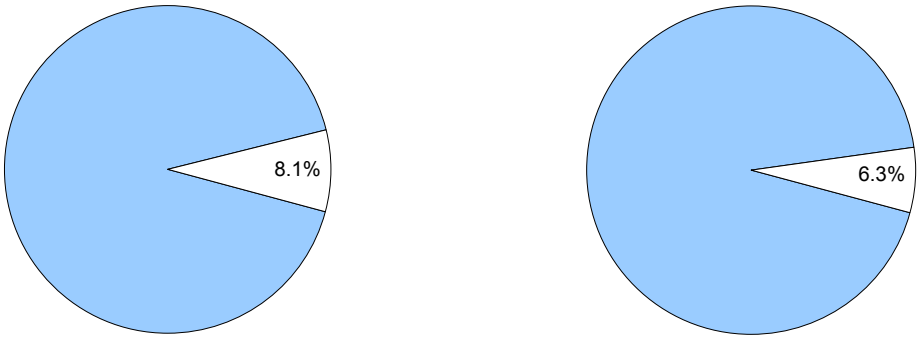

Figure 3.10: Percentage of employees who tried to stop or cut down on alcohol use by reported place of consumption of alcohol

Drinking more alcohol than intended

A total of 9,820 employed recent drinkers (weighted n=6,331,827), who reported that they did not usually drink at their workplace, responded to the question regarding whether they drank alcohol in larger amounts than intended. Of these, 27.4% (95% CI, 26.3%–28.5%) reported having consumed more alcohol than intended. A total of 1,183 participants (weighted n=716,185) who reported usually drinking at their workplace also responded to this question. Of these, 37.5% (95% CI, 34.2%–40.9%) reported consuming more alcohol than intended (Figure 3.11). Employees who usually drank at their workplace were 1.4 times (95% CI, 1.2–1.7) more likely ($t = 4.4$, $p < .001$), than employees who did not usually drink at their workplace, to have consumed more alcohol than intended.

a: usually drank at the workplace **b: did not usually drink at the workplace**

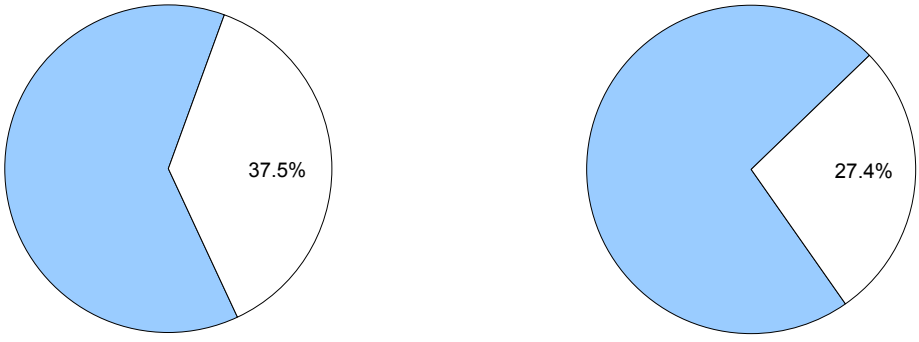

Figure 3.11: Percentage of employees drinking more alcohol than they intended by reported place of consumption of alcohol

Discussion

The prevalence and patterns of alcohol use in the workforce

The current study examined the alcohol consumption patterns of employed recent drinkers who responded to the 2001 National Drug Strategy Household Survey. Thus, the results of this study provide a comprehensive description of the prevalence and patterns of alcohol use within the Australian workforce. Nearly 90% of the workforce were recent drinkers and half these workers drank at levels associated with risk of harm at least once during the 12 months prior to the survey. Nearly 10% of male and over 7% of female employed drinkers reported frequently (at least weekly) drinking at short-term risky or high risk levels, while over 11% of males and over 13% of females reported drinking at long-term risky or high risk levels. Of particular concern is the substantial percentage of workers who reported drinking patterns associated with harm in the short-term. Over 40% of male and nearly 37% of female employed drinkers reported infrequently or very infrequently (at least monthly, or at least yearly) drinking at short-term risky or high risk levels. As outlined in the background of this chapter, individuals who engage in patterns of infrequent high consumption may represent the highest level of injury risk due to their pattern of consumption (Gruenewald et al, 1996; Treno et al, 1995; Treno & Holder 1997).

It is also important to note the relatively large proportion of employed females who drank at long-term risky and high risk levels. While 13.4% of employed female drinkers drank at long-term risky and high risk levels, only 10.5% of female drinkers not in the paid workforce drank at long-term risky and high risk levels. This finding is undergoing further investigation (Roche et al, 2005b).

In general, the prevalence of risky and high risk drinking appeared to decline with age, while a larger proportion of country employees, compared to capital city employees, reported short- and long-term risky or high risk drinking. Also, differences in consumption patterns between states and territories were observed. In particular, two jurisdictions stood out. Tasmania had the largest percentage of workers frequently drinking (at least weekly) at short-term risky or high risk levels and the largest percentage of workers drinking at long-term high risk levels. The Northern Territory had the largest percentage of workers who infrequently (at least monthly) engaged in short-term risky or high risk drinking and the largest percentage of workers who engaged in long-term risky drinking. Various factors may contribute to this finding including strong drinking cultures in those locations in general, together with a predominance of industries conducive to risky drinking (e.g. agriculture, mining, etc).

Industry differences in the pattern of workers' alcohol use

Differences in consumption patterns were also observed between industry groups. Not unexpectedly, the hospitality industry had the largest percentage of workers who engaged in frequent (at least weekly) short-term risky or high risk drinking and the largest percentage of workers who engaged in long-term risky drinking. Many hospitality industry workers are employed in workplaces where alcohol is readily available and as outlined in Chapter 2, alcohol availability is a workplace factor that can influence workers' consumption patterns. The agricultural industry had the largest percentage of workers engaging in long-term high risk drinking, while the mining industry had the largest percentage of workers who engaged in infrequent (at least monthly and at least yearly) short-term risky or high risk drinking. These findings may also be due to factors associated with the workplace. Agricultural industry workers often work unsupervised in isolated locations for small employers who do not have clear policies on alcohol use. As outlined in Chapter 2, isolation, low levels of supervision, and lack of clear alcohol policies can influence the consumption patterns of workers. Similarly, the consumption patterns of mining industry employees may be influenced by extended on-site/off-site work patterns.

Differences between more narrowly defined industry sectors were also observed. For example, of those employed in the services industry, 7.0% frequently (at least weekly) drank at short-term risky or high risk levels while 9.5% drank at long-term risky levels and 2.1% drank at long-term high risk levels. However, of the those employed in the community services sector of this industry, 11.0% frequently drank at short-term risky or high risk levels while 12.2% drank at long-term risky levels and 3.2% drank at long-term high risk levels. In contrast, of those employed in the health services sector of the services industry, only 4.4% frequently drank at short-term risky or high risk levels, while 6.4% reported long-term risky consumption and 1.5% reported long-term high risk consumption. These differences suggest that workplace factors may be associated with workers' consumption patterns and that these factors differ between individual workplaces within larger industry groups.

Among the important findings to emerge were differences in the consumption patterns of males and females employed in the same industries and same industry sectors. In general, more males than females drank at short-term risky or high risk levels. There has long been speculation about the probability of the 'convergence' of drinking patterns by males and females (Roche & Deehan 2002). The findings identified in this study provide some support for convergence theory. However, differential patterns among industry groups raise questions about specific work settings. Moreover, for some industries and industry sectors, the opposite gender trends were evident. For example, in the retail industry, a larger percentage of females (12.2%) compared to males (10.8%) frequently (at least weekly) drank at short-term risky or high risk levels. Similarly, in the food retailing sector of the retail industry, a larger percentage of females (16.4%) compared to males (9.2%) frequently drank at short-term risky or high risk levels. Unexpected industry-related gender differences were also evident in patterns of consumption associated with long-term risk. In general, more males than females drank at long-term high risk levels. However, in the retail and hospitality industries a larger proportion of females (6.5% and 5.6% respectively) compared to males (4.2% and 4.3% respectively) drank at long-term high risk levels.

Occupation differences in the pattern of workers' alcohol use

Further evidence of the association between workplace factors and workers' alcohol use was provided by the finding that workers' consumption patterns differed according to their occupation. Tradespersons were the group most likely to report frequent (at least weekly) short-term risky or high risk consumption, infrequent (at least monthly) short-term risky or high risk consumption and long-term risky consumption. Unskilled workers were most likely to report long-term high risk drinking, while professionals and managers were most likely to report very infrequent (at least yearly) short-term risky or high risk consumption.

As was the case for industry groups, differences were observed between more narrowly defined occupations. For example, 21.7% of all tradespersons compared to 34.3% of food tradespersons reported infrequent (at least monthly) short-term risky or high risk consumption. While 6.9% of all managers frequently (at least weekly) drank at short-term risky or high risk levels, 13.9% of farm managers frequently drank at these levels. Similarly, 7.8% of all professionals, compared to 18.3% of health and welfare associate professionals drank at long-term risky levels.

Gender differences in workers' consumption patterns were also evident between broad occupational categories and more specific occupations. While in general, more males than females drank at short-term risky or high risk levels, a larger percentage of female managers (8.0%) compared to male managers (6.5%), reported frequent (at least weekly) short-term risky or high risk consumption. Similarly, a larger percentage of female health professionals (4.1%) compared to male health professionals (2.9%), frequently drank at short-term risky or high risk levels. Unexpected occupation-related gender differences also extended to consumption associated with long-term risk. In general, more females than males drank at long-term risky levels, while more males compared to females drank at long-term high risk levels. However in the case of tradespersons, a larger proportion of males (11.9%) compared to females (10.2%) drank at long-term risky levels, while a larger proportion of females (9.6%) compared to males (4.9%) drank at long-term high risk levels.

Patterns of workers' alcohol use and the workplace environment

Differences in consumption patterns between industry groups, between industry sectors, between occupations, and between males and females employed in the same industries, same industry sectors, and same occupations indicate that workplace environments may differ in important ways that relate to alcohol use. While none of the questions contained in the survey specifically refer to workplace factors (i.e. work stress, workplace controls, or workplace culture) that could be associated with workers' consumption patterns, the results obtained allow for some limited inferences to be drawn.

For some occupations and industries, the observed differences in consumption patterns may be due to work stress. For example, compared to other occupations, a larger percentage of health and welfare associate professionals reported frequent (at least weekly) short-term risky or high risk consumption and long-term risky consumption of alcohol. It is increasingly acknowledged that workers in the health and human services field often experience high levels of work-related demands and stressors (c.f. Dollard et al, 2003). In addition, the current study identified that health-related occupations and industries also reported high levels of alcohol- and/or drug-related abuse and intimidation in the workplace. Thus it could be argued that work-related demands in

general, and in particular, incidents of alcohol- and/or drug-related abuse and intimidation may lead to stress that is alleviated with alcohol use. Further evidence for this argument is provided by the finding that females were more likely than males to report alcohol-related abuse and intimidation in the workplace. Compared to males, a larger percentage of female health professionals reported frequently drinking at short-term risky or high risk levels. Similarly, high levels of workplace alcohol- and/or drug-related abuse and intimidation were also reported in the hospitality industry. Within this industry, a larger proportion of females compared to males drank at long-term high risk levels.

For other occupations and industries, differences in workers consumption patterns may be explained by workplace controls. For example, a relatively small percentage of workers employed in the mining industry reported long-term risky or high risk drinking or frequent (at least weekly) short-term risky or high risk drinking. However, the mining industry had the largest percentage of workers who infrequently or very infrequently (at least monthly or at least yearly) engaged in short-term risky or high risk consumption. Many mines have clear policies on the use of alcohol at the mine site, and management actively discourages the use of alcohol. While some mine sites may have a wet mess where alcohol is served, quite often this is restricted to low alcohol beverages or the number of full strength alcoholic drinks an employee can purchase each day is restricted. However, many mining industry workers are employed on a roster system where they work at the mine site for two to three weeks and then have one week of recreational leave away from the mine site. Thus, while workers may drink little alcohol during their time on the site, they may engage in heavy alcohol consumption during leave periods. The workplace controls of the mining industry that restrict workers' consumption of alcohol at the mine site do not extend to employees' recreational leave away from the mine site, and may account for workers' pattern of short-term risk consumption.

Patterns of workers' alcohol use and workplace culture

There is also evidence to indicate that differences in workers' consumption patterns may be associated with factors in the workplace that contribute to workplace culture regarding alcohol use. For example, the largest percentages of workers who reported frequent (at least weekly) short-term risky or high risk drinking or long-term risky drinking were employed in the hospitality industry. In addition, while 21.7% of all tradespersons infrequently (at least monthly) drank at short-term risky or high risk levels, more than 30% of food tradespersons (the majority of whom would be employed in the hospitality industry) drank at these levels. Within the hospitality industry, alcohol is not only available, but the use of alcohol is actively promoted as a core component of the industry's business. Administrative and managerial support for the use of alcohol may influence the alcohol use of workers employed in the hospitality industry. Thus, a culture of alcohol promotion within the hospitality industry may account for the large percentage of employees who consume alcohol at risk levels. In addition, the hospitality industry traditionally attracts younger workers and the results of the current study indicated that younger workers were more likely than older workers to engage in at risk alcohol consumption. Further support for a culture of alcohol use in the hospitality industry was evident when data concerning alcohol-related incidents in the workplace was examined. Compared to other industries, the hospitality industry had the highest percentage of workers missing a work day due to their alcohol use, attending work under the influence, and usually drinking at the workplace.

Support for the cultural approach to understanding workers' consumption patterns is also provided by data concerning drinking more alcohol than intended and unsuccessfully cutting down on alcohol use. Employees who reported that they usually drank at their workplace (such as those employed in the hospitality industry) were 1.4 times more likely to also report drinking alcohol much more often in larger amounts than they had intended. This may indicate that in workplaces with a culture of alcohol use (typified by workers usually drinking at their workplace), there may be social pressure to consume more alcohol than intended. Similarly, there was a non-significant trend for employees who reported that they usually drank at their workplace to be more likely, than those who did not usually drink at their workplace, to have tried stopping or cutting down on their alcohol use in the past 12 months. This trend may indicate that these workers recognise they are drinking more than they should, however, due to social pressure to consume alcohol at their workplace, they find it difficult to reduce their alcohol intake.

Patterns of workers' alcohol use: Implications for the workplace

The results of the current study provide evidence that the alcohol consumption patterns of workers have important implications for the workplace in terms of productivity and safety. Overall, 3.9% of the drinking workforce reported having missed a work day due to their alcohol use, 6.6% reported attending work under the influence of alcohol, and 10.2% reported usually consuming alcohol at their workplace. Workers who reported having missed a work day in the past three months due to their alcohol use were three times more likely, than workers who had not missed a work day due to alcohol use, to also report having missed a work day in the past three months due to any illness or injury. While these percentages are relatively small, they represent a substantial threat to workplace safety and productivity.

Of particular importance was the finding that worker's alcohol consumption patterns were associated with negative consequences for the workplace. Controlling for age and gender differences, workers who frequently (at least weekly) drank at short-term risky or high risk levels were 19 times more likely to miss a work day due to their alcohol use, six times more likely to attend work under the influence of alcohol, twice as likely to usually drink at their workplace, and 1.4 times more likely to miss a work day due to illness or injury, compared to workers who reported drinking at short-term low risk levels.

Workers who infrequently (at least monthly) drank at short-term risky or high risk levels were seven times more likely to miss a work day due to their alcohol use, over three times more likely to attend work under the influence of alcohol, twice as likely to usually drink at their workplace, and 1.3 times more likely to miss a work day due to illness or injury, compared to workers who reported drinking at short-term low risk levels. Workers who very infrequently (at least yearly) drank at short-term risky or high risk levels were three times more likely to miss a work day due to their alcohol use, twice as likely to attend work under the influence of alcohol, 1.6 times more likely to usually drink at their workplace, and 1.2 times more likely to miss a work day due to illness or injury, compared to workers who reported drinking at short-term low risk levels.

Workers who reported drinking at long-term risky and high risk levels were five and eight times (respectively) more likely to miss a work day due to their alcohol use, and four and five times more likely to attend work under the influence of alcohol. Workers who drank at long-term risky levels were 1.4 times more likely than those who drank at

long-term low risk levels to usually drink at their workplace, however, those who drank at long-term high risk levels were no more likely than those drinking at long-term low risk levels to usually drink at their workplace. Those who drank at long-term risky or high risk levels were no more likely than those who drank at long-term low risk levels to miss a work day due to illness or injury.

Overall, riskier patterns of alcohol consumption were associated with an increased likelihood of work absences and other negative workplace behaviours. Together, these findings suggest that alcohol-related threat to workplace safety and productivity could be minimised by strategies designed to reduce levels of employees' alcohol consumption that are associated with risk of harm in the short- or long-term.

Of particular interest, for these types of strategies, was the finding that a substantial proportion of workers who reported risky patterns of consumption also considered themselves to be social drinkers. It appears that many workers drink in a risky manner, but are oblivious to the fact. This trend was evident for both male and female workers, and was consistent across industries and occupations. This suggests that, in general, workers are either not aware of what constitutes at risk drinking, or they are not prepared (consciously or subconsciously) to acknowledge that their consumption patterns place them at risk. Regardless of which interpretation is correct, the health and safety of workers could benefit from workplace education programs, policies, and norms that outline and reinforce NHMRC guidelines concerning low risk alcohol consumption. This is especially the case given the large number of workers who engage in risky patterns of consumption.

Strategies to reduce alcohol-related threat to workplace safety and productivity also need to address the alcohol use of others with whom workers come into contact with in the context of the workplace. Alcohol- and/or drug-related abuse and intimidation in the workplace were evident in the sample population. Nearly 5% of workers reported being verbally abused in the workplace by someone affected by alcohol and/or illicit drugs, and approximately 1% reported being physically abused. Just over 2% reported being put in fear in the workplace by someone affected by alcohol and/or illicit drugs.

While the percentage of employees who reported such alcohol- and/or illicit drug-related incidents in the workplace was relatively low, it is important to note that for some occupations and industries, the percentage of workers reporting these incidents was markedly higher. For example, just over 15% of respondents employed in the health services sector of the service industry and nearly 20% of health professionals reported being verbally abused in the workplace by a person affected by alcohol and/or drugs in the 12 months prior to the survey. This is three to four times greater that the prevalence in the general working population.

These occupational and industry differences in reported alcohol- and/or drug-related abuse or intimidation were also evident in the proportions of these incidents that occurred in the workplace. For example, just over 6% of employees reported being physically abused by a person affected by alcohol and/or drugs in the 12 months prior to the survey. Across all industries and occupational groups, approximately one in six of these incidents (16.7%) occurred in the workplace. However, for health professionals and workers employed in the health sector of the services industry, more than half (57.6% and 55.8% respectively) occurred in the workplace.

Due to the nature of the questions contained in the survey, it could not be accurately determined if these incidents were perceived by the respondent to be the result of someone under the influence of alcohol alone, drugs alone, or a combination of alcohol

and drugs. However, an examination of frequency counts indicated that the majority of these incidents (over 70%) were perceived to be due to a person who was affected either by alcohol alone, or by a combination of alcohol and illicit drugs.

Data analyses indicated that little alcohol- and/or drug-related abuse or intimidation in the workplace was due to intoxicated co-workers. The majority of these incidents were due to intoxicated persons unknown to the respondent. For some industries and occupations, many of these incidents may have involved customers/clients. The industry groups with the largest percentage of workers reporting alcohol- and/or drug-related abuse or intimidation were the services industry and the hospitality industry. Within the services industry, the health services sector stood out as having the largest percentage of workers reporting these types of incidents. A large proportion of the health sector consists of hospitals and a large proportion of the hospitality industry consists of hotels and other entertainment venues where alcohol is served. Of the occupation groups, health professionals, associate health and welfare professionals, intermediate service workers, and managing supervisors were the groups most likely to report alcohol- and/or drug-related abuse or intimidation. These occupations and industries often deal with intoxicated customers and clients. For example, health professionals working in hospital Emergency Departments are often called upon to treat intoxicated injury victims. Similarly, service workers and supervising managers employed in the hospitality industry often have to deal with intoxicated customers.

Limitations and directions for further research

The current study has highlighted that a substantial proportion of the Australian workforce consume alcohol at levels that place them at risk of harm in the short- and/or long-term. This pattern of consumption has important implications for the safety and productivity of the workplace. Workers who drink at risky or high risk levels are significantly more likely to take time off work due to their alcohol consumption, take days off work due to illness or injury, attend work under the influence of alcohol, and usually drink at their workplace when compared to workers who drink at low risk levels. An examination of occupation and industry differences in workers' consumption patterns also indicates that workplace factors, in particular the workplace culture, may be associated with differences in workers' consumption patterns.

However, due to the nature of the questions contained in the survey, the extent to which workplace factors such as culture influence workers' consumption patterns could not be fully determined. Thus, future research should be conducted that examines, on a national basis, the consumption patterns of workers and workplace factors that contribute to both workers' alcohol consumption and workplace cultures regarding alcohol use.

A second noteworthy limitation was the lack of questions in the 2001 NDSHS on injury. This is important because injury is a likely harmful consequence of short-term risky and high risk patterns of alcohol consumption which are common in the Australian workforce.

Caution needs to be applied when interpreting long-term risk levels. Long-term risk was calculated by using the mid point for frequency of consumption. For example when respondents reported drinking 5–6 days a week, 5.5 days a week was used to calculate long-term risk. Thus, the levels of long-term risk reported in the current study are mean estimates.

The results of the current study also highlighted that for some occupations and industry groups, alcohol- and/or illicit drug-related abuse and intimidation in the workplace was an issue. While these incidents appear to be associated with exposure to intoxicated clients or customers rather than intoxicated co-workers, it has implications for the health and safety of these workers. These types of incidents may increase the level of work stress experienced by workers and thus, may be associated with increased alcohol consumption patterns, and/or increased levels of absenteeism and stress-related compensation claims. However, the nature of the questions contained in the survey did not allow for a more detailed examination of this issue. Further research could be conducted that examines this issue in more detail, with a focus on industries and occupations that are likely to experience alcohol- and/or illicit drug-related abuse and intimidation.

4 Alcohol and workplace safety

The aim of this chapter is to review literature and research data concerning alcohol use and injury that occurs in the context of the Australian workplace. Despite the obvious risk alcohol use represents to workplace safety, surprisingly little is known about the extent of alcohol-related injury in the Australian workplace or its relationship with alcohol use. Much of what is known about these issues comes from international research, or research concerning road and air traffic safety. However, as will be pointed out, this information may have limited applicability to Australian workplaces.

A case study: Aviation safety report 2002/04/328

At approximately 5.08pm (EST) on the 26th of September 2002 a Piper Cherokee aircraft began its departure from Hamilton Island Aerodrome, Queensland. On board this short (15 km) charter flight to Lindeman Island were the pilot and five passengers. Witnesses reported that shortly after takeoff, the aircraft's engine began misfiring before cutting out and starting again. Shortly after, the aircraft commenced a right turn and the engine was again heard to misfire. Part way through the turn the engine again cut out and the aircraft descended rapidly and impacted the ground. A severe post-impact fire engulfed the aircraft fuselage, fatally injuring all six occupants (ATSB 2004).

A subsequent investigation into this accident found nothing to suggest that fuel contamination, the amount of fuel carried, structural failure, engine fault, or meteorological conditions were factors in the accident. However, a post-mortem toxicological report of the pilot's blood revealed a blood alcohol concentration (BAC) of 0.081 g/100ml, the presence of inactive cannabis metabolites, and analgesics consistent with a therapeutic dosage. The possibility that the pilot's BAC level was, in part, due to post-mortem alcohol production could not be discounted (ATSB 2004). The report into this accident concluded that there was insufficient evidence to definitively link the pilot's alcohol and/or cannabis consumption to the accident. However, evidence concerning the pilot's activities the previous evening and the use of a headache medication that could have been consistent with remedial action to treat a hangover, also led the report to conclude that "the adverse effects on pilot performance of post-alcohol impairment, recent cannabis use and fatigue could not be discounted as contributory factors to the occurrence" (ATSB 2004, p.v).

The above case study highlights the catastrophic consequences that can potentially result from workers' alcohol use, and also highlights the difficulty in retrospectively determining the degree to which workers' alcohol use contributes to workplace accidents and injuries. These issues are discussed in more detail in the following sections.

The physiological effects of alcohol

Alcohol is a central nervous system depressant that, after ingestion, is rapidly absorbed into an individual's blood supply. In general, the depressant effect of alcohol on the central nervous system impairs human performance (Finnigan & Hammersley 1992). Alcohol has been shown to have a detrimental effect on cognitive functioning such as information processing, reaction time, verbal skills, attention and vigilance, perception and reasoning, and memory function (Tzambazis & Stough 2000; Heishman et al, 1997; Koelega 1995; Maylor & Rabbitt 1993; Tharp et al, 1974). Similarly, alcohol has been shown to have a detrimental effect on psychomotor abilities (Hindmarch et al, 1991; Kerr & Hindmarch 1998). Even relatively low levels of alcohol have been shown to impair psychomotor performance of complex tasks (Moskowitz & Fiorentino 2000; Finnigan & Hammersley 1992), while the detrimental effect of alcohol on skill-based psychomotor tasks, such as driving and flying, are well documented (Newman 2004; e.g. Drummer et al, 2004).

The effect alcohol has on the central nervous system is dose-dependent (Heishman et al, 1997; Koelega 1995). That is, as the amount of alcohol consumed increases so does an individual's level of blood alcohol concentration (BAC) which in turn is directly proportional to the degree to which central nervous system function is impaired. However, the relationship between alcohol consumption and levels of BAC and the relationship between BAC level and central nervous system functioning depends on a range of factors including; gender, body weight and size, alcohol tolerance, rate or pattern of consumption, food consumed prior to drinking or while drinking, fatigue, consumption of medications or other drugs, health status, and the environment (Levine et al, 1975; Fillmore & Vogel-Sprott 1997; Kerr & Hindmarch 1998; Single et al, 1999).

In addition, the residual effects of alcohol ingestion, commonly known as a 'hangover' can continue after BAC levels have returned to zero. Hangover effects are characterised by headaches, nausea, and fatigue, combined with decreased occupational, cognitive, and visual-spatial performance (Wiese et al, 2000). In particular, memory retrieval processes can be significantly impaired during hangover (Verster et al, 2003).

Fatigue that results from alcohol ingestion is particularly important when considering the relationship between alcohol and workplace safety. Alcohol can interfere with normal sleep patterns by causing a dose-dependent reduction in the proportion of rapid eye movement (REM) sleep (Zarcone 1973; Kobayashi et al, 2001; 2002), that can result in fatigue and impaired concentration the next day. The relationship between fatigue and motor vehicle accidents is well documented (Stutts et al, 2003; Phillip et al, 2001; Sagberg 1999; Horstmann et al, 2000), and there is evidence to indicate that fatigue is also associated with workplace accidents (Lilley et al, 2002). In addition, research has demonstrated that decrements in performance related to fatigue are equivalent to decrements in performance associated with BAC levels of 0.05 g/100ml and greater (Williamson et al, 2000; Fairclough & Graham 1999).

Alcohol use and traumatic injury

Recent data indicate that 23% of Australian males and 18% of Australian females aged 14 years and over drink at risk levels for acute (short-term) harm at least once a month, while a smaller proportion of males (10%) and females (9%) drink at risk levels for chronic (long-term) harm (Chikritzhs et al, 2003). The higher proportion of Australians drinking at risk levels of acute harm are also reflected in mortality and morbidity data. During the ten year period from 1992–2001, an estimated 31,133 Australians died from the effects of risky and high risk alcohol use (Chikritzhs et al, 2003). More than half (53.8%) died from acute alcohol-related conditions, which can be defined as resulting from episodes of drinking to intoxication (e.g. road injury, drowning, etc). Similarly, of the estimated 577,269 hospitalisations due to risky or high risk drinking, that occurred during the same period, nearly 70% were for acute conditions (mostly injuries) caused by occasions of intoxication (Chikritzhs et al, 2003).

Alcohol use has been associated with increased injury in a wide variety of settings including road traffic accidents, falls, fires, injuries that occurred during sport or recreational activities, and injuries related to violence (Single et al, 1999). For example, in 1997, 953 Australian motor vehicle drivers and motor cycle riders were fatally injured in road accidents. Of these fatalities, 239 (28% of those tested) had a BAC level of 0.05 g/100ml or greater (FORS 1999). Similarly, during the 2000/2001 financial year 282 drowning deaths were identified using the National Coronial Information System, of which 21% were attributed to alcohol use (Driscoll et al, 2003b).

The association between alcohol use and increased risk of injury is also evident in Australian data concerning non-fatal injuries. Hospital ED data indicate that drinking any alcohol in the six hours prior to injury significantly increases the odds of injury when situational and other risk factors are accounted for (Stockwell et al, 2002; Watt et al, 2004). These data also indicate that the risk of injury increases with the quantity of alcohol consumed (McLeod et al, 1999).

Alcohol use and workplace traumatic injuries

While there appears to be clear evidence concerning the relationship between alcohol use and injury within the general population, there are major gaps in knowledge on the relationship between alcohol use and workplace injury, especially in the Australian context. The most extensive body of evidence regarding the association between alcohol use and workplace injury concerns accidents that result in fatal injury. Very little research evidence is available concerning non-fatal traumatic workplace injury. In addition, much of the evidence concerning alcohol use and workplace injury has been obtained from international workplace research and research concerning road traffic and air safety. While this research is useful, important differences between countries in terms of consumption patterns, cultural norms, and industrial relations may limit the applicability of this international workplace research to the Australian context, while important environment, task, and legal requirements may limit the applicability of road and air safety research to other workplace contexts. Research evidence concerning fatal and non-fatal workplace injuries and limitations to this research are outlined in the following sections.

Alcohol use and non-fatal workplace injuries

As previously noted, much of the evidence concerning alcohol use and non-fatal workplace injury has been obtained from international research which may have limited applicability to the Australian workplace. This research is also subject to some methodological criticism. For example, the majority of studies concerning workplace injury and alcohol use are restricted to cross-sectional survey research, and few studies have utilised analytic designs that include appropriate comparison groups.

Hospital Emergency Department data

Exceptions to this criticism are studies that have examined hospital Emergency Department (ED) data utilising matched case-control designs to identify the relationship between alcohol use and injury. However, few of these studies specifically examine work-related injuries and those that have indicate very few workplace injuries are associated with alcohol. In a review of international ED studies, Cherpitel (1993) identified only one study that focused on workplace injuries (Lings et al, 1984) which concluded that only 4% of work-related injuries were associated with alcohol use. A more recent study than that of Lings et al., while not a case controlled study, also concluded few work injuries were alcohol-related. Trent (1991) utilised national injury surveillance data to examine approximately 24,000 workplace injuries that presented at 63 U.S. hospital emergency rooms and concluded that 5% of alcohol-related injuries occurred at work.

The finding that few workplace injuries are associated with alcohol was confirmed in a recent Australian study (Watt et al, 2004) that utilised a hospital-based case-control design to quantify the relationship between acute alcohol consumption and risk of injury. While not reported in the Watt et al. study, an examination of the data set indicated that of the total sample population (n=1,048) only 101 participants were injured while working. Of these participants only 40 (3.8% of the total sample) reported consuming alcohol in the 24 hours prior to the injury, and only six (0.5% of the total sample) reported consuming alcohol in the six hours prior to the injury.

One limitation of data obtained by most hospital ED studies, however, is that the focus is not specifically on injuries that occur in the workplace. Rather, alcohol-related work injury is identified by sub-group analysis. Thus, workplace injuries may be underrepresented in these studies due to the study design. For example, in order to maximise the number of likely alcohol-related incidents, the most recent Australian ED studies (McLeod et al, 1999; Roche et al, 2001; Stockwell et al, 2002; Watt et al, 2004) were conducted on weekends from Friday to Sunday night. Compared to the total employed population, relatively few employees work on the weekends and those that do tend to be employed in particular industries such as the hospitality industry.

A further limitation of hospital ED studies is that the focus of data collection is on the injured person's consumption patterns and usually ignores the consumption patterns of other non-injured workers who may have played a causative role in the injury event. Data obtained by ED studies, and limitations to this data for determining the extent of alcohol-related workplace injuries, are discussed in more detail in Chapter 5.

Cross-sectional survey data

Cross-sectional survey data, while limited, also provide an indication of risk of workplace injury due to workers alcohol consumption, however, some of this evidence is equivocal. For example, in a study of 6,857 USA workers (aged 51–61 years) Zwerling et al. (1996) utilised a test instrument (CAGE) that discriminates between alcoholics and non-alcoholics, and self-reported measures of alcohol consumption to examine the relationship between alcohol and workplace injury. Controlling for confounding factors such as age, gender, education, occupation, and strenuous job activity, alcoholism and self-reported alcohol consumption were associated with higher rates of injury. Of interest in this study was the finding that moderate drinkers had the lowest injury rates, while those that consumed more than five drinks a day and those that drank less than one drink per day had an elevated risk of injury. In contrast, Veazie and Smith (2000) surveyed 8,569 younger USA workers (aged 24–32 years old) and after adjusting for the same confounding factors as Zwerling et al (1996), found that alcohol dependent workers were not at higher risk of injury. Veazie and Smith concluded that these confounding factors may explain much of association between heavy drinking and occupational injury for workers of this age group.

Despite the findings of Veazie and Smith (2000), other large scale USA survey research indicates that heavy alcohol use is associated with workplace injuries. For example, Dawson (1994) utilised data from a large USA national health survey and found that after adjusting for the effects of age, gender, education, occupation, and strenuous job activity, the odds of occupational injury increased with the frequency of heavy drinking. Similarly, Ragland et al. (2002) conducted a prospective examination of workers' compensation claims and self-reported alcohol consumption patterns of more than 1,800 USA workers over a period of five years. Results indicated that those who drank more than 10 alcoholic drinks per week were approximately 1.3 times more likely than abstainers to have had a workers' compensation claim during the five-year period.

One reason for inconsistency in survey research findings may be failure to adequately control for occupational differences. Holcom, Lehman, and Simpson (1993) classified a sample of USA municipal employees according to jobs associated with high and low accident risk and found that alcohol use was a major discriminator between those who had accidents and those that did not have accidents, but only for those whose jobs were associated with high accident risk.

An alternative explanation for inconsistent research findings may be due to the type of instrument utilised to measure alcohol consumption patterns. An Australian study of manufacturing industry employees (Webb et al, 1994) utilised three measures of alcohol use (the Mortimer-Filkins test of problem drinking, self-reported alcohol consumption, and self-report measures of binge drinking) in conjunction with workplace medical and absence records to determine the relationship between alcohol, workplace injury, and injury-related absence from work. Heavy binge drinking was defined as drinking more than seven standard drinks on each occasion at least two times a month, while medium binge drinking was defined as drinking more than seven standard drinks on each occasion two to 12 times a year. High alcohol consumption was defined as drinking more than 41 standard drinks per week for males and drinking more than 27 standard drinks per week for females. Problem drinkers were defined as those who scored more than 23 on the Mortimer-Filkins test. The results of this study indicated that binge drinking and high alcohol consumption were not associated with injury or absence from work. However, problem drinking was significantly associated with both injury and absence.

Problem drinkers were 2.7 times more likely to have injury-related absences than non-problem drinkers.

Webb and her colleagues (1994) outlined several reasons why indicators of problem drinking, but not measures of consumption, may be related to workplace injury. First, workers who consume large quantities of alcohol may absent themselves from work, rather that face the risk of accident or detection. Second, workers may drink at times and places that are temporally and geographically distant from the workplace. Third, it may not be the direct effects of alcohol consumption that produce higher risk of accidental injury in the workplace, but rather the social and psychological consequences of drinking such as family and relationship problems, financial difficulties, or personal problems such as guilt or low self-esteem. Finally, and perhaps more importantly, Webb et al's study measured average levels of alcohol consumption using a retrospective seven-day diary. However, it is more likely the quantity of alcohol consumed on any given drinking occasion rather than the average quantity consumed over longer periods, predicts alcohol-related workplace injury.

While cross-sectional survey research indicates that alcohol use appears to be associated with non-fatal workplace injury, this research also indicates that the prevalence of alcohol-related non-fatal workplace injuries is relatively low. Reviews of Australian and international research concerning alcohol use and non-fatal workplace injury (Macdonald 1997; Webb et al, 1994; Stallones & Kraus 1993) identify that overall, between 3% and 11% of all non-fatal workplace injuries may be attributable to alcohol use. However, these reviews also caution that there are relatively few studies that have examined this issue and much of the evidence that is available is methodologically weak. In general, these reviews tend to conclude that while there is some evidence that alcohol may contribute to non-fatal workplace evidence, the strength of this relationship is not known.

Alcohol use and fatal workplace injuries

Perhaps more compelling evidence of a relationship between alcohol and workplace injury comes from research that has examined the role of alcohol in fatal workplace injuries. A recent examination of workplace fatalities that occurred in Australia between 1989 and 1992 (Driscoll et al, 2001; Driscoll 2003), identified that during this 4 year period a total of 2,413 workers were fatally injured. Of these, 1,787 (74%) were injured while working and 626 (26%) were injured while commuting to or from work. Of the 1,787 working deaths, 1,244 occurred in the workplace and 543 were work-road deaths. In addition, a further 811 bystanders were killed as a result of a work activity.

Information on BAC levels was available for 1,252 (70%) of the 1,787 working deaths. Of these, 126 (10.1%) had a non-zero BAC level and 74 (5.9%) had a BAC level of 0.05 g/100ml or greater. Based on information in coronial files, raised BAC levels appeared to have contributed to at least 64 working deaths (3.6% of all working deaths and 4.4% of working deaths where BAC levels were available). As BAC levels were unavailable for approximately 30% of working deaths, it was concluded that alcohol contributed to between 4% and 5% of all working deaths (Driscoll 2003).

Of the 626 commuting deaths, BAC levels were available for 502 (80%). In 54 of these cases (10.8%) BAC levels were 0.05 g/100ml or greater. Information from coronial files indicated that alcohol appeared to contribute to 56 commuting deaths (8.9% of all commuting deaths and 10.8% of commuting deaths where BAC levels were known) (Driscoll 2003).

Of particular interest, for an examination of the relationship between workplace culture and alcohol use, is the finding that in 28 (44%) of the 64 working deaths where raised BAC levels appeared to contribute to the incident, alcohol had been consumed either at work or at a work-sponsored function (Driscoll 2003). Similarly, in 25 (45%) of the 56 commuting deaths where raised BAC levels appeared to contribute to the incident, alcohol had been consumed either at work or at a work-related social function (Driscoll 2003).

While post-mortem levels of BAC provide compelling evidence concerning the relationship between alcohol use and fatal workplace injury, these data are not without limitations. There is substantial evidence that for most drugs, including alcohol, there are important differences in blood concentrations depending on the time of collection after death, choice of sampling site, and volume of blood analysed (Pounder 1993; Pounder & Jones 1990). For example, the quantitative aspects of BAC levels are often complicated by post-mortem putrefaction which can lead to microbial fermentation processes that result in post-mortem alcohol production (Vu et al, 2000). Thus, the accuracy of BAC levels may be influenced by the time that has elapsed between death and autopsy.

Similarly, it has been demonstrated that particular body sites where autopsy blood and tissue samples are collected are more reliable indicators of BAC levels than other body sites (Pounder & Jones 1990). However, the nature of injuries the deceased worker incurs may limit the use of blood and tissue samples from the more reliable body sites. This was the case in the Hamilton aerodrome accident cited previously. Due to body damage the pilot suffered during the post-impact fire, toxicological analysis for alcohol and cannabinoid metabolites was limited (ATSB 2004).

While reliable and accurate post-mortem BAC levels are not always available due to the nature of injuries the deceased worker incurs, or due to post-mortem alcohol production, legislative differences may also limit information concerning the extent of alcohol-related workplace fatalities. Current Australian road traffic legislation requires BAC analysis for all road traffic fatalities, however, BAC analysis is not always conducted for fatalities that occur in the workplace. As evident from an examination of Australian workplace fatalities during 1989–1992 previously outlined (Driscoll et al, 2001; Driscoll 2003), BAC levels were available for 81% of workers fatally injured in a road accident while carrying out a work activity, and 80% of workers fatally injured while commuting to or from work. However, information on BAC levels was available for only 65% of workers fatally injured at the workplace (Driscoll 2003). Thus, BAC levels alone may not provide an accurate indication of the extent of alcohol-related workplace fatalities.

In addition, post-mortem toxicology reports are only obtained for deceased workers. Data concerning the BAC levels of co-workers or others who may have contributed to the fatal incident are usually not available. This further limits the degree to which post-mortem BAC levels provide an accurate indication of the extent of alcohol-related workplace fatalities.

Summary

The research that has been reviewed indicates that alcohol consumption can negatively impact on human cognitive function and performance. Therefore, the alcohol use of workers represents a potential risk for workplace safety. Also, the research reviewed indicates that alcohol use is associated with workplace traumatic injury. However, the extent of alcohol-related workplace injury is unknown, especially with respect to non-fatal workplace injury. In addition, little is known regarding the causative role alcohol plays in traumatic workplace injuries. The finding that an injured worker had a high level of BAC does not indicate that alcohol was the sole, or main, cause of the accident. Similarly, the finding that alcohol consumption outside of working hours is associated with workplace injuries and that problem drinkers have significantly more work injuries than non-problem drinkers does not indicate causation. A wide variety of individual, environmental, organisational, job and task characteristics are likely to contribute to any accident incident that results in injury. However, given the negative impact that alcohol can have on an individual's cognitive function and performance, alcohol consumption has the potential to interact with these factors and play a contributory role in traumatic workplace injury.

To determine the extent of alcohol-related injury in the Australian workplace, further research is needed. This research should be rigorous, methodologically sound, and address the limitations of previous research that have been outlined. In particular, it is recommended that well designed studies incorporating appropriate comparison groups be conducted to specifically examine the relationship between alcohol use and workplace injuries. These studies need be conducted during times that workplace injuries are most likely to occur, and should take into account the multi-faceted nature of factors likely to contribute to workplace injury. These studies should also be designed to determine what patterns and contexts of alcohol consumption are the most likely to contribute to workplace injury, and identify individual and organisational factors that are likely to increase the risk of alcohol-related injury in the workplace.

5 Assessment of other data sources

Introduction

There is a scarcity of evidence concerning alcohol-related injury in the Australian workplace. This chapter examines existing data from a variety of sources including hospital Emergency Department (ED) data, hospital separations data and National Coroners Information System (NCIS) data.

The NCIS and hospital separations data are large administrative datasets that may provide useful information on alcohol-related fatal and non-fatal injuries in the workplace, although they were not purposefully designed for this function. Such information can be derived at low cost, but there are several disadvantages; determining the alcohol- and work-relatedness of cases is not straightforward, and the datasets are not optimally designed to answer specific research questions. ED data has been collected for the purpose of examining the relationship between alcohol and traumatic injury, but few studies focus on occupational injuries.

The aim of this chapter is to investigate what new information on alcohol-related injury in the Australian workplace can be extracted from these existing data sources and to examine the feasibility of making improvements to the data sources so they yield better information.

Source 1: Hospital Emergency Department data

A relatively large number of research studies have utilised hospital ED data to examine the relationship between alcohol use and traumatic injury. For example, a review of ED studies published between 1967–1993 (Cherpitel 1993) identified 29 such studies. A more recent systematic review of literature published between 1990–2003 (Roche et al, 2005a) identified 65 hospital based studies of which 33 were undertaken in EDs. In general, these reviews indicate a substantial proportion of trauma presentations at EDs are alcohol-related. However, the proportion of alcohol-related trauma presentations at EDs varies considerably according to the location of the ED, the time and day of presentation, the type of injury, and the alcohol screening method used.

While ED data have primarily been utilised to determine the proportion of traumatic injury associated with alcohol use, and/or to examine the usefulness of EDs as a screening and intervention setting, ED studies also provide an opportunity to examine the relationship between work-related traumatic injuries and alcohol use. That is, data concerning the injury event (e.g. location of injury event, activity engaged in at time of injury, etc) allows for the proportion of work-related ED presentations that are associated with alcohol use to be determined. Despite this opportunity, few research studies have taken this approach. For example, Cherpitel's (1993) review identified only one ED study (Lings et al, 1984) that examined occupational injuries, and this study indicated 4% of work-related injuries were associated with alcohol use.

A review of recent ED literature

In order to examine if more recent ED research has examined alcohol-related work injury, literature collected as part of a systematic review of ED studies (Roche et al, 2005a) was re-examined. Roche et al's review involved hospital alcohol screening studies published from 1990–2003 in English language journals. The databases searched were Medline, PsycINFO, ERIC, CINAHL, all EBM Reviews, AustHealth and ISI Web of Science. The search string used was: 'hospital' or 'screening' and 'alcohol' and 'alcohol consumption' or 'alcohol interventions' or 'emergency department' or 'injury' or 'problem drinking' or 'trauma'. Only studies which reported prevalence rates of positive screens were included (studies which reported only psychometric properties of tools, for example, were not included). As previously outlined, this review identified 65 hospital based studies of which 33 were undertaken in EDs. A review of these 33 ED studies identified only seven that mentioned some aspect of work-related injury. These seven studies are outlined in Table 5.1.

As can be seen from Table 5.1, only two of the seven studies provided evidence as to the extent of alcohol-related workplace injury. Becker, et al. (1995) screened all patients over the age of 15 years who presented at the ED of an urban USA teaching hospital. Ninety-six work-related trauma presentations were recorded during a period of four months, of which 14 (15%) tested positive for alcohol using a saliva alcohol test. Conversely, Dowey (1993) surveyed all patients who presented at the ED of Belfast City Hospital over a three month period and observed only one alcohol-related work injury. However, Dowey's (1993) results need to be treated with caution as the aim of this study was to determine the association between ED presentations and self-reported patterns of overall alcohol consumption, not intoxication levels or recent consumption. Indeed, the observed alcohol-related work injury in Dowey's study was only detected by the smell of alcohol on the patient's breath (Dowey 1993).

The remaining studies presented in Table 5.1 provide little evidence concerning the extent of alcohol-related work injury. Cherpitel's (1997) study of three separate EDs provided no information regarding the number of work-related trauma presentations, nor the proportion of work-related presentations that were alcohol positive. However, Cherpitel (1997) did observe that a number of patients at two EDs reported drinking in the workplace prior to the injury event. Three of the studies reported in Table 5.1 (Soderstrom et al, 1997; i.e., Soderstrom 1994; Lapham et al, 1998) classified work-related trauma as 'other trauma' and grouped work-related injury with recreational injury and home injury. Thus, the exact proportion of work-related injuries associated with alcohol use could not be determined. Similarly, one study (i.e. Simpson et al, 2001) grouped work-related injury with injury that occurred at school and again the exact proportion of work-related injuries associated with alcohol use could not be determined.

In addition to the ED studies identified by the reviews of Roche et al (2005a) and Cherpitel (1993), there appears only one additional study that utilised ED data to determine the extent of alcohol-related workplace injury. Trent (1991) utilised national injury surveillance data to examine approximately 24,000 workplace injuries that presented at 63 US hospital emergency rooms during a six month period from October 1986 to March 1987 and concluded 5% of alcohol-related injuries occurred at work.

Table 5.1: Studies reporting the prevalence of positive screens for work-related injury in Emergency Departments

Study and location	N	Data sample	Screening tools	Prevalence of alcohol-related trauma	Alcohol positive work-related Injury event
Becker *et al.* (1995) USA	791 ≥15 yrs old	All presentations over 4 month period	Saliva alcohol test (SAT)	21% positive (+) SAT	96 work-related trauma presentations reported 14 (15%) alcohol positive (2% of total trauma presentations)
Cherpitel (1997) 3 separate ED sites USA	Site 1=384 Site 2=1,548 Site 3=523 ≥18 yrs old	3 probability samples of all presentations over a 6 month, 3 month, and 6 week period respectively	Breath test ≥ 0.05 (BT) Self-report of drinking prior to event (SR)	Site 1=12% (+BT), 23% (SR) Site 2=9% (+BT), 13% (SR) Site 3=23% (+BT), 36% (SR)	Number of work-related trauma presentations not reported Those injured in workplace were statistically less likely to report drinking prior to event 3% of respondents at Site 2 and 1% at Site 3 reported drinking in workplace prior to injury
Dowey (1993) UK	6,625 All ages	All presentations during a 3 month period	Self-report of drinking patterns	217 alcohol-related traumas	1 work-related trauma presentation associated with alcohol use
Lapham *et al.* (1998) Thailand	993 ≥14 yrs old	All presentations between 1800 hrs and 0200 hours	AUDIT	36% of all traumas associated AUDIT score ≥ 8.	Work-related injury = 'other trauma' 75 'other trauma' presentations associated with AUDIT score ≥ 8.
Simpson *et al.* (2001) UK	544 ≥10 yrs old	All presentations during 2x 24 hour periods of each day of week	SAT	22% + SAT	Of 118 injury events that occurred at school or work 27, (18%) were alcohol positive (5% of total trauma presentations)
Soderstrom (1994) USA	16,251 All ages	All presentations during a 6 year period	Retrospective BAC records	32% + BAC	Work-related injury = 'other trauma'. 445 'other trauma' presentations (16%) were alcohol positive (3.5% of total trauma presentations)
Soderstrom *et al.* (1997) USA	1,118 ≥18 yrs old	All injury admissions of ≥ 2 days	Structured Clinical Interview DSM-III-R, BAC	24% current dependence 29% + BAC	Work-related injury = 'other trauma' No detail provided on alcohol-related 'other trauma' presentations

A re-examination of Australian ED data

The evidence reviewed to this point indicates that few ED studies have examined the extent of work-related injuries associated with alcohol use. In particular, there appears to be no Australian study that has specifically examined this issue. In order to address this, recent Australian ED data were examined. These data were collected at a metropolitan hospital ED (Gold Coast Hospital) at several time points during a period of approximately 32 months from early 2000. Data collection involved all patients aged 15 years and over who presented at the ED for treatment of an injury that had occurred in the prior 24 hours. Alcohol screening was conducted using self-report surveys of alcohol consumption in hours prior to the accident. In addition, information concerning the patients' demographic background was collected together with information concerning the nature and type of injury including the patients' activity at the time of injury. This data set has been utilised to inform several Australian studies concerning alcohol use and traumatic injury (Roche et al, 2001; Watt et al, 2004). These studies are not described in Table 5.1 as they did not report on work-related injury.

An examination of this data set indicated that of the total sample population (N =1,048), 101 (9.6% of total sample) participants were injured while working for an income. Of these, 40 (40% of those injured while working or 3.8% of the total sample population) reported consuming alcohol in the 24 hours prior to the injury and six (6% of those injured while working or 0.6% of total sample population) reported consuming alcohol in the six hours prior to the injury. This would suggest that relatively few alcohol-related injuries occur in the Australian workplace. However, this conclusion requires cautious consideration. This Australian ED data was collected on weekends from 1800 hrs on a Friday night to 2200 hrs on the following Sunday night. Thus, the results may not be a true indication of the extent of alcohol-related workplace injury. Compared to the total employed population, relatively few employees work on the weekends and those that do tend to be employed in particular industries such as the hospitality industry.

Summary

Research evidence concerning the proportion of work-related trauma presentations at hospital EDs is extremely limited. Of the evidence that is available, it appears that between 4% and 15% of all workplace injuries treated at hospital EDs may be associated with alcohol use. However, the use of existing ED studies to determine the extent of alcohol-related workplace injury is problematic for several reasons.

First, many of these studies do not specifically focus on work-related injury. Rather, alcohol-related work injury is identified by sub-group analysis of larger data sets. Thus, workplace injuries may be misrepresented in theses studies due to the study design. For example, in order to maximise the number of likely alcohol-related incidents, many studies collected data on weekends (Roche et al, 2001; e.g. Lapham et al, 1998; Watt et al, 2004). Thus, the extent of alcohol-related workplace injuries may be underrepresented in these studies due to the large proportion of the workforce who do not usually work on weekends.

A second limitation to existing ED studies concerns the methods utilised to screen for alcohol use. Many of these studies rely on self-report surveys to determine the role of alcohol in the traumatic injury. This may not be an appropriate method for detecting alcohol-related workplace injury, as employees who have suffered a compensable injury

in the workplace may be reluctant to admit to alcohol use for fear of jeopardising any compensation. For example, the Cherpitel (1997) study outlined in Table 5.1, provided no statistics concerning blood alcohol levels for work-related injuries. However, patients injured in the workplace were statistically less likely to report drinking prior to the injury event (Cherpitel 1997). This may indicate that alcohol-related injuries are less likely to occur in the workplace, or alternatively, it may indicate that employees are less likely to report alcohol use that occurred prior to a workplace injury event.

To some degree, even the use of more reliable indicators of intoxication such as breath analysis or saliva tests may be limited in their ability to determine the extent of alcohol-related injury. Quite often a substantial amount of time can elapse between the injury event and a subsequent breath or saliva test in the ED. For example, it is not uncommon for several hours to pass between the ED presentation and treatment (including breath testing) especially when the injury is less serious and the ED presentation occurs during a busy period. The elapsed time period between the injury event and subsequent testing can result in a significant reduction in blood alcohol levels from time of injury.

In addition, the use of ED data alone may not provide a true indication of the extent of alcohol-related workplace injury. In many cases, EDs are chosen for treatment due to the seriousness of the injury or the time of day that less serious injuries occur (i.e. outside of normal working hours when medical clinics and doctors' surgeries are not open). As the majority of the workforce is employed during relatively normal business hours (i.e. 0730 hrs to 1730 hrs) on weekdays, it is likely that many less serious workplace injuries are treated at local medical clinics and local doctors' surgeries. Thus, ED studies may capture only a subset of workplace injuries (i.e. those that are either serious, or occur outside of normal working hours).

Finally, the broader concept of 'work-related' alcohol use (e.g. drinking with co-workers after work, but before going home) is often not incorporated within the conceptual framework of most ED studies. Most ED studies define work-related injury as injury that occurs in the workplace, or injury that occurs while the patient was working for a living. However, these narrow definitions exclude any injury that occurs outside of work hours, or away from the workplace, that may be associated with alcohol use when workers socialise after work, but before going home. Cases due to drinking by a person other than the injured person tend not to be included. Narrow definitions of work-related injury, may result in an underestimation of the proportion of work-related injury associated with alcohol use for two reasons. First, alcohol-related road injury is the most common cause of fatal and non fatal alcohol-related trauma in Australia (Chikritzhs et al, 2003). Second, alcohol use while socialising with co-workers after work appears to be the most common form of 'work-related' alcohol use in Australian workplaces (Davey et al, 2000; Bush et al, 1992; Pidd 2003b).

In order to accurately determine the extent of alcohol-related workplace injury, further studies are required that focus on workplace injury as the main variable of interest. These studies need to go beyond hospital EDs as a setting for the treatment of traumatic injury by including other potential injury treatment settings such as medical clinics and doctors' surgeries. In addition, these studies need to adopt a broader conceptualisation of work-related injury that includes work-related injury that may occur outside of the workplace or normal working hours.

Source 2: Hospital separations data

Introduction

In developed countries like Australia, people who sustain injures that are more than moderately severe commonly attend an acute care hospital and are often admitted.[13] Administrative data on people who have been admitted to hospital may provide a means to quantify and characterise the involvement of alcohol in the occurrence of serious work-related injuries, without the costs associated with undertaking a specific study to identify and investigate this type of case.

This section reports on an exploratory investigation into the feasibility of using administrative data on in-patient (i.e. admitted) care provided by acute hospitals in Australia to identify and describe injury cases that are related both to work and to alcohol.

To be feasible, this requires a source of administrative data on hospital cases which:

1. Includes data on all, or nearly all, hospitalised injury cases (or a sufficiently large and representative sample),
2. Enables 'work-relatedness' to be ascribed to injury cases, and
3. Enables 'alcohol-relatedness' to be ascribed to injury cases.

The first of these conditions is largely met by the National Hospital Morbidity Database (NHMD), a unit-record collection of administrative data that includes records for nearly all cases treated as in-patients at nearly all acute-care hospitals in Australia (Australian Institute of Health and Welfare 2001b). The NHMD is nearly complete and it is likely that nearly all serious injury cases, including those involving alcohol or work, are represented by records in the collection. Identification of those records is not necessarily straightforward.

The NHMD is operated by the AIHW, and comprises records supplied by the health department, or equivalent agency, in each state and territory. Each annual file in the collection contains records for nearly all episodes of in-patient care that ended (i.e. in which the patient 'separated' from hospital) during a one-year period. Known limitations on the completeness of each annual collection are documented, and are small for recent years (Australian Institute of Health and Welfare 2001b).

The NHMD has some limitations for the purpose of measuring injury occurrence. One is that records in the collection represent episodes in hospital, not people. Since some injury cases result in more than one episode in hospital, the collection does not provide a direct route to precise estimates of case numbers. This is one of several characteristics of NHMD data that affects the interpretation of measures derived from this source. These are manageable and the NHMD can be used, with caution, for purposes such as injury surveillance (Harrison & Steenkamp 2002; Bradley & Harrison 2004). These methodological issues are not especially relevant to the problem of identifying work-related and alcohol-related injury cases, and so they are not addressed in this section.

[13] An important exception is injury cases that are rapidly fatal. In Australia, these cases are usually attended by police and referred to a coroner.

In summary, the questions addressed in this section are:

- Do data items in the NHMD allow 'alcohol-related' and 'work-related' cases to be identified in a meaningful and adequate manner?
- Are methods used to estimate alcohol-relatedness of hospital admissions as a whole suitable for the task of estimating alcohol-relatedness of the sub-set of hospital records meeting a definition of 'work-related injury'? If not, can the methods be modified for the purpose?

Background

Approaches to assignment

The same principals apply to assignment of cases in the NHMD according to 'work-relatedness' and according to 'alcohol-relatedness'. Two basic approaches exist: classification and proportional (or fractional) attribution.

Classification requires each record in the NHMD to be assigned as 'work-related' or not, and as 'alcohol-related' or not.[14] Classification can only be used to group cases according to characteristics that are known about individual cases, based on the data source being used. For example, the NHMD provides information on diagnoses, which allows cases to be grouped in various ways according to this characteristic.

Proportional attribution uses characteristics that are known about individual cases, in combination with other information, to estimate the presence in a group of cases of characteristics that are not known about individual cases.

Proportional attribution requires each record to be assigned a value in the range 0 to 1 for harmful effects and 0 to -1 for protective effects. These values can be seen as representing the likelihood that the case is 'work-related' or 'alcohol-related'. Individual records with '-relatedness' proportions of exactly 0 or exactly 1 can be considered as being not '-related' or definitely '-related'. Individual records with any non-zero value cannot meaningfully be described as either not '-related' or '-related'. However, a set of records with such values can be interpreted in a straightforward way: the sum of the proportions for each of the individual records provides an estimate of the number of records in the set that can be regarded as being '-related' to the phenomenon of interest.

'Attributable proportions' (or fractions) methods in epidemiology are a form of proportional assignment that generally involves reviewing research literature to obtain estimates of causal relationships (typically expressed as the ratio by which the risk of an outcome is increased in the presence of an exposure). If information can be obtained on the extent of such exposure in a population, then the risk ratio estimate can be used to derive an estimate of the proportion of all cases of the condition in the population that can be attributed to that exposure. If a source of information is available on the number of cases of the condition occurring in a population of interest, then the attributable proportion can be used to estimate the number of the cases that are attributable to the exposure of interest.

[14] In practice other options may be provided, such as 'unknown due to insufficient information'.

Note that attributable proportions methods require several types of information: risk ratios, population exposures, population case occurrence. Inadequacy of one or more of these types of information often constrains use of the approach.

Attributable proportions methods have been used to estimate numbers and rates of hospital admissions that are attributable to alcohol (Holman et al, 1990). A body of findings and methodological work on this theme has emerged in Australia during the past decade or so. This is reviewed later in this section (see the heading *Alcohol-relatedness*). This approach provided the basis for the method used in this project.

Attributable proportions methods have also been used to estimate numbers and rates of work-related disease and injury of various types (Kerr et al, 1996). However, the approach has not been applied frequently for this purpose, perhaps reflecting the lack of much of the information that would be needed for a satisfactory implementation, especially literature from which risk ratios can be derived and information on working population exposure to risk factors. A consequence is that a credible and current set of attributable proportions values does not exist for work-related hospitalised injury (or disease) in Australia. Development of such a set, if feasible, was beyond the scope of this project. Hence, the work-relatedness of injury cases was assigned by means of classification.

Work-related injuries

This section provides background to the method used to identify and select work-related injury cases from the NHMD. Injury can be specified in various ways, generally in terms of a wider or narrower range of diagnosis codes, with or without a requirement for the presence of codes for certain 'external causes of injuries'. The NHMD data used in this investigation are coded according to the second edition of the Australian modification of the tenth revision of the International Classification of Diseases, ICD-10-AM. For the purposes of this investigation, injury has been defined as cases for which the principal diagnosis was a condition coded to the ICD-10-AM code range S00-T79. This range includes nearly the entire 'injury and poisoning' chapter of the ICD-10-AM, chiefly omitting cases where the principal reason for the episode in hospital was a complication of medical or surgical care.

The concept of 'work-relatedness' of injury is an abstraction, which can be interpreted as meaning injury cases sustained while working, or occurring at a workplace, or recognised by some administrative process as being due to work, or in other ways. 'Work' can be interpreted in terms of a formal definition, such as the 'Employed Civilian Labour Force', or in various other ways.

For the purposes of this project, the concept had to be specified in terms of information available in the NHMD. Two data elements in the NHMD provide a relatively direct way to identify cases as being 'work-related' injury. These data elements are defined by the Admitted Patient Care National Minimum Data Set of the National Health Data Dictionary (Australian Institute of Health and Welfare 2001a).

One is an item that is provided to record the 'activity when injured', which is defined as the activity that was being undertaken by a person when he or she sustained an injury. The classification used in the NHMD to code this item includes a category 'While working for income'.

The second is an item designed to record the type of 'Funding source for hospital patients', from which payment for an episode in hospital was expected to come. One of the categories in the code list for this item is 'workers' compensation'. Workers' compensation is normally only paid for conditions that have been accepted by an administrative system as being work-related, and this provides a basis for using the item to identify work-related injury cases.

For the purposes of this investigation, records in which activity equals 'working for income' or funding source equals 'workers' compensation', or both were regarded as being work-related. It is likely that these criteria do not identify all 'work-related' injury cases. Not all work is covered by workers' compensation insurance, and so hospital care for some work-related injury cases will be funded from other sources. Use of the type of activity category 'while working for income' is not subject to this constraint, but completeness of identification of relevant cases is likely to be constrained by limited information about the circumstances of occurrence of injury that is available in the patient records used by coders. The scope of 'work-related' may exclude any injury that occurs away from the workplace, or outside work hours, that was associated with the workplace (e.g. socialising after work but before going home).

Formal validation studies of the quality of coding of Activity and Funding source items have not been published. On the basis of the limited evidence available, we think that the cases in the set selected as 'work-related injuries' will generally have been coded correctly (i.e. good specificity), but that not all work-related injury cases in the NHMD will have been identified such (i.e. imperfect sensitivity).

Alcohol-relatedness

Use of attributable proportions to estimate alcohol-related hospital admissions in Australia

Since 1990, several publications have reported studies designed to estimate proportions of deaths and hospital admissions attributable to alcohol and other drugs. This work is reviewed here, focusing on aspects dealing with alcohol-related hospital admissions.

Holman, Armstrong et al. (1990) published the first detailed set of attributable proportions of alcohol-caused mortality and morbidity in Australia. Their estimates were framed in terms of alcohol consumption relative to abstention. Alcohol-attributed conditions resulting in morbidity and mortality were defined in terms of codes from the ninth revision of the International Classification of Diseases (ICD-9).

Subsequently, English, Holman et al. (1995) modified these proportions. They estimated alcohol-related causes of morbidity and mortality in terms of 'hazardous and harmful' drinking as opposed to 'safe' drinking. This was achieved by calculating the morbidity and mortality aetiological proportions using an exposure contrast of high alcohol consumption ('unsafe' levels) to low alcohol consumption ('safe' levels), rather than drinking compared to abstinence. Levels of alcohol consumption were determined in accordance with the definitions provided by the National Health and Medical Research Council (NHMRC 2001). The rationale for this methodology was to align its focus with the public health aim of reducing harmful drinking behaviours. Separate rates were calculated for 'safe' and 'unsafe' drinkers. The proportions reported in this study were larger than previously found. The authors attributed this to an underestimation of 'unsafe' alcohol consumption in the past.

Ridolfo and Stevenson (2001) argued that the conceptual model presented by English, Holman et al. (1995) does not accurately reflect the risks and benefits of alcohol at all levels of consumption. On this basis they proposed that, in line with English, Holman et al. (1995), alcohol-related attributable proportions should be calculated using a contrast of alcohol consumption relative to abstinence. Additionally, Ridolfo and Stevenson made some modifications to the grouping of ICD-9 codes specified by English, Holman et al. such as: including ischaemic heart disease and heart failure, distinguishing ischaemic and haemorrhagic stroke and splitting road traffic injuries into pedestrian and non-pedestrian (Chikritzhs et al, 2002a). Responding to public health intentions to reduce harmful alcohol consumption levels, Ridolfo and Stevenson also presented the attributable proportions in terms of effects of 'safe' as opposed to 'unsafe' drinking.

In light of the inconsistent use of reference groups, Chikritzhs, Stockwell et al. (2002a) called for a standardised methodology for the use of reference groups in calculating attributable proportions for alcohol-related morbidity and mortality in Australia. Chikritzhs, Stockwell et al. (2002a) suggest that the choice of reference groups used in past attributable proportions may have been misleading. They suggest that estimating net consequences of alcohol consumption at any level compared to abstinence may give a misleading account of the relative costs and benefits of alcohol consumption. Whilst only comparing hazardous and harmful drinking compared to 'safe' drinking may also be misleading as for some causes of mortality and morbidity there is no 'safe' level of drinking. On this basis, they recommended using abstainers as a reference group and identifying the costs and benefits for both 'low risk' and 'risky/high-risk' drinking, thus allowing the examination of the protective effect of alcohol on conditions such as heart disease and the harmful effects of alcohol on events such as assault.

Subsequently, these authors made further modifications to the set of alcohol-attributable categories and proportions (Chikritzhs et al, 2002b). A factor prompting this revision was the need to re-specify the categories in terms of ICD-10-AM, which replaced ICD-9-CM for coding Australian hospital case data in the late 1990s. Translation was achieved by manual matching of the codes and subsequent discussion with a working group.

In summary, the basic method for calculating attributable proportions for alcohol-related mortality and morbidity has remained consistent, with minor modifications introduced along the way in regards to use of reference group and version of ICD codes used. The main available source of evidence on which conditions are attributable to alcohol, and of attributable proportions applicable to these conditions in Australia, is the work of English, Holman et al. (1995) as extended and updated by Ridolfo and Stevenson (2001) and Chikritzhs, Unwin et al. (2002b). A summary of proportions for 41 conditions, by age group and sex, was provided to us in electronic form by Chikritzhs, from analyses conducted as part of the National Alcohol Indicators Project. This is reproduced as Appendix B7. In this report, we refer to this set of conditions and attributed proportions as the 'standard set'.

Modified attributable proportion method for estimating alcohol-related cases among work-related injuries admitted to hospital in Australia

The starting point for the work presented in this section was the standard set of conditions and attributable proportions for alcohol-related admissions to hospital (Appendix B7) and a previous approach to using them (Chikritzhs et al, 2002a). In doing this we undertook a limited re-estimation of the alcohol aetiological fraction for work-related injuries. In essence, the work reported here constitutes a case-study in which the existing set of attributable proportions is assessed for adequacy when applied to work-related injuries.

Our aim was to assess alcohol-attributable cases among work-related injuries admitted to hospital. This aim differs from that of Chikritzhs, et al. (2002a), whose aim was to estimate alcohol-related cases among all cases admitted to hospital. This difference in purpose prompted certain changes in how we applied the method and our interpretation of results.

A. Applicability of attributable proportions: validity for work-related injury

The attributable proportions presented in the standard set are intended for application to hospitalised cases generally, or to gender- and age- specific subgroups of cases. We are interested in the sub-set of cases where admission was due to work-related injury. Attributable proportions for cases in general are not necessarily applicable to this sub-set of cases.

A systematic review of literature with a view to developing a set of proportions specific to hospitalised work-related injury in Australia was beyond the scope of this project. We did, however, undertake a preliminary literature search concerning four conditions in the standard set that are common among hospitalised work-related injuries: falls, motor vehicle traffic accidents, assault, and occupational machine injuries. We did this in order to (a) identify any published attributable proportions or systematic reviews relevant to this topic, and (b) assess the likely sufficiency of available literature for the development of attributable proportions.

We found little relevant literature on the involvement of alcohol in work-related injuries of these types, and no developed sets of attributable proportions. Most of the little that we found reported studies of fatal work-related injury, rather than hospitalised injuries.

The attributable proportion of 32.8% given in the standard set for males injured in motor vehicle traffic accidents (MVTA), except pedestrians, might be appropriate as an estimate for the proportion of all such cases in the Australian community that are attributable to alcohol, but this value is unlikely to be a good estimate for the subset of the cases that are work-related.

Literature reviewed elsewhere in this report (Chapter 4, Alcohol and workplace safety) supports a conclusion that the prevalence of alcohol-related non-fatal workplace injuries is relatively low. Somewhat more specific information is available concerning fatal work-related injuries. A detailed assessment of work-related fatalities in Australia in the period 1989-1992 concluded that alcohol appeared to be important for 6.5% of road-deaths while working (8.0% after adjusting for cases lacking information on blood alcohol level) and for 9.1% (10.9% after adjustment) of deaths while commuting (Driscoll et al, 2001; Driscoll 2003).

One condition category in the set provided by Chikritzhs, Unwin et al. (2002b)—'occupational machine injuries'—is likely to be fairly specific to work-related injury (but not entirely specific, since it is specified in terms of types of machine, not the activity of the injured person). This category has been assigned an attributable proportion of 7.8% for ages 15 years and older, for males and females.

A report based on the Australian study of work-related fatalities in the period 1989-1992 presented an analysis of fatalities involving falls includes an assessment of the involvement of alcohol (NOHSC 2000). Information about alcohol (mainly blood alcohol values) was available for 118 falls cases, and the authors concluded that alcohol probably contributed to eight of these deaths. After allowing for the absence of blood alcohol data for 45% of cases, the authors concluded that alcohol was likely to have contributed to about 8% of all of the deaths involving falls while working. In five of these eight cases an intoxicated worker fell from a boat and then drowned. It is noteworthy that none of the eight occurred at a factory, mine, construction site or other 'classical' industrial site.

While the relevant literature is not extensive, and sources specific to hospitalised work injury in Australia were not found, it seems likely that the general population attributed proportions for case categories such as 'MVTA except pedestrian' (0.328 throughout the age range 15–64 years) and falls (0.206 for men and 0.130 for woman aged 15–64 years) are overestimates of alcohol involvement in work-related cases. We note that the attributed proportion for occupational machine injuries (0.078) is similar to the proportion of work-related falls attributed to alcohol (0.08) in the Australian study of work-related fatal injuries cited above, and to the proportion of fatal road injuries while working attributed to alcohol on the basis of the same study (0.08). Excluding road deaths, that study attributed about 4% of fatal injuries while working to alcohol.

The lack of a specific set of attributable proportions applicable to work-related injury is an important impediment to this investigation, but some use can be made of the existing attributable proportions, nevertheless. If the 'all-cases' attributable proportion (AP) for a condition (or for a combination of condition, sex and age-group) is exactly 0 or 1, then it follows that the same proportion should apply to any sub-set of the cases, such as work-related injury cases. Accordingly, we grouped cases for analysis according to which AP values each record was assigned when we applied the standard set of conditions and proportions. The groups are records containing:

1. At least one diagnosis or external cause code for which the assigned AP=1
2. At least one diagnosis or external cause code for which the assigned AP is non-zero, but none for which AP=1
3. Other cases (i.e. only diagnoses or external cause codes for which AP=0).

The last column in Table 5.2 indicates, for each of the alcohol-related conditions and reasons for admission distinguished in the standard set (Appendix B7), whether the AP is 1.0 (i.e. group 1) or a non-zero value between -1 and 1 (i.e. group 2)[15]. Of these three groups, 1 and 3 should not be susceptible to the problem that AP values developed for all hospitalised cases might not be applicable to the work-related injury subset. Group 2 is susceptible to this problem, and estimates of alcohol-relatedness for this subset and based on the currently available APs are not likely to be reliable. The overall extent of the

[15] Negative values allow for the possibility of protective effects of alcohol. Alcohol has been found to confer protective effects for some conditions including cardiovascular disease, but not for injury.

potential problem of inapplicable APs depends partly on the proportion of records analysed that are in the second group.

In conclusion:

- At least some of the APs in the standard set are unlikely to provide a reliable estimate of alcohol involvement in work-related injury in Australia.
- This problem should not apply to conditions where the AP equals 1.0.
- A preliminary literature search concerning alcohol-relatedness of several common types of work-related injury revealed little relevant literature, and none based on Australian data for hospitalised cases. It did provide a basis for an estimate of 8% alcohol-attributability for work-related fall injury and 8% for work-related motor vehicle traffic injury, based on an Australian mortality study.

B. Applicability of attributable proportions: recent and chronic consumption of alcohol

The chief mechanism by which alcohol consumption influences risk of injury is through acute intoxication. Some of the alcohol-related conditions and reasons for admission distinguished in the standard set imply that the injured person has consumed alcohol shortly before the events resulting in admission (e.g. 'acute alcohol poisoning'). Other categories imply extensive consumption of alcohol at some time, but not necessarily shortly before injury (e.g. 'alcoholic liver cirrhosis').

We divided the categories in the standard set into those in which the adverse effect of alcohol that resulted in admission is likely to be through acute intoxication and all others.

The first of these mechanisms implies consumption of alcohol by the alcohol-attributed proportion of cases shortly before occurrence of the injury that has resulted in admission to hospital. Types of conditions that we have assigned to this group have been designated 'recent consumption' (Table 5.2).

The presence of most of the other alcohol-related conditions for which APs are available implies that the person has consumed alcohol at high levels over a considerable period of time. The persons may or may not have consumed alcohol shortly before occurrence of the work-related injury that resulted in admission to hospital. These conditions have been designated 'Chronic consumption' (Table 5.2).

Assignment was simply based on *prime facie* assessment of the conditions. Assignment as straightforward for most categories, although a few were somewhat ambiguous (notably epilepsy, suicide and stroke (Chikritzhs et al, 2001)). None of the ambiguous categories appeared frequently enough in the work-related injuries set to have a substantial effect on the size of the 'Recent' or 'Chronic' categories.

Table 5.2: Alcohol-related conditions and ICD-10-AM code ranges by likely mode of alcohol involvement and attributable proportion

Conditions	ICD-10-AM codes	Attributable proportion
Chronic consumption		
acute pancreatitis	K85	other non-zero value
alcohol dependence	F10.2	1.0
alcoholic cardiomyopathy	I42.6	1.0
alcoholic liver cirrhosis	K70	1.0
alcoholic pancreatitis	K86.0	1.0
alcoholic polyneuropathy	G62.1	1.0
cholelithiasis	K80	other non-zero value
chronic pancreatitis	K86.1	other non-zero value
female breast cancer	C50	other non-zero value
gastro-oesophageal haemorrhage	K22.6	other non-zero value
haemorrhagic stroke	I60–I62, I69.0, I69.2	other non-zero value
heart failure	I50–I51, I97.1	other non-zero value
hypertension	I10–I15	other non-zero value
ischaemic heart disease	I20–I25	other non-zero value
ischaemic stroke	G45, I63, I65-I67, I69.3	other non-zero value
laryngeal cancer	C32	other non-zero value
liver cancer	C22	other non-zero value
low birth weight	P05, P07	other non-zero value
oesophageal cancer	C15	other non-zero value
oesophageal varices	I85, I98.20, I98.21	other non-zero value
oropharyngeal cancer	C01–C06, C09, C10, C12–C14	other non-zero value
psoriasis	L40 (.0-.4, .8, .9)	other non-zero value
spontaneous abortion	O03, O36.5	other non-zero value
supraventricular cardiac dysrhythmias	I47.1, I47.9, I48	other non-zero value
unspecified liver cirrhosis	K74 (.3–.6), K76.0, K76.9	other non-zero value
unspecified stroke	I64, I69.4, I69.8	other non-zero value
Recent consumption		
alcoholic psychosis	F10 (.3–.9)	1.0
alcohol abuse	F10 (.0–.1)	1.0
alcoholic gastritis	K29.2	1.0
alcohol poisoning	X45, Y15, T51.0, T51.1, T51.9	1.0
aspiration	W78, W79	1.0
assault	X85–X99, Y00–Y09, Y87.1	other non-zero value
drowning/immersion	W65–W74	other non-zero value
epilepsy	G40, G41	other non-zero value
falls	W00–W19	other non-zero value
fire injuries	X00–X09	other non-zero value
motor vehicle traffic accident, pedestrians	V02–V04 (.1 or .9), V09.2	other non-zero value
motor vehicle traffic accident, except pedestrians	V12–V14 (.3–.9), V20–V28 (.3–.9), V29 (.4–.6), V29 (.4–.9), V30–V79 (.4–.9), V80 (.3–.5), V87 (.0-.8), V89.2	other non-zero value
occupational machine injuries	W24, W31	other non-zero value
suicide/intentional self-harm	X60–X84, Y87.0	other non-zero value

C. Application of proportions: additional diagnosis fields

Most of the alcohol-related conditions in the standard set (Appendix B7) are defined in terms of diagnosis codes. The remainder are defined in terms of external cause codes. AP values are usually assigned to records on the basis of the Principal Diagnosis field in hospital discharge records (and an associated external cause field). This is appropriate when the aim is to weight records according to the likelihood that the admission was due to alcohol, because Principal Diagnosis is meant to record the main reason for the episode in hospital.

We are interested in alcohol-relatedness among the sub-set of cases admitted to hospital because of work-related injuries. The Principal Diagnosis field is the basis for selecting injury cases. Subsequent assignment of AP values to this sub-set solely on the basis of the principal diagnosis field (and the associated external cause field) would, by definition, result in no use of most of the alcohol-related condition categories listed by Chikritzhs, Unwin , et al. (2002b), because they are defined in terms of ICD values outside the 'injury' range. Instead, we assigned AP values on the basis of all diagnosis fields and external cause fields, not only the Principal Diagnosis and its associated external cause field.

Records in the NHMD can contain up to 31 diagnosis codes and the same number of external cause codes. In practice, most injury cases contain several diagnosis codes, some of which are injury diagnoses and one or two external cause codes. The records identified as work-related in the set of injury data analysed in this section contain a mean of 1.68 (SD 1.28) injury diagnosis codes and 1.33 (SD 0.57) external cause codes. The remainder of the records (i.e. injuries not identified as work-related) contain similar mean numbers: 1.58 (SD 1.23) and 1.39 (0.63). A consequence of this approach to assigning AP values is that some records were assigned more than one non-zero value, raising the question of which value should be assigned to the record.

In the work reported here, we have assigned to each record the highest AP assigned to any of its diagnosis or external cause codes. This approach was taken because it is simple and we judged that it would provide a better indication of alcohol-relatedness than the equivalently simple approach of selecting the lowest value. Further work might reveal a better approach to dealing with records to which multiple non-zero values are assignable (e.g. if the highest AP for a record is less than 1.0, perhaps it should be increased in the presence of other non-zero values).

D. Additional alcohol-relatedness categories

We searched ICD-10-AM diagnosis codes and external cause codes (Chapter XX) for any that implied alcohol involvement in cases and which were not included in any of the categories in the standard set of alcohol-attributable conditions (Appendix B7). The categories that we found are listed in Table 5.3.

Table 5.3: Additional ICD-10-AM codes for alcohol involvement

ICD-10-AM Code	Label
Y90	Evidence of alcohol involvement determined by blood alcohol level
Y91	Evidence of alcohol involvement determined by level of intoxication
Z50.2	Alcohol rehabilitation
Z71.4	Counselling and surveillance for alcohol use disorder
Z72.1	Lifestyle: [hazardous] use of alcohol
Z81.1	Family history of alcohol use disorder
Z86.41	Personal history of alcohol use disorder

Table 5.4: Presence of additional ICD-10-AM codes for alcohol involvement in test set of hospitalised injury cases, Australia 2001–02

Identified by standard set of alcohol-attributable conditions	Identified by additional condition list	Not work-related	Work-related
Yes	No	192,725	9,615
Yes	Yes	2,378	36
No	No	121,776	17,190
No	Yes	594	40

Records with any of the additional alcohol-related ICD-10-AM codes are a small proportion of injury cases: 0.3% of work-related injuries and 0.9% of other injury cases (Table 5.4). However, many of the injury cases with the additional codes are not among the cases identified as alcohol-related (with any AP) according to the standard set of alcohol-attributable conditions. This is so for 53% of the work-related additional cases and 20% of the other additional cases. The additional records not already identified as alcohol-related according to the criteria for the standard set increased the number of injury case records identified as having any degree of alcohol-relatedness only slightly, by 0.4% for work-related injuries and 0.3% for other injury cases.

Ninety-one percent of the work-related injury records identified by the additional criteria were selected because they included ICD-10-AM code Z72.1, ''Lifestyle: [hazardous] use of alcohol'. This category accounted for 61% of other injury records identified by the additional criteria.

Categories Y90 and Y91, which refer to elevated blood alcohol concentration and signs of intoxication as evidence of alcohol involvement, did not appear frequently in the test set of cases (n=938, 0.22% of cases). Despite the small numbers, it is noteworthy that only 2 of these 938 cases were recorded as work-related (<0.01% of work-related cases).

Since the impact of including these categories would have been small, particularly among work-related injury cases, and since AP values were not available for them, these codes were not included in the main APs analysis reported in this section.

Exploratory implementation

The assessment of data sources and methods described above led to the conclusion that the standard set of alcohol-attributable conditions and APs might not be appropriate for assessment of the involvement of alcohol in hospitalised work-related injuries. The assessment also led us to conclude that certain modifications of usual methods for analysing APs might be useful, and that the extent of the potential problems was related to the distribution of types of conditions in the data, and that analysis of a test set of records was required to assess this.

This section describes an exploratory implementation of a modified APs method, intended to assess:

- the technical feasibility of assigning alcohol-relatedness proportions to work-related injury cases,
- the extent to which assignment based on the standard set of conditions and APs would rely on values whose validity for work-related injury cases is uncertain,
- the sensitivity of estimates of alcohol-attributable work-related injuries to plausible changes to APs, and
- the feasibility of obtaining reliable estimates of alcohol-attributed work-related injury.

Case data

Case data from the NHMD were used. Data in this source have been obtained, checked and processed by the Australian Institute of Health and Welfare (AIHW) from state and territory health departments, and take the form of annual files, each containing data on episodes in hospital that ended during a year ending 30 June. A subset of records from each annual file that includes all injury cases and some related conditions is obtained processed and checked by the AIHW National Injury Surveillance Unit (NISU).

The starting point for this project was the NISU data file of episodes that concluded during the year ending 30 June 2002. Diagnoses and external causes in this file had been coded according to the second edition of ICD-10-AM. Records that met the following criteria were selected for analysis:

- Episodes of admitted (in-patient) care in any Australian acute-care hospital that ended during the 12 month period from July 1st, 2001 to June 30th, 2002, and
- Principal Diagnosis code was an ICD-10-AM code in the range S00–T79 (i.e. Chapter XIX 'Injury, poisoning and certain other consequences of external causes' codes, other than those concerning complications of surgical and medical care), and
- Mode of admission was not 'Transfer from another acute hospital'.

Episodes of in-patient hospital care conclude with 'separation', usually home or to another place of residence, or following the patient's death, but sometimes with transfer to another hospital, or 'statistical type change' to another episode of care in the same hospital.

Hence, some incident cases of injury result in more than one admission to hospital, and result in more than one hospital separation record. Injury cases admitted following

'Transfer from another acute hospital' were omitted to reduce multiple counting of such cases. The analysis set contains 344,354 records.

Work-relatedness

ICD-10-AM codes for work-related Injuries

Injury cases in the analysis set were identified as work-related on the basis of two criteria:

- 'Activity when injured' code meaning 'while working for income' OR
- Funding Source code meaning 'worker's compensation'.

The 'activity when injured' code (Y93 in the second edition of ICD-10-AM) identifies the activity of the injured person at the time the event occurred. Coding guidelines require coding of the activity item for injury cases given an external cause code in the range V01-Y34. The analysis set includes 22,024 (6.4%) records where Activity = 'while working for income'.

The 'Funding source for hospital patients' item is used to record the source from which payment for an episode in hospital was expected to come, one of which is 'worker's compensation'. The funding source item is supposed to be completed for all records. The analysis set includes 17,271 (5.0%) records where funding source = 'worker's compensation', 26,881 records have Activity = 'while working for income' OR funding source = 'worker's compensation', and these are the cases defined as work-related for this analysis. Eighty-two percent of the work-related records have Activity = 'while working for income' and 64% have funding source = 'worker's compensation'.

Alcohol-relatedness

ICD-10-AM codes for alcohol-relatedness

The codes for APs by age and gender for diagnosis codes were obtained from Chikritzhs, Unwin et al. (2002b).

Categories and attributable proportions

For the main part of this analysis we used the standard set of conditions and age-, and sex-specific APs provided by Chikritzhs, Unwin et al. (2002b). These are tabulated in Appendix B7.

Every diagnosis field (n=31 per record) and every external cause code record (n=31 per record) was scanned for the presence of a code in range for any of the conditions listed in Table 5.2. For each in-range code, a look-up procedure was used to obtain the appropriate AP value, taking account of the age and sex of the case. For this exploratory investigation we used the series of AP values that are designed to estimate the total effects of alcohol, net of the protective effects of low level consumption that have been reported for some conditions, though not injury (i.e. the 'Total' series APs).

Three percent of work-related records in the analysis set and 19% of other records included more than one of the alcohol-related conditions in Table 5.2. In these instances, we assigned to the record the highest of the applicable APs.

Each record was assigned, in its entirety or proportionally, among three fields. These were designed to enable summarisation, for a set of cases, of (1) cases where the assigned

AP = 1.0, (2) alcohol-attributed proportions of records assigned a non-zero AP (i.e. -1 and <0, >0 and <1); and (3) cases where the assigned AP = 0 (including records with none of the designated alcohol-related conditions) plus the non-alcohol related proportion of records partly assigned a non-zero AP.

In addition, records with a non-zero AP were categorised on the basis of the type of alcohol-related condition that determined this assignment according to the likely mode of alcohol involvement. Categorisation follows the division into 'Chronic' and 'Recent' given in Table 5.2. The 'Recent' category includes codes such as 'all alcohol poisoning', 'finding of alcohol in the blood', 'toxic effect of alcohol'. The 'Chronic' category includes codes such as 'liver cancer', alcoholic liver cirrhosis', and 'ischaemic heart disease'. The relationship of these categories to each other and to the underlying APs is shown schematically in Figure 5.1.

Analysis focused on patterns of estimated of alcohol related case numbers and proportions, comparing work-related injuries with other injuries, by age-group, sex, selected sub-types of injury, and sub-sets of alcohol-related conditions. Analyses were performed using SPSS statistical software, version 12.0.

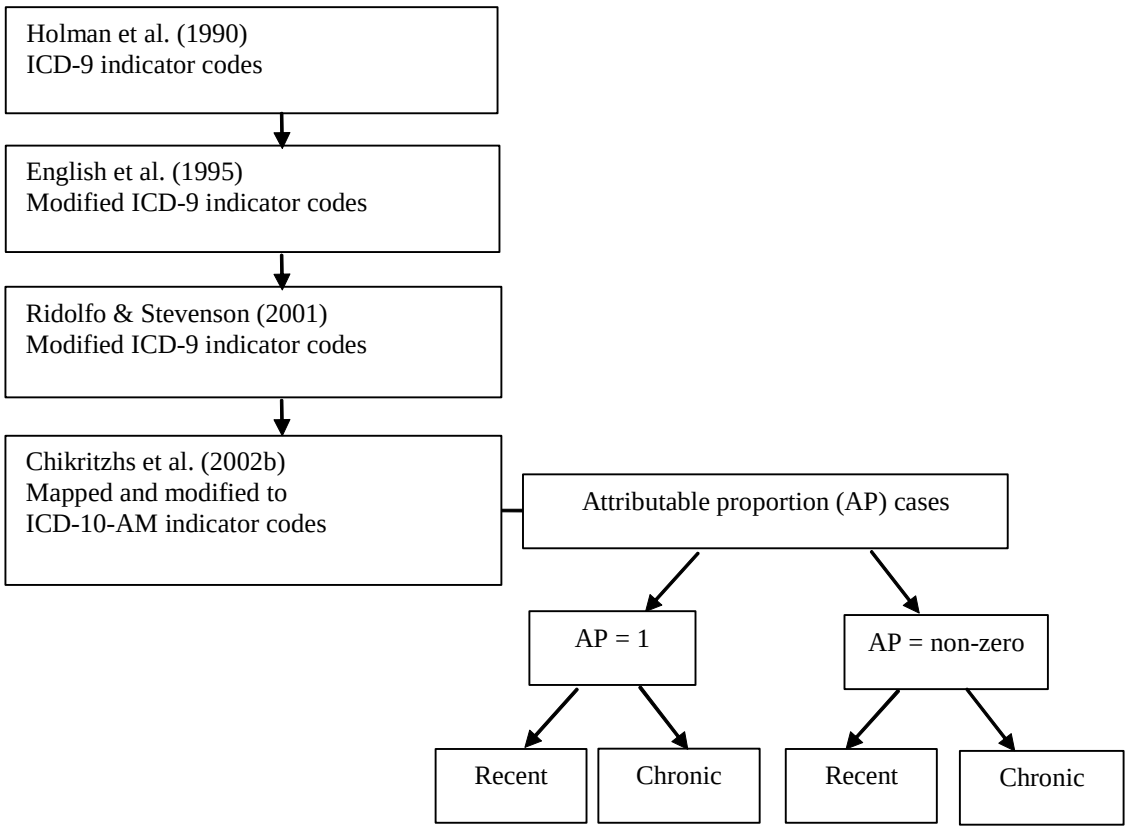

Figure 5.1: Development of attributable proportion categories

Findings

Application of the APs method described above produced an overall estimate of 53,224 (15.5%) alcohol attributable injury cases among a total of 344,354 hospitalised injury cases in Australia in 2001–02. This estimate and the other values in this section are based on the Total series APs.

Cases identified as work-related make up 26,881 (7.8%) of all hospitalised injury cases. About 98% of these work-related injuries involved people aged 15–64 years, reflecting the usual working age range. In contrast, 57% of other admitted injury cases were in this age range. Since injury rates and the profile of case-types vary greatly with age, comparison of all-ages data might be confounded by age-related effects. This potential problem was managed by restricting most of the analysis presented in this section to the age range 15–64 years (n=208,191).

Ages 15–64 years

Of the total set of 344,354 injury cases, 208,191 (60.5%) have ages in the range 15–64 years. Application of the standard set of alcohol-attributable conditions and proportions to this set of cases resulted in an estimate of 44,677 (21.5%) alcohol attributable injury cases.

When work-related and other cases are considered separately, application of the standard set of attributable conditions and proportions produced an estimate of 1,965 (7.5%) alcohol-related cases among 26,339 work-related injuries, and 42,712 (23.5%) alcohol-related cases among 181,852 other injury cases.

Conditions underlying attribution as alcohol-related injury

Table 5.2 divides the conditions whose presence determines the attribution of alcohol-relatedness according to whether the attributed proportion is exactly 1 (i.e. all cases of the condition are attributed to alcohol) or a non-zero proportion (i.e. a part of the case is attributed to alcohol). Table 5.2 also divides the conditions according to the likely mechanism of alcohol involvement: acute effects of recent consumption (e.g. road injury), or effects of chronic consumption (e.g. malignancies and cardiovascular disease).

The contribution of each of these types of condition to the total estimates of alcohol-attributable injury is shown in Table 5.5, for work-related and other injury cases, restricted to the age range 15–64 years.

Table 5.5: Alcohol attributed cases by type of condition and work-relatedness, hospitalised injury ages 15–64 years, Australia 2001–02 (standard set of attributable conditions and proportions)

	Per cent of alcohol-attributed cases	
	Work-related	**Other**
Chronic		
Attributable proportion = 1	0.8%	6.7%
Other non-zero attributable proportion	1.5%	0.6%
Recent		
Attributable proportion = 1	2.7%	35.2%
Other non-zero attributable proportion	95.0%	57.4%
	100.0	**100.0**
Cases attributed to alcohol (n)	*1,965*	*42,712*
Total cases	**26,339**	**181,852**
Attributed cases (%)	**7.5%**	**23.5%**

Conditions implying chronic consumption of alcohol were not prominent, accounting for 2.3% of work-related injuries attributed to alcohol and 7.3% of other injuries attributed to alcohol. The small size of these proportions is in keeping with evidence that acute intoxication is the main mechanism by which alcohol increases risk of injury.

Inclusion of injuries at older ages would have the effect of slightly increasing the prominence of the group of conditions implying chronic consumption and with AP values less than one. The proportion of injury cases in which these conditions were present increased with age, especially from about age 65 (data not shown). There are, however, few work-related injury cases in this age group.

In total, 97.7% of the estimate of work-related injury due to alcohol, and 92.6% of the estimate for other injuries, were due to the presence in injury case records of codes for conditions where the likely mechanism of alcohol-relatedness is acute effects of recent consumption.

About one-third of the total estimate of alcohol-attributable injuries (i.e. considering work-related and other injuries together) were attributed because of the presence of a condition implying recent consumption of alcohol with an AP of 1.0 (e.g. alcohol poisoning). This type of condition, however, accounted for only 3% of all work-related injuries attributed to alcohol.

Ninety-five percent of the total estimate of work-related injury due to alcohol was due to the presence of a code for one of the conditions for which the likely mechanism of alcohol involvement is acute effects of recent consumption, and the AP is less than one. The equivalent proportion for other injury cases was 57%.

Four conditions of this type accounted for 88% of all work-related injury attributed to alcohol by the standard set of APs (Table 5.6). These conditions are falls, motor vehicle traffic accidents (excluding pedestrians), assault and occupational machine injuries. The presence of codes for these four conditions accounted for 43% of all other injury cases attributed to alcohol.

Table 5.6: Alcohol attributed cases by type of condition and work-relatedness, hospitalised injury ages 15–64 years, Australia 2001–02: numbers and proportions for common conditions (standard set of attributable conditions and proportions)

	Work-related		Other	
	n	Per cent	n	Per cent
Recent (non-zero attributable proportion)				
falls	742	37.8	5,128	12.0
MVTA except pedestrian	520	26.5	5,333	12.5
assault	251	12.8	8,027	18.8
occupational machine injuries	215	10.9	85	0.2
fire injuries	87	4.5	526	1.2
5 other conditions with non-zero attributable proportion	51	2.6	5,438	12.7
Sub-total	**1,866**	**95.0**	**24,537**	**57.4**
All other conditions	**98**	**5.0**	**18,175**	**42.6**
Total alcohol-attributed cases	**1,965**	**100**	**42,712**	**100**

Since these estimates are based on a set of APs that do not distinguish between work-related cases and other cases, they embody an implicit assumption that the APs applicable to injury cases in the general population are also applicable to work-related injury cases.

As argued above ('*Applicability of attributable proportions: validity for work-related injury*'), this assumption is not likely to be correct. While good evidence on which to base APs for hospitalised work-related injury in Australia is lacking, available information suggests that general population estimates are likely to be overestimates for work-related injury cases.

Some evidence was found concerning falls and road injuries, the two types of condition which, between them, accounted for almost two-thirds of the work-related injury cases attributed to alcohol according to the standard set of APs.

The limited available information led us to conclude that an AP of about 8% is likely to be a more plausible estimate of alcohol involvement for work-related injuries due to falls and road injury than the proportions in the standard set (NOHSC 2000; Driscoll et al, 2001). This value is lower than the proportions given in the standard set for cases with these conditions at ages 15–64, which are: falls, males 20.6% and females 13.0%; MVTA (except pedestrian) males 32.8% and females 10.7%.

Since the presence of these conditions accounts for such a large proportion of the total estimate of alcohol-attributed work injury (Table 5.6), overestimated APs for these conditions could result in substantial overestimation of the proportion of work-related injury that is attributable to alcohol.

We explored the extent of this potential by applying a set of APs in which the values for work-related cases involving falls and MVTA (except pedestrian) were set to 8%. The results of applying this modified set of APs are shown in Tables 5.7 and 5.8.

Since no change has been made to the set of proportions applied to non work-related cases, the estimates for this set are as before.

This change to the set of APs applied to work-related cases resulted in a 41% reduction in the estimate of alcohol-related cases, from 1,965 (7.5% of all work-related cases) to 1,162 (4.4%).

Table 5.7: Alcohol attributed cases by type of condition and work-relatedness, hospitalised injury ages 15–64 years, Australia 2001–02 (modified attributable proportions)

	Per cent of alcohol-attributed cases	
	Work-related	**Other**
Chronic		
Attributable proportion = 1	1.3%	6.7%
Other non-zero attributable proportion	2.6%	0.6%
Recent		
Attributable proportion = 1	4.6%	35.2%
Other non-zero attributable proportion	91.5%	57.4%
	100.0	**100.0**
Cases attributed to alcohol (n)	**1,162**	**42,712**
Total cases	**26,339**	**181,852**
Attributed cases (%)	**4.4%**	**23.5%**

Table 5.8: Alcohol attributed cases by type of condition and work-relatedness, hospitalised injury ages 15–64 years, Australia 2001–02: numbers and proportions for common conditions (modified attributable proportions)

	Work-related		Other	
	n	**Per cent**	**n**	**Per cent**
Recent (non-zero attributable proportion)				
falls	316	27.2	5,128	12.0
MVTA except pedestrian	144	12.4	5,333	12.5
assault	251	21.6	8,027	18.8
occupational machine injuries	215	18.5	85	0.2
fire injuries	87	7.5	526	1.2
5 other conditions with non-zero attributable proportion	51	4.3	5,438	12.7
Sub-total	**1,064**	**91.5**	**24,537**	**57.4**
All other conditions	**98**	**8.5**	**18,175**	**42.6**
Total alcohol-attributed cases	**1,162**	**100**	**42,712**	**100**

Discussion

The method presented in this section selected a subset of hospital-admitted injury cases that met an operational definition of being work-related, and used a modified version of an existing approach to assess the 'alcohol-relatedness' of this sub-set of hospitalised injury cases, comparing findings for work-related injuries and other injuries.

The criteria for selecting work-related cases were the presence in a record of (1) a code indicating that the person's type of 'activity when injured' was 'working for income', or (2) the presence of a code indicating that the expected source of funding for the episode in hospital was worker's compensation insurance. Application of these criteria to records in the NHMD concerning separations from hospitals in Australia during the year to 30 June 2002 selected n=26,881 records, 7.8% of all injury records. Injury cases were defined as records with a Principal Diagnosis code in the range S00–T79, omitting transfers from other hospitals (to reduce multiple counting of cases admitted more than once).

We are not aware of published coding validation studies on either of these items.[16] Identification of the source that will provide funding for the treatment of each case is a matter of interest to the hospitals in which the data are collected, interest which might flow through to the quality of coding underlying the 'worker's compensation' set of cases. The type of 'activity when injured' item is not collected for administrative reasons. A sign of this is the large proportion of injury cases in which the type of 'activity when injured' item is coded to a residual category, 'other specified activity' or 'unspecified activity'. This is likely to reflect lack of relevant information in clinical records, and perhaps also relatively low priority accorded to this item. However, the item is normally coded by professional clinical coders, for whom coding quality is likely to be important. On this basis, we think coding of cases as occurring 'while working for income' is likely to be more specific than sensitive. That is, those cases coded as occurring 'while working for income' are likely, in fact, to have been work-related, but it is likely that not all work-related injury cases were identified.

For the purposes of this section, failure to identify some work-related injury cases is not a major impediment, provided that the identified work-related injury cases are reasonably similar to the non-identified work-related injury cases, particularly in terms of alcohol-relatedness. We were unable to find published evidence on this point.

Our method for ascribing alcohol-relatedness was based on that of Chikritzhs, et al. (2002a), modified to allow for differences between the purpose for which the method was developed, and the present purpose.

The unmodified method was designed to provide an estimate of the proportion of all episodes of hospital admission in a specified place and period that can be attributed to alcohol.

The purpose of the present exercise is to select from all episodes of hospital admission in a specified place and period a subset of interest (i.e. work-related injury cases) and to assess the alcohol-relatedness of this subset.

[16] A project in progress at the time of writing has validation of Activity coding as one of its aims.

This difference in purpose prompted three changes to the method:

1. Conditions for which AP values were available were stratified according to whether the proportion was equal to 1, or non-zero, because of the greater potential for true values of the latter type to be different for the 'work-related injuries' subset of hospital cases than it is for all hospital cases.
2. Since injury is chiefly a consequence of the acute effects of alcohol, the conditions for which AP values were available were stratified according to whether acute effects of alcohol were likely to have been the mechanism by which alcohol was involved in producing the nominated condition.
3. All diagnosis code fields and all external causes code fields in records were used when assigning AP values, rather than solely the Principal Diagnosis and the first external cause. This was necessary because 'injury' was defined in terms of Principal Diagnosis. This approach reveals that some records contain codes for more than one alcohol-related condition. In the work reported here, we assigned such records the highest of the applicable APs.

We considered the possibility that the conditions listed by Chikritzhs, Unwin, et al. (2002b), and for which APs were available, might not include all alcohol-related conditions that can be identified by means of the data available in the NHMD. We identified a small number of additional ICD-10-AM Diagnosis codes of potential relevance:

Y90	Evidence of alcohol involvement determined by blood alcohol level
Y91	Evidence of alcohol involvement determined by level of intoxication
Z50.2	Alcohol rehabilitation
Z71.4	Counselling and surveillance for alcohol use disorder
Z72.1	Alcohol use
Z81.1	Family history of alcohol use disorder
Z86.41	Personal history of alcohol use disorder

Few records in the work-related injury case set included these codes, and we lacked APs values for them. Hence, we did not include these conditions in the analysis of alcohol-involved work-related injury cases. These categories might appear more frequently in some other subsets of injury cases, and consideration should be given to including them if APs for alcohol-related conditions are revised.

We applied the revised APs method to the records of cases discharged from hospital during the year to 30 June 2002 that met the selection criteria for work-related injury. We also applied the method to all other injury separations in the same year, for comparison. We restricted most of the analysis to cases at ages 15–64 years. This age-range included 98% of the work-related injury cases in the all-ages set of cases.

We initially applied the same set of APs used by Chikritzhs, Unwin et al. (Chikritzhs et al, 2002b) (2002b). This resulted in an estimate of 23.5% of alcohol-related cases among the non-work injuries, and 7.5% among work-related injuries. The lower proportion of alcohol-attributed cases among the work injuries reflects the different distribution of cases in the two groups: 37% of the work-related cases in the set included a condition designated as sometimes or always alcohol-related, according to the standard set of APs, whereas 58% of other injury records included one or more of the designated conditions.

The proportion of 7.5% of work-related hospitalised injuries attributed to alcohol by applying the general community set of APs is likely to be an inflated estimate, because at least some of the condition-specific proportions in that set probably overstate the proportion of alcohol-relatedness among work-related injury cases of those types.

Prior to undertaking the work reported in this section, it was not apparent what proportion of all work-related injury records with any of the conditions in the standard set would be assigned an AP of exactly 1, and what proportion, on the basis of conditions, would be assigned a non-zero AP. We found that 97% of the total estimate of work-related injury attributable to alcohol was assigned on the basis of APs with non-zero values. Even if these values are validly applicable to injury cases generally, they are not necessarily valid for work-related injuries. The implication of this finding is that the estimate of alcohol-attributed work-related injuries is very susceptible to error due to differences between APs applicable to injuries in the general community and proportions applicable to work-related injuries.

We focused on the APs for falls and for motor vehicle traffic accidents (excluding pedestrians), since the presence of codes for these two conditions determined nearly two-thirds of the total estimate of alcohol-attributed injury in the work-related group. This is much higher than the equivalent proportion for non-work-related injuries which was 25%.

We found no published Australian estimates of alcohol involvement in non-fatal injury cases of these types. A large study of fatal work-related injuries in the period 1989–1992 provided estimates that alcohol was involved in about 8% of cases involving a fall, and 8% of fatal road injuries sustained while working.

We tested the sensitivity of the original estimates by re-doing the analysis as before, except that work-related injury cases with a fall or a motor vehicle traffic accident (excluding pedestrian) were assigned an AP of 8%, rather than the higher proportions assigned according to the general community set.

This change reduced the estimate of alcohol-attributed cases from 7.5% of work-related injury cases to 4.4%, a reduction of about 40%. We note that 4.4% was the estimated proportion of alcohol-related cases among all fatal injuries while working, aside from road injuries, in Australia in 1989–1992 (Driscoll et al, 2001).

Hence, estimates of alcohol-attributable work-related injury are sensitive to changes in the APs for a few of the conditions in the standard set of APs. These proportions were developed for application in the general community, and the values of at least some are likely to be inappropriately high for work-related injuries in Australia now.

Sixty-three percent of work-related injury case records in the set studied, and 42% of other injury case records contained no condition among those for which alcohol APs are assigned by the standard set. Alcohol will be involved, at least sometimes, in many of the types of cases that are out of scope for the standard set of alcohol-attributable conditions. A revised set of APs would be improved by attempting to provide values for a larger proportion of all injury cases.

Assessment of the work-related injury cases aged 15–64 years that were assigned none of the standard set of alcohol-attributable conditions in terms of the recorded external causes of these injuries, suggests some additional condition categories for which development of AP estimates would be particularly valuable. These are the section of the 'exposure to inanimate mechanical forces' code range W20–W31 (this is partly included

in the existing 'occupational machine injury' category), non-traffic motor vehicle accidents, focusing particularly on special vehicles used mainly for work, injury due to foreign bodies entering through the skin (W45) and injuries related to animals. Non-specific external cause codes (chiefly W49, X50 and X59) were present in about 30% of the records not assigned to an alcohol-related condition.

If valid APs were available for these types of work-related cases, then the overall proportion of work-related injuries attributed to alcohol would probably rise. A similar problem affects other injuries in the test set, 42% of which included no condition that is in-scope for the standard set of conditions and proportions.

The standard set of conditions and APs includes three series of attributed proportions. These are designed to enable separate estimation of total effects of alcohol consumption, the effects of high-level consumption, and the effects of consumption at low levels.

The difference between these estimates is important for overall estimates of deaths and admissions from all causes that are attributable to alcohol, largely because low level consumption has been found to have protective effects for certain causes of mortality and morbidity, chiefly cardiovascular. Depending on the issue of interest, it may be more meaningful to compare the overall, or net, effects of consumption at all levels with no consumption, or the effects of high consumption with those of low consumption.

For this exploratory investigation, we chose to use the set of APs that were designed to estimate the total effect of alcohol consumption at all levels, net of protective effects. The conditions for which low-level alcohol consumption is thought to be protective are uncommon in the test set of hospital data used in this section, because (by definition) the cases were admitted to hospital for injury, and because a high proportion of injury cases occur at young ages, when cardiovascular diseases are uncommon. Moreover, low-level alcohol consumption has not been found to be protective for injuries. Injury risk generally rises with blood-alcohol levels at the time of injury, from low levels.

The standard set of conditions attributed to alcohol (Table 5.2) contains some in which the predominant mechanism by which alcohol has its effect is though acute intoxication due to recent consumption and others in which the effect is chiefly through chronic exposure to high levels of alcohol. Since available evidence suggests that injury is predominantly due to the first of these mechanisms, we considered that it might be useful to partition the conditions in the standard list according to the likely predominant mechanism of effect, in order to assess whether the profile of attribution in the exploratory study was in accord with expectation. We found that it was: the conditions that we assessed as predominantly due to recent consumption of alcohol accounted for over 96% of alcohol-attributed work-related injury cases, and over 92% of other injury cases.

Partitioning of conditions attributed to alcohol according to the predominant mechanism of effect (i.e. intoxication due to recent consumption, or effects of chronic consumption) parallels the partitioning of alcohol consumption into distinct profiles, such as those in terms of which the Australian Alcohol Guidelines are framed (NHMRC 2001). An important purpose of the method for estimating health burden attributable to alcohol consumption advocated by Chikritzhs, Stockwell et al. (2002a) is to enable account to be taken of the differing consequences of high and low levels of consumption. Partitioning of conditions according to predominant mechanism of effect appears to provide a basis for producing estimates of health burden that take account of another aspect of the way in which particular profiles of burden relate to particular profiles of consumption.

Consumption patterns characterised by infrequent high-level drinking are likely to relate most closely to attributed conditions which imply recent consumption. Drawing this distinction in future assessments of morbidity and mortality attributable to alcohol would help to maintain alignment between developments in theory and practice concerning consumption, and assessments of burden.

Summary

The questions addressed in this section are:

- Whether data items in the NHMD allow 'alcohol-related' and 'work-related' cases to be identified in a meaningful and adequate manner, and
- Whether methods used to estimate alcohol-relatedness of hospital admissions in general are suitable for the task of estimating alcohol-relatedness of the sub-set of hospital records meeting a definition of 'work-related injury' and, if not, whether they can be modified for the purpose.

A modified version of a previously reported approach to APs analysis, designed to be applicable to injury cases, was found to be technically feasible using Australian hospitals data. Use of this method for occupational injuries was limited by lack of reliable and comprehensive AP values specific to non-fatal work-related injury in Australia. It was also constrained by uncertain completeness of identification of work-related cases, but this was a less severe impediment.

Estimates of work-related injury cases due to alcohol based on the standard set of attributable conditions and proportions are very sensitive to the AP values assigned to a few common conditions, especially 'falls' and 'motor vehicle traffic accidents (other than pedestrians)'. The AP values for these conditions in the standard set are probably not valid for work-related cases. Reduction of APs for work-related cases of these two conditions to 8% (assessed as plausible on the basis of limited available evidence) resulted in a reduction of more than 40% in total work-related injuries estimated by the model as being attributable to alcohol.

The current standard set of APs does not assign any value to many types of injury case, which comprised a large proportion of work-related cases (63%) and of other injury cases (42%) in the set of records studied here. This is likely to result in underestimation of alcohol-attributable injury cases, both work-related and other.

Findings based on application of the standard set of attributable conditions and proportions, and the modified set, produced estimates that alcohol involvement is substantially less common among work-related injuries than among other injuries admitted to hospital in Australia. This is consistent with findings reported elsewhere in this report, and in other sources. However, limitations in the reliability and comprehensiveness of available APs are such that the specific estimated values reported here are not a reliable guide to levels of alcohol-relatedness of hospitalised work-related injury.

The potential value of Australian hospital data for estimating and monitoring alcohol-related admitted injury cases (work-related or other) could be better utilised by developing more comprehensive, better validated and more specific APs values and by more complete recording of indications that alcohol contributed to the occurrence of admitted injury cases. This should be based on direct study of samples of Australian

hospital records of recent cases, as well as literature-based assessments. Two topics should be the subject of the initial stage of this work:

Of admitted injury cases meeting a definition of likely alcohol involvement (e.g. having consumed more than a specified quantity within a specified period before injury)

- What proportion have information in their in-patient record from which this can be determined and how does this vary between case types?
- How is this information, when present, represented in hospital discharge summary records, if at all? (e.g. by use of available ICD-10-AM codes for evidence of alcohol involvement, such as Y90 and Y91).

Source 3: National Coroners Information System (NCIS)

To date there have not been any comprehensive or easily accessible sources of information on either work-related deaths or the possible involvement of alcohol in those deaths. Coroners' reports are an important source of information on work-related injury deaths because all such deaths should be reported to a coroner, and this reporting and investigation should be independent of the employment status of the persons involved and the setting of the incident.

The recently developed National Coroners Information System (NCIS) is a national system of information and supporting infrastructure that is designed to provide prompt access to coronial data from all coronial jurisdictions in Australia, to support the work of coroners and others interested in the prevention of injury and disease. The NCIS has been developed for coroners and is managed by the Monash University Centre for Coronial Information (MUNCCI) [17]. The NCIS appears to be a good source of information on most types of external cause death (Driscoll et al, 2003a) and has been shown to be a useful source of information on the involvement of alcohol in drowning deaths (Driscoll et al, 2003b).

This section investigates the role of alcohol in work-related deaths, using the NCIS as the primary data source.

Methods

This analysis considers work-related external cause deaths. Work-related deaths can be assigned to several different categories—persons injured in some sort of workplace ('workplace' deaths), persons driving for work purposes ('work-road' deaths), persons driving to or from work ('commuting' deaths), and persons not working but injured as a result of the work activity of others ('bystander' deaths). A work-related case was defined as '*A person who was fatally injured as a result of, or who died of a fatal condition caused by, exposure to their own or others' work activity or work factors; or who was fatally injured whilst travelling to or from work*'. This general definition of work-relatedness that was used is the same as that adopted by the NCIS, which was the main data source on which the analysis

[17] Detailed information about the NCIS is available at: <http://www.ncis.org.au/>

was based.[18] The analysis presented here only considers workplace deaths in detail. The information on a small number of work-road deaths was also examined.

The National Coroners Information System

The NCIS covers all Australian states and territories. All deaths referred to a coroner and that occurred in Australia are covered by the system. Information is available for all deaths that occurred from 1 July 2000 onwards, with the exception that Queensland information is available for deaths that occurred from 1 January 2001 onwards. The structure of the NCIS is described in detail elsewhere (Driscoll et al, 2003b; Driscoll 2003; Driscoll et al, 2003a). The following brief description comes from the NCIS Data Dictionary. 'The NCIS has been designed to hold Core Data Items that are fields, variables or reports concerning the deceased person, the causes and circumstances of death and related matters. Depending on the data item, this information is in the form of codes (or code labels); numerical values (e.g. for age); brief passages of text (e.g. for name and address) or documents. Much of this information is recorded as an ordinary part of the practice of coroners and their staff. Several core data items (e.g. Mechanism of injury) are designed to enable users of NCIS data to identify specific types of cases efficiently and reliably. The coroners' findings are generally in the form of text files' (Monash University National Centre for Coronial Information (MUNCCI) 2001).

Information was obtained from the NCIS in electronic form, both through a subset of data sent by MUNCCI (extracted in early October 2003) and from direct interrogation of the NCIS web site. All relevant fields from the various NCIS forms were requested, as well as the police description of circumstances. The autopsy, toxicology and Finding documents, where available, were obtained through the web site.

The police description consists of one or more entries describing the particulars of the fatally injured person, the circumstances leading to their death, and other information related to the person, the subsequent investigation of circumstances and various other factors. It is usually prepared at, or soon after, the fatal incident. The extent, detail and usefulness of the descriptions vary considerably between jurisdictions, and between cases within the same jurisdiction. The coronial Finding covers similar information to the police description, but is prepared at the end of the Coronial process. A well-written Finding usually contains a very useful summary of the important aspects of the circumstances surrounding the fatal incident. However, some Findings are very brief, and Findings are not available for a considerable minority of cases. Post mortem documents record the autopsy results and the cause of death. They also sometimes contain the main toxicology results and/or a brief description of the main circumstances of the fatal incident. The toxicology document almost always records the alcohol level in blood, or sometimes other body tissue, if this was determined. Other toxicology results are recorded where available.

Identifying work-related deaths

The NCIS has two specific variables that identify deaths as being work-related or not. The variables are *Work-relatedness* and *Activity*. The *Work-relatedness* variable is designed to identify all deaths that are work-related according to the NCIS definition. In addition to

[18] The full NCIS definition of *work-relatedness* is available at: <http://www.vifp.monash.edu.au/ncis/>

the *Work-relatedness* variable, the *Activity* variable also provides information on work-relatedness, as it describes the activity of the person at the time of the incident. The categories related to work are 'working', 'commuting', and 'working or commuting'. For an individual case, the relationship to work indicated by the codes for the *Activity* and *Work-relatedness* variables would usually be expected to match, although legitimate exceptions can occur.

The group of cases for which detailed information was sought comprised any death that was identified as work-related by either the *Work-relatedness* or the *Activity* variable. No detailed attempt was made to use other information in the NCIS to identify other work-related cases. The work-relatedness of particular deaths could only be independently assessed if sufficient information was available. This resulted in a small number of cases identified by NCIS codes as being work-related subsequently being excluded because they were considered not to have been work-related.

Information on alcohol involvement

Information in the NCIS on alcohol can come from any of the four main text documents—police report, post mortem report, toxicology report and Finding—but it is most commonly found in the toxicology report. Information on alcohol involvement is also sometimes available from the text fields covering cause of death, or the coded and text agency fields. All potential sources of information on alcohol were searched for the current analysis.

Study period

The analysis presented here covered all workplace deaths of Australian-based workers that occurred on or between 1 July 2000 and 30 June 2001. This one-year period was chosen because July 1 2000 is the earliest date of death for cases included in the NCIS, and to allow time for the coronial process to have been completed for the vast majority of cases. Only limited information is available on a case in the NCIS until the coronial investigation process is completed and the status of the case is formally changed from 'Open' to 'Closed' in the NCIS. However, all cases, whether 'Open' or 'Closed', were included. Queensland cases could not be included because information on these deaths was not available to researchers at the time this analysis was conducted. Unintentional and intentional deaths were included, but suicides were excluded.

Results

Two hundred and forty five (245) work-related cases were identified for the one-year period ending June 30, 2001. Of these, 145 were excluded because they were not workplace deaths—95 deaths in motor vehicle crashes on public roads, 42 bystander deaths due to medical misadventure, five other bystander deaths and three other deaths that were not workplace deaths of workers. This left 100 deaths of workers fatally injured in some type of workplace.

Most of the information on alcohol involvement came from the toxicology report. This report was incorporated in the post mortem report in New South Wales, but was a separate report in all other jurisdictions. When a toxicology report was available, it nearly always contained information on blood alcohol concentration (BAC). Information on

BAC or alcohol involvement (in terms of an explicit statement that alcohol was or was not involved, or BACs were or were not determined, and what their value was) was not commonly present in either the police report or the Finding. On the basis of the limited consideration of work-road deaths in this study, and previous use of the NCIS, relevant statements including this sort of information are more common in police reports concerning motor vehicle crashes. Qualitative information relevant to the BAC, such as whether decomposition might have affected the measured level, was often present in the autopsy report, but rarely present in the toxicology report.

Blood alcohol levels were available for 49 (49%) of the 100 workplace deaths. For the remaining deaths, there was either no available toxicology information, or toxicology information was available but BACs had not been determined.

Of the 49 deaths for which BACs were available, 45 (90%) had a BAC of zero. The non-zero blood alcohol levels for the four (8%) remaining deaths were (in mg/100ml) 10, 20, 50 and 100. These four cases are briefly described below.

Case 1

A young woman working as a sex worker was murdered. Her BAC was low (0.01g/100ml) and the circumstances suggested alcohol did not make an important contribution to her death.

Case 2

A manager died at her office of aspiration associated with drinking alcohol during a holiday period. At least some of the alcohol had probably been consumed at the office. The available information suggested the worker had deliberately consumed a lot of alcohol prior to being found, although her measured BAC was only 0.02g/100ml. This may have been due to her being unconscious for a sustained period prior to dying.

Case 3

A farmer died as a result of being run over by his tractor, although the exact circumstances were not clear. The BAC of 0.05g/100ml was probably due to post-mortem autolysis rather than consumption of alcohol near the time of the incident.

Case 4

A truck driver making a delivery was run over by his truck after he parked it and got out. It appeared that the handbrake was faulty and had failed. Although the man's BAC was reported as 0.10g/100ml, there was no information in the file that directly suggested this had contributed to the incident or that indicated when the alcohol had been consumed.

Discussion

This limited study of work-related fatalities using the NCIS did not provide a lot of useful information on the role of alcohol involvement in workplace deaths. Blood alcohol levels were only available from the NCIS for about half of the workplace deaths, and alcohol was likely to have been importantly involved in a minimum of one, and a maximum of two, of these deaths (i.e. about 2% to 4%).

The NCIS standard police report and Findings in their current form are only likely to provide information on alcohol involvement if the deceased person's BAC was raised at

the time of death. Explicit statements regarding the absence of alcohol were sometimes present, but uncommon. When present, they were usually in police reports regarding motor vehicle crashes, with wording along the lines of 'Alcohol does not appear to have been a factor.'

The scenarios in which alcohol might contribute to the occurrence of incidents are described in Chapter 4. The likelihood of relevant information being recorded in the NCIS is considered here for these scenarios. There is unlikely to be information that allows assessment of the use of alcohol prior to commencing work unless the measured BAC was high, and even then the information is not likely to be comprehensive. Therefore, the potential role of high BAC prior to work that have fallen to normal by the time of work cannot be assessed. Relevant information is unlikely to be included in the NCIS in the medium term unless there is some form of checklist for the police to use that contains an explicit prompt regarding this. Information on the context of alcohol use is likely to be present if the BAC is raised, but there were too few cases with raised levels in this analysis to allow this to be assessed. Again, the use of a checklist can be expected to increase the presence and quality of this information recorded in the police report.

More detailed information is available from a comprehensive study of work-related fatalities that occurred in Australia between 1989 and 1992 inclusive. This study was also based on coronial information, but used all relevant information in each Coroner's file, and so had access to more detailed information than is currently available via the NCIS. Apart from BAC, information was also obtained on the circumstances of consumption for many cases where alcohol appeared to have contributed to the occurrence of the incident. There was little information on alcohol intake prior to work if the BAC was not raised. Information on BAC was available for 65% of workplace deaths, and alcohol was found to have contributed to the incidents that led to about 3% of these deaths. The contribution of alcohol was more common in work-road (7%) and commuting (11%) deaths. Alcohol was found to have been consumed either at work during normal duties, or at a work-sponsored function, in 44% of the workplace, work-road and commuting deaths (Driscoll et al, 2001; Driscoll 2003). The extent to which alcohol involvement has changed since the period covered by the study is not clear.

Information on relevant alcohol consumption by a person other than the deceased person is very uncommon in the NCIS for workplace deaths. It is also likely to be uncommon for bystander deaths. The limited analysis of work-road deaths, and previous use of the NCIS, suggests that such information is more common if the incident involved a motor vehicle incident on a public road.

A recent analysis of the role of alcohol on drowning in Australia also used the NCIS as the main source of data and provides information the nature and extent of information on alcohol. This study found information on alcohol available for 72% of drowning cases, being present for 12% in police reports, 39% in post mortem reports, 49% in toxicology reports (68% when toxicology information in the post mortem reports for New South Wales is included) and 14% in Findings (Driscoll et al, 2003b).

The focus of this analysis was workplace deaths. It is likely that motor vehicle incidents would have a higher proportion of deaths with known blood alcohol values than is the case for workplace deaths because the potential role of alcohol is more widely known in the community in general and the police in particular. Police are therefore more likely to collect information on blood alcohol. The 1989–1992 study mentioned earlier supports this contention, with information on BAC available for 80% of work-road and commuting deaths, compared to 65% of workplace deaths.

Summary

This limited analysis suggests that alcohol does not make a major direct contribution to the occurrence of workplace deaths in Australia. The NCIS can be a useful source of information on the direct contribution of alcohol to work-related deaths of workers if the worker had consumed alcohol near the time of the incident and consequently had a raised BAC at the time of the autopsy. Improvements in the proportion of NCIS cases with all four documents present, the use of a checklist by police officers investigating fatal incidents, and emphasis in police reports and Findings on the recording of explicit statements regarding information on BAC and the contribution or lack of contribution of alcohol to the fatal incident would all help to ensure the availability of more comprehensive and useful information on the role of alcohol in the occurrence of work-related deaths in Australia.

Conclusions

This chapter examined data from three sources which were thought to have potential to provide information on the extent and nature of alcohol involvement in work-related injury and the role of workplace culture. The sources are Emergency Departments (using data collected at one Emergency Department, for a special study), hospitals (using a national collection of data on admitted cases), and the National Coroners Information System.

These sources were less fruitful than we had hoped. Analysis of the data available to us shed little light on the involvement of workplace culture in work-related injury. They provided somewhat more information on the involvement of alcohol in workplace injury, but this was constrained by important limitations of the data and related information.

The work provided insights into the specific characteristics of the sources that limited their value for this project, and on ways in which these could be overcome, which are described in the last part of the section on each of the sources. In addition, the analysis of hospital data resulted in innovations in methods and concepts concerning use of attributable proportions methods to study specific topics, of which alcohol involvement in work-related injury is an example.

A noteworthy development of concepts and methods involved partitioning conditions attributed to alcohol according to the predominant mechanism of effect (i.e. intoxication due to recent consumption, or effects of chronic consumption). This modification of usual attributable proportions methods for assessing the burden of disease and death due to alcohol consumption parallels the increasing attention being given to distinct patterns of consumption in national health guidelines and in surveys such as the NDSHS, and appears to provide a way to maintain alignment between developments in theory and practice concerning consumption patterns and assessments of burden.

6 Workplace interventions

There is increasing recognition that the workplace has considerable potential as a setting to reduce or minimise alcohol (and other drug) related harm. The rationale for utilising the workplace as an intervention setting is evident from data presented in Chapter 3 of this publication. That is, a substantial proportion of the workforce engage in alcohol consumption patterns that place them at risk of harm and these consumption patterns can have a negative impact on the productivity of the workplace and the health and safety of workers and the wider community.

There are several advantages in utilising the workplace as an intervention setting. First, the majority of people who engage in harmful alcohol use are employed and therefore, the workplace provides convenient access to large numbers of people who otherwise may not seek assistance. Second, full time employees spend a substantial amount of time at the workplace, maximising opportunities for exposure to intervention strategies. Third, for many people, work plays an important and valued role in their lives, thus employers have leverage to motivate employees to seek help for alcohol-related problems. Finally, messages concerning harm minimisation and 'safe' or 'responsible' levels of consumption delivered in the workplace are likely to extend into the wider community via employees' interaction with family and friends, thus optimising the return on any investment in workplace interventions.

Reflecting the increasing interest in the workplace as an intervention setting, the last decade or so has seen considerable effort by employers, unions, and employer organisations to address the issue of alcohol-related harm in the workplace. However, while some of the responses to this issue are constructive and based on models of best practice, many are considered to be either contentious, or ill-informed and ill-advised (Allsop et al, 2001). One of the main reasons for this is the paucity of research concerning the nature and extent of alcohol-related harm in the workplace, and the lack of good quality, practical information that is available to employers and employees (Allsop et al, 2001).

Many traditional responses to alcohol-related harm in the workplace have taken a secondary prevention approach. That is, the focus has largely been on the identification and referral to treatment of impaired or alcohol dependant workers. However, this approach is at best a limited response to alcohol-related harm in the workplace. While the identification and referral of impaired or alcohol-dependent employees is important, this approach fails to consider the much larger number of employees who individually may experience few alcohol-related problems, but together account for a much greater proportion of alcohol-related harm in the workplace. Thus, contemporary Australian (e.g. Allsop et al, 2001), American (e.g. Bennett & Lehman 2003), and international literature (e.g. ILO 2003) has argued for a shift away from the traditional workplace secondary prevention focus to a much broader primary prevention approach.

The following sections outline the five most common responses to alcohol-related harm in Australian workplaces and briefly review evidence concerning the effectiveness of each response. For ease of presentation, these responses are categorised as alcohol policy, employee assistance programs, testing, health promotion, and other interventions. A brief summary of these interventions is presented in Table 6.1.

Table 6.1: Strengths and limitations of responses to alcohol-related harm in the workplace

Type of intervention	Evidence of effectiveness	Strengths	Limitations
Policy	Limited	Necessary basis for all interventions	Not an intervention strategy per se Needs to incorporate other strategy
EAP	Limited	Necessary for secondary prevention	Focus on individual 'problem' workers
Testing	Limited	Relatively easy to implement	Focus on illicit drugs Focus on individual 'problem' workers Can have unexpected negative outcomes
Health promotion	Limited	Focus on a range of health issues	Alcohol (and other drugs) not the main issue
Others (peer programs) (education and training) (brief intervention) (stress management)	Limited	Type of intervention can be tailored to workplace	Difficult for individual workplaces to determine which is 'best' for them

Alcohol policy

The development and implementation of an alcohol policy is the most important response to alcohol issues that can be utilised by Australian workplaces. A 1991 survey indicated that 95% of the top 600 Australian companies had some form of formal or informal restriction on alcohol use in the workplace (Richmond et al, 1992).

In general, there are two types of policy that workplaces can utilise:

1. those that adopt a social control approach, and
2. those that adopt a harm minimisation approach (Duffy & Ask 2001).

Social control policies link alcohol use with deviant behaviour and focus on identifying alcohol dependent employees. In contrast, harm minimisation policies recognise that *all* employees are at risk of alcohol-related harm and focus on reducing this risk. According to Ames, Delaney, and Janes (1992), social control policies are likely to fail, or at least be of limited effectiveness, as they do not provide strategies for dealing with non-alcohol dependent employees whose drinking behaviour is also likely to pose a safety risk to themselves and others.

Alcohol policies are the fundamental building block on which responses to alcohol-related harm in the workplace are based. Such policies provide a formal process for response implementation and provide a guide for the roles and responsibilities of all employees in relation to the response. While there is no clear evidence regarding the effectiveness of workplace alcohol policies in reducing alcohol use or alcohol-related harm in the workplace, it is generally accepted that workplace policies play an important role in determining employees' attitudes and behaviours concerning alcohol use. As outlined in Chapter 3, an examination of data obtained from the 2001 National Drug Strategy Household Survey indicated that the workplace policies of the mining industry may be associated with employees' alcohol consumption patterns. Other research has also demonstrated an association between workplace policy and employees' alcohol consumption. A recent workplace study (Pidd 2003b) found that apprentices employed in workplaces with a formal alcohol policy had significantly lower levels of alcohol consumption both during and outside of work hours compared to apprentices employed in workplaces with no formal policy.

Workplace alcohol policies are a crucial component of any workplace response to alcohol-related harm as they provide the foundation for all other workplace interventions. However, to be effective, workplace policies must:

- contain a clear statement on how the organisation deals with alcohol problems,
- must clearly articulate the objectives of the policy and clearly outline the processes for achieving these objectives,
- must outline processes and personnel involved in implementing the policy, and
- must be specifically designed to accommodate the physical and industrial environment of the work organisation (Calogero et al, 2001).

Employee Assistance Programs (EAPs)

Employee assistance programs (EAPs) have a relatively long history of use and are the most common intervention strategy utilised by Australian workplaces (Richmond et al, 1992; Loxley et al, 2004). The core function of an EAP is the identification and referral to treatment of employees with alcohol problems. Thus, EAPs are essentially a treatment response targeting individual workers and place little emphasis on primary prevention.

Reviews of research concerning the effectiveness of EAPs (Allsop et al, 1997; Roman & Blum 2002; Calogero et al, 2001) identify that while there are no definitive evaluations of the effectiveness of EAPs, individual studies provide some evidence they are successful in rehabilitating workers with alcohol problems. However, these reviews also caution that many evaluations of EAPs suffer from methodological limitations and further studies are needed to accurately assess their effectiveness. In particular, the evidence suggests that employees with infrequent or moderate alcohol-related problems are not being adequately identified or assisted by EAPs (Calogero et al, 2001).

The EAP is an essential component of a strategy for dealing with alcohol-related harm in the workplace as it provides a method of secondary prevention that allows for the treatment and rehabilitation of employees with alcohol-related problems. However, this individualistic focus limits the effectiveness of the EAP as a response to alcohol-related harm in the workplace as it does not address physical and cultural factors in the workplace that may contribute to problematic alcohol use. In addition, a focus on employees with alcohol-related problems does not provide a process for dealing with employees whose occasional drinking behaviour is also likely to pose a safety risk to themselves or others.

Testing

There has been a growth in interest concerning alcohol (and other drug) testing in the Australian workplace over the last decade. A 1991 survey indicated that only 2% of Australia's top 600 companies had testing programs (Richmond et al, 1992). However, more recent research (Heiler 2003) indicates that the number of tests being conducted in Australian workplaces is rapidly rising.

There is a range of testing programs workplaces can utilise, including:

- pre-employment screening,
- random testing, and
- testing for cause following an accident or 'near miss' incident.

Similarly, there is a range of test 'types' that workplaces can utilise including breath testing, hair testing, urinalysis, and saliva, or oral fluid testing. The core function of testing programs is to identify employees whose alcohol (or other drug) consumption is likely to pose a risk to safety or productivity. Thus, testing programs are a secondary prevention response targeting individual workers and place little emphasis on primary prevention.

There is some limited evidence that workplace testing may have a deterrent effect on employees' alcohol (and other drug) use (Bennett & Lehman 2003; Bennett et al, 2003). In addition, there is some evidence that testing may be associated with reductions in injury rates (Sheridan & Winkler 1991) and productivity improvements (Normand et al, 1990). However, reviews of research concerning the effectiveness of testing (Normand et al, 1994; Trice & Steele 1995; Cook & Schlenger 2002; Corry 2001) conclude that many of these studies are methodologically flawed and that overall, scientific evidence for the effectiveness of workplace testing is weak.

In many cases, the results obtained by studies examining the effectiveness of workplace testing could also be explained by other factors such as:

- changes in population consumption patterns,
- changes in employer policy and attitudes, and
- overall improvements in safety and productivity (Cook & Schlenger 2002).

Despite the growing interest in workplace testing, testing is at best a limited response to alcohol-related harm in the workplace for several reasons. First, the target of many testing programs in the workplace is illicit drug use. However, as alcohol is the most commonly used drug in Australia (Australian Institute of Health and Welfare 2002b), much of the drug-related risk in the workplace is likely to be associated with alcohol use. Second, the types of drug tests available to employers are limited in their ability to detect impairment. This is especially the case for the most common type of drug test utilised in workplace testing (i.e. urinalysis). While breath testing is a more reliable method of detecting alcohol impairment, it is also limited in that it cannot detect other alcohol-related problems (e.g. hangover effects) that are also likely to impact on workplace safety and productivity. Finally, the individualistic focus of testing limits its usefulness as a primary prevention strategy.

Health promotion

Health promotion programs are a relatively recent strategy for responding to alcohol-related harm in the workplace. As such, research concerning their effectiveness in reducing alcohol-related harm in the workplace is relatively sparse (Corry 2001). In general, health promotion programs do not specifically focus on alcohol consumption, rather they involve a range of health promotion strategies including education and other interventions that focus on improving the overall health of employees. The basic premise of health promotion programs is that healthy life styles and heavy alcohol consumption

are incompatible (Shain et al, 1986). Thus, it is argued that incorporating alcohol issues within the context of health concerns in general, may be an effective method of motivating behavioural change concerning alcohol use (Shain et al, 1986).

The limited research evidence concerning the effectiveness of health promotion as a response to alcohol-related harm in the workplace has produced mixed results. For example, a recent Australian study (Richmond et al, 2000) evaluated the effectiveness of a brief alcohol intervention that was incorporated into a wider health promotion program. The results indicated that across the work organisation as a whole, there was no significant reduction in alcohol consumption. However, a significant reduction in the number of drinks consumed by females was observed. The authors offered two explanations for these results. First, it may be that females were more likely than males to reduce their alcohol intake when it was brought to their attention that their alcohol consumption was an issue. Second, it may be that females were less inclined to participate in a male-dominated culture that promoted heavy drinking. Compared to males in the control group, males in the intervention groups did show a substantial reduction in alcohol consumption over time. However, these differences were minimised by large variations in responses, in particular, variations between different work networks. The authors argued that it may have been different drinking subcultures within these networks that influenced the drinking behaviour of male employees.

More recent USA research (Cook et al, 2003; Heirich & Sieck 2003) has indicated that workplace health promotion programs can be effective in changing alcohol-related attitudes and behaviour if they incorporate brief interventions that focus on alcohol-related harm. According to Shain (1994), the effectiveness of health promotion programs can be optimised when attention is paid to individuals achieving a sense of control over their own health, and attention is paid to how the interdependent nature of health practices such as alcohol consumption is closely interwoven with other health practices such as exercise, diet, and stress management.

Other responses

A range of other strategies have been utilised by Australian workplaces as a response to alcohol-related harm in the workplace including education and training, brief interventions, and peer assistance programs. In general, evidence for the effectiveness of these interventions is limited (Roman & Blum 2002; Loxley et al, 2004). However, recent evidence indicated that workplace interventions do show some promise. Bennett, Reynolds, and Lehman (2003) identified 12 workplace intervention studies published between 1991 and 2003 that attempted to modify some aspect of alcohol or other drug use, incorporated a pre-post-test design, utilised a control group, used reliable outcome measures, and reported appropriate statistical analyses procedures. These interventions included education, prevention and intervention training, building stress coping skills, and health promotion. A meta-analysis of these 12 studies indicated that the interventions were effective, however, the effect size was relatively small.

In addition, the available evidence does indicate that these strategies may be effective in minimising alcohol-related harm in the workplace if used in conjunction with other strategies. For example, brief interventions are essentially a secondary prevention strategy and there is little conclusive evidence concerning their effectiveness in the workplace (Allsop et al, 1997). However, as described above, brief interventions can be an

effective strategy if incorporated into broader primary prevention interventions such as health promotion programs (Cook et al, 2003; Heirich & Sieck 2003).

Similarly, there is little evidence to indicate that educational programs focusing on the provision of factual information alone are effective in minimising alcohol-related harm (Holder 1990). However, education programs can be effective if they emphasise the development of specific prevention skills (McBride et al, 2004). In addition, workplace education and training can raise awareness of alcohol-related harm in the workplace, and be an effective dissemination strategy for other interventions (Calogero et al, 2001).

The effectiveness of any intervention as a response to alcohol-related harm in the workplace is also likely to depend on the applicability of the strategy to individual work organisations. For example, peer interventions are based on the premise that co-workers are in the best position to recognise and respond to workers with alcohol problems. Evaluations of these programs indicate that they have been effective in identifying and addressing problem behaviours and have contributed to achieving alcohol-related cultural change in Australian and U.S. workplaces (Sonnenstuhl 1996; Milne 1995). However, these evaluations are largely descriptive, and are restricted to highly unionised workplaces engaged in building and construction. Little evidence is available regarding their effectiveness in non-unionised workplaces or workplaces in other industries.

In addition, the effectiveness of any intervention is likely to be dependent on the ability of the intervention to acknowledge and address the existing workplace culture concerning alcohol use. For example, a recent Australian evaluation of a workplace alcohol safety training program (Pidd 2004) delivered to adolescent apprentices indicated that this type of training was effective in producing long-term changes in attitudes, beliefs and behaviours concerning alcohol use. However, reductions in alcohol use were only evident for apprentices employed in workplaces where the pre-existing workplace culture reflected an intolerance of alcohol use during work-related hours.

Summary

A number of intervention strategies have been utilised by Australian workplaces as responses to alcohol-related harm. However, there is no strong empirical evidence that any single workplace strategy is effective in reducing alcohol-related harm (Loxley et al, 2004). In general, reviews of research concerning the effective of workplace intervention strategies (e.g. Allsop et al, 1997; Calogero et al, 2001; Roman & Blum 2002) conclude that evaluation studies are extremely scarce, and many of those that are available are methodologically flawed. A more recent review that focused on the few available methodologically sound evaluations (Bennett et al, 2003), concluded that while the strategies reviewed were effective, the size of any effect was relatively small.

While research concerning the efficacy of workplace interventions is limited, there is a substantial body of evidence indicating prevention and counselling/treatment responses in other settings are effective in preventing alcohol problems and reducing harm for the individual and the wider community (e.g. Loxley et al, 2004). Thus, there is good reason to believe strategies such as brief interventions, education and training, health promotion, and policy development that have been effective in the wider community, could be adapted and applied in the workplace. However, these intervention strategies should acknowledge the differing needs, resources, and environments of individual workplaces. It is unlikely that any single intervention strategy will be appropriate for all workplaces.

In addition, effective workplace interventions need to adopt a comprehensive and integrated approach by incorporating aspects of policy, treatment, and prevention. Policy provides the foundation for the strategy, and treatment is necessary to provide a process for responding to impaired workers, or workers with alcohol-related problems. Prevention, however, needs to go beyond individual workers to address systemic change by focusing on the physical and cultural workplace factors that may promote problematic alcohol use.

However, the ability of workplaces to select, adapt, and implement comprehensive and integrated responses to alcohol-related harm in the workplace is limited by the lack of research concerning the effectiveness of differing intervention strategies and their applicability to individual workplaces. More research is required to identify the types of responses that are likely to be suitable for different workplaces, and to examine the efficacy of these responses. In particular, the efficacy of workplace interventions needs to be evaluated not only in terms of any impact on the alcohol-related behaviours and attitudes of individual workers, but also in terms of economic and social benefit for employers and the wider community.

7 Implications

This body of work is unique in several respects. Firstly, it represents one of the most comprehensive examinations of the role of alcohol in the Australian workplace undertaken to date. Secondly, the data sources examined and the analyses undertaken yielded the most fruitful and meaningful findings yet identified in relation to alcohol and work. Thirdly, the conceptual frame of this investigation (i.e. a workplace culture perspective) allowed for a wider examination of the role of alcohol in the workplace than hitherto undertaken. This widened perspective provides a more meaningful and utilitarian approach which allows us to move beyond just describing the relationship of alcohol and work, to the identification of effective strategies for the prevention and amelioration of associated problems.

This work has important implications for three areas:

1. concepts and theory,
2. data and research methods, and
3. policy and practice.

Concepts and theory

A number of important issues emerged from this work from a conceptual and theoretical perspective. Four new perspectives are highlighted below in separate categories. The first three of these categories fall under the umbrella heading of a 'widened perspective'. The fourth identifies a particular pattern of consumption, infrequent or periodic high-level consumption (in contrast to frequent high level consumption) that has been largely overlooked in descriptive epidemiological studies but that has been found here to have important implications.

Widened perspective (1): workplace culture

This important change in perspective involves a shift in focus from exclusive concerns about 'drinking at work' to a much broader focus that addresses 'work-related drinking'. In making this shift, emphasis is placed on the drinking culture of a given workplace.

Culture is widely recognised as exerting a strong influence on behaviours, including consumption of alcohol. Little investigation, however, has been undertaken on the influence of workplace culture on alcohol use and its consequences.

An analysis of literature on alcohol and workplace culture (Chapter 2) provided a basis for concluding that a conceptual model focusing solely on alcohol consumption and intoxication at one's workplace (or while working) would account for only part of the impact of alcohol on work and work-related safety, and the corresponding influence of workplace culture on alcohol use.

Our analysis of data from the 2001 National Drug Strategy Household Survey (NDSHS) confirmed this assessment. This analysis reveals, for example, evidence of the impact on the workplace of certain patterns of drinking which occur outside of work. Compared to

employees who drank at levels indicating low short-term risk, those who drank at short-term risky or high risk levels at least weekly were 19 times more likely to have taken a day off work due to their alcohol use and nearly six times more likely to have attended work under the influence of alcohol. Similarly, compared to employed respondents who drank at low levels of long-term risk, those who drank at long-term high risk levels were nearly eight times more likely to have taken a day off work due to their alcohol use and nearly five times more likely to have attended work under the influence.

The NDSHS data also provided evidence of a relationship between the workplace environment and employees' alcohol consumption patterns. For example, the mining industry employed the largest proportion of respondents who engaged in infrequent consumption of large amounts of alcohol. This consumption pattern may be due to workplace controls and working conditions. Many remote mine sites have strong controls (in the form of workplace policy) that restrict the consumption of alcohol on-site both during and outside of working hours. However, many employees at these sites also work on a 'fly in-fly out' roster of three weeks on and one week off. Thus, the workplace controls of the mining industry do not extend to the employees 'week off' and as such this lack of control may account for the pattern of infrequent high consumption reported by employees. Historically, Australia has a long tradition known as '*work and burst*'. That is, long intense work periods (often in isolated settings) followed by long breaks associated with heavy bouts of drinking. This pattern was very common among occupations such as shearing, jackaroos, miners etc. and is still reflected in some occupational groups today.

Our data analyses indicated that workplace drinking cultures may play a role in the formation of an employee's consumption patterns. The hospitality industry, in particular, had the largest proportion of employees who reported drinking frequently (at least weekly) at short-term risky and high risk levels, and also at long-term risky levels. In the hospitality industry, alcohol is not only available, but the use of alcohol is actively promoted as a core component of the industry's business. The hospitality industry also traditionally attracts younger workers who are more likely to engage in at risk alcohol consumption patterns and are likely to be at an early stage in their drinking career. Compared to other industries, the hospitality industry also had the highest percentage of workers who attended work under the influence and who usually drank at the workplace.

Employees who reported that their workplace was a setting in which they usually drank, were more likely to also report drinking alcohol much more often and in larger amounts than they had intended. These findings indicate that in workplaces with a culture of alcohol use (typified by workers usually drinking at their workplace), there may be social pressure to consume more alcohol than intended.

We concluded that a broader model is more satisfactory: drinking behaviour at work and elsewhere influences work and work safety, and workplace culture modulates drinking behaviour.

Widened perspective (2): primary prevention

Traditionally, responses to alcohol-related harm in the workplace have focused on the identification and subsequent treatment or dismissal of 'problem' drinkers. This type of approach is sometimes referred to as 'tertiary' level intervention or prevention. In general, 'problem' drinkers are those who regularly consume large amounts of alcohol, and NHMRC guidelines would categorised them as long-term risky or high risk drinkers and/or frequent short-term risky or high risk drinkers. However, our analysis of 2001 NDSHS data indicates that focusing on this type of drinker alone may be limited in its ability to deal with the full range of alcohol-related problems in the workplace. Our analysis indicated that compared to the percentage of employed recent drinkers who drank at long-term risky or high risk levels (12.3%), or those who frequently drank at short-term risky or high risk levels (8.7%), a much larger percentage infrequently or very infrequently drank at risky or high risk levels (39.1%).

Infrequent and very infrequent heavy drinkers were significantly more likely than low risk drinkers to have taken a day off work due to their alcohol use, and were significantly more likely to have attended work under the influence of alcohol. While, the likelihood of taking a day off or attending work under the influence was considerably lower for infrequent and very infrequent heavy drinkers compared to frequent heavy drinkers, the much larger number of workers drinking at these levels made a substantial contribution to alcohol-related harms in the workplace.

This finding is consistent with the notion of a 'prevention paradox' (Kreitman 1986). That is, while regular heavy drinkers may represent the greatest individual risk to workplace safety and productivity, they are relatively few in number. In contrast, because infrequent heavy drinkers are more numerous, they account for most of the risk to workplace safety and productivity. Thus, prevention strategies need to target the infrequent, or occasional heavy drinker as well as the frequent heavy drinker. Workers who only occasionally or fairly infrequently drink heavily are by far the majority of any workforce, and it is this group that has been largely overlooked to-date.

This primary prevention approach is particularly important given the evidence presented here indicating the workplace can influence the consumption patterns of workers. As outlined in earlier chapters, workplace norms, controls, values, and beliefs play an important role in the development and maintenance of individual worker's attitudes and behaviours concerning alcohol. These workplace influences may be particularly salient for several reasons. First, it is increasingly recognised that the boundaries between work, family, and leisure are increasingly blurred with a large degree of overlap. Therefore, workplace values and norms increasingly extend into one's social life and vice versa. Second, workplace roles and identities can have a strong influence on individuals' identity and self-concept. Therefore, workplace values and norms can influence individual attitudes and beliefs both at, and away from, the workplace. Finally, for many individuals, work is a valued part of life for economic, social, and psychological (e.g. self-esteem) reasons. Thus, employers have a degree of leverage when requiring workers to conform to productivity and safety standards.

It is evident from this body of work that what is required is greater attention to the ordinary worker, at all levels throughout a given workplace. It is the ordinary Australian worker, who drinks in a typically Australian way (i.e. with occasional bouts of risky drinking) who warrants greater attention and prevention effort.

Widened perspective (3): drinking by others

To-date, the focus of research on alcohol and the workplace has been largely directed at the individual worker and his or her drinking, or a co-worker and the impact of their drinking on their fellow workers. What became evident from the current study was the importance of also examining the drinking of others in the work environment such as customers and clients. This is highlighted as an area with important occupational, health and safety implications for the working environment.

The alcohol use of employees has important implications for their own health, safety, and productivity and for the health, safety, and productivity of co-workers and other employees. However, the alcohol consumption patterns of others, such as customers or clients can also impact on workplace health, safety and productivity.

Analysis of data from the 2001 NDSHS revealed that a substantial proportion of employed Australians report being put in fear (18.7%), or being verbally abused (33.8%), or physically abused (6.1%) by someone they perceive to be affected by alcohol and/or illicit drugs. Most of these incidents occurred in public places, but for some occupations and industries, a substantial proportion occurred in the workplace.

Reported incidents of alcohol- and/or illicit drug-related abuse and intimidation in the workplace were most prominent in the health care sector of the services industry and in the hospitality industry. Compared to employed respondents in general, a much larger percentage of those employed in the health services sector or the hospitality industry reported being verbally abused, physically abused, or put in fear by a person who was affected by alcohol or alcohol and/or illicit drugs. This trend was also evident for occupation groups associated with the hospitality industry (e.g., sales and service managers) and the health services sector (e.g. health and welfare professionals). The perpetrators of these incidents appear to be mainly clients (e.g. customers in service industries or patients in the health care sector). Less than 20% of incidents involved a co-worker, a current or ex-partner, family member, relative or friend.

The alcohol- and/or other drug-related abuse and intimidation of workers by customers and clients has important implications for an examination of workplace cultures and work-related alcohol use. Not only do these incidents have a direct impact on workplace health, safety, and productivity, but they may also have an indirect impact on employees' alcohol use. Incidents of abuse or intimidation, perpetrated by customers and clients, may cause stress for employees who are the victims or employees who witness the violence. These employees may alleviate this stress by self-medicating with alcohol.

Analysis of the 2001 NDSHS provided some support for this proposition. For example, compared to other professionals, a much larger percentage of health and welfare associate professionals reported long-term risky consumption. Given that health-related occupations and industries also reported high levels of workplace alcohol- and/or drug-related abuse and intimidation, it could be argued that dealing with intoxicated patients in health settings leads to worker stress that is alleviated with alcohol use. This pattern of alcohol consumption could in turn impact on the workplace culture whereby self-medication with alcohol use becomes normative behaviour for dealing with stress.

We conclude that examinations of alcohol use and workplace safety need to consider the impact of alcohol use by clients and customers. While the consumption patterns of clients and customers is likely to have only a small impact on most workplaces, it may be substantial in workplaces where alcohol is sold and consumed (e.g. hotels and hospitality

venues) or which deal with clients with acute and chronic alcohol and other drug problems (e.g. hospitals and other health services).

Identification of a new pattern of risky alcohol consumption

Current theory suggests that while frequent consumption of large quantities of alcohol is likely to result in alcohol-related diseases (chronic harm), less frequent *c*onsumption of large quantities might pose particular threats to safety and other types of acute harm. The differentiation between patterns of consumption for chronic and acute harm has been highlighted in the recently revised Australian Alcohol Guidelines developed by the NHMRC (NHMRC 2001).

However, while the new NHMRC guidelines identify different levels of consumption associated with short and long term harms, they do not include a category for *infrequent* high-risk drinking. Short-term risk drinking is defined by NHMRC guidelines as consuming more than six (males) or four (females) standard drinks on any one day, no more than three days per week. However, this definition includes those who drink at these levels relatively frequently (e.g. weekly or more often) and those that drink at these levels relatively infrequently (e.g. monthly or less often).

In the present analyses, we gave more attention than usual to patterns of drinking that can be characterised as infrequent or periodic high-level consumption. This was prompted by literature suggesting that compromised safety might be particularly likely with this pattern of drinking. Further, we considered that frequent (e.g. weekly) episodes of high consumption would be more likely to result in certain effects on work and work safety than less frequent episodes (e.g. monthly or less often).

Data items in the 2001 NDSHS allowed us (within some constraints) to construct categories for infrequent high-risk drinking. We framed much of the analysis in terms of three sub-groups of 'short-term risky or high risk' consumption, according to the reported frequency of episodes: at least weekly, at least monthly and at least yearly.

The importance of distinguishing between patterns of consumption associated with chronic harm and patterns associated with acute harm was supported by our examination of NDSHS data. Previously, much of the workplace research has utilised either a dichotomous assessment of whether alcohol was consumed or not (drinking status), or quantity/frequency measures to determine long-term risk drinking.

This traditional focus on drinking status or drinking associated with chronic (long-term) harm appears limited for determining the full extent and nature of alcohol-related risk to workplace safety and productivity. For example, compared to employed Australians who drank at low levels of long-term risk, those who drank at long-term high risk levels were about eight times more likely to have taken a day off in the past three months due to their alcohol use and five times more likely to attend work under the influence of alcohol. However, those who frequently drank at short-term risky or high risk levels were 19 times more likely to have taken a day off due to their alcohol use and six times more likely to attend work under the influence of alcohol, compared to those who drank at low levels of short-term risk.

Analyses of NDSHS data also supported the importance of distinguishing between patterns of short-term risk consumption (i.e. frequent and infrequent). A distinction between frequent (at least weekly) and infrequent (at least monthly and at least yearly) short-term risk consumption patterns, indicated that even occasional high level

consumption was significantly associated with negative outcomes for workplace safety and productivity. For example, compared to employed Australians who drank at low levels of short-term risk, those that infrequently (at least monthly) drank at short-term risky or high risk levels were seven times more likely to have taken a day off in the past three months due to their alcohol use and over three times more likely to have attended work under the influence of alcohol. Similarly, compared to those who drank at low levels of short-term risk, those that infrequently (at least yearly) drank at short-term risky or high risk levels were three times more likely to have taken a day off in the past three months due to their alcohol use and twice as likely to have attended work under the influence of alcohol. Thus the distinction between frequent consumption of large quantities of alcohol and relatively infrequent, occasional, or intermittent *c*onsumption of large quantities has important implications for not only determining the extent and nature of alcohol-related risk to workplace safety and productivity, but also for strategies designed to minimise or reduce this risk.

Data and methods

2001 National Drug Strategy Household Survey

The 2001 National Drug Strategy Household Survey is a rich source of new information on employee levels and patterns of alcohol consumption and work-related behaviours. Its strength for this purpose was largely due to three characteristics:

(i) The richness of data items concerning levels and patterns of alcohol consumption, which enabled us to distinguish relevant patterns of consumption,

(ii) The availability of a range of data items concerning work and the workplace, which enabled our analysis to extend beyond narrow concepts, such as 'drinking at work', and

(iii) A large sample size, which provided enough study power to make meaningful comparisons between many categories of interest.

Specific observations and conclusions:

- Analysis of the recently completed 2004 survey using a method similar to the one used in this project has potential to begin to assess change over time.
- Injury is an important adverse consequence of alcohol use, in the context of work and more generally, but there were no specific items in the NDSHS survey on this topic, and few questions about workplace culture and drinking behaviour. The survey data would have been considerably more useful for this project if the survey had included questions on the recent injury experience of respondents. We recommend that consideration be given to including such questions in future surveys on this topic.
- The present work focuses only on alcohol. There is scope to undertake similar analyses of the NDSHS to examine the role of other drugs in relation to the workplace.

Other data sources

Emergency Department (ED) data (using data from a special study of alcohol-related attendances to one ED), hospital separations data, and National Coroners Information System (NCIS) data were less fruitful than had been anticipated, shedding little light on workplace culture, and providing limited information on alcohol involvement in work-related injury cases.

In general, the limitations flowed from the fact that the data sources had not been designed to provide information on topics relevant to this project. Changes and additional work that would improve the utility of these sources are outlined below.

Emergency Department data: The main constraint was the small number of work-related cases in the set available to us. This was a consequence of the case sampling method used in the original study, which was not designed to sample work-related injury cases. A study similar to the one whose data we analysed, but with case sampling designed to obtain a representative sample of work-related cases, could be undertaken. If designed like the original study, then data collection costs would probably be somewhat higher, due to the need to sample cases at all hours on all days of the week. However, such an expanded ED study design would provide data not elsewhere available on alcohol-related work injuries.

Hospital separations data: Australia's national collection of in-patient hospital data is of good quality, and has potential to provide useful information on alcohol and work-related injury. The main factor constraining our attempt to tap this potential was lack of appropriate attributable proportion values (see below). However, two other constraints relate more directly to this data source.

- *Incomplete flagging of cases involving alcohol.* The existing system for obtaining summary case information for the national data collection provides ways to record several types of involvement of alcohol in cases, particularly injury cases, mainly by means of certain categories in the Australian clinical edition of the International Classification of Diseases (ICD-10-AM). These codes appear much less frequently in the data than is expected on the basis of other information about the extent of alcohol involvement in injury. We see value in undertaking a study to assess reasons for this and to assess and test methods to improve the extent to which cases in which alcohol involvement can be identified are recorded as such in the coded case summary prepared after discharge.
- *Uncertain completeness of identification of work-related cases*. Evaluation of the completeness of identification of work-related cases among admitted injury cases would enable more meaningful interpretation of results based on this source, and might provide ways to reduce the extent of under-identification or misclassification.

Alcohol-attributable injury conditions and proportions. The main constraint on obtaining useable estimates on alcohol-attributable work-related injury was the lack of appropriate estimates of attributable proportions (APs). The standard set of conditions and APs were not appropriate, mainly because alcohol-related proportions of injuries of particular types are likely to be lower for work-related cases than for cases of these types in the community as a whole. A second limitation of the standard set of conditions is that it does not provide any estimate of alcohol involvement for types of injury that make up a large proportion of all cases.

The standard set of conditions and APs was developed by a process that relied on reviewing available scientific literature. The limited extent and quality of relevant literature was the main constraint on this work and will constrain updates and extensions using similar methods (though it is important to undertake updates periodically to take account of new findings). A study of a sample of people admitted to hospital due to injury (work-related and other, to enable comparisons) would be more likely to provide valid estimates, though such a project would be costly. A less costly and less reliable approach would be to base a study of alcohol involvement on examination of a sample of hospital records.

National Coroners Information System data: This source has previously been found to be useful for statistical description and analysis of alcohol-related fatal injuries, at work and elsewhere. The challenge of this project was to assess whether coroners' data could also provide insights into the more abstract issue of workplace culture and its influence on such cases. The source did not prove to be fruitful in this regard, partly due to fairly small numbers of relevant cases available for assessment. A more fundamental factor is that the idea that workplace culture concerning alcohol is a potentially relevant consideration when assessing injury deaths is not widely recognised, and may not be familiar to Coroners.

Overall, it was concluded that little is known regarding the extent and nature of alcohol-related injury that occurs in the context of the Australian workplace. This could be rectified by changes in data collection methods (i.e. to provide more detail on alcohol-relatedness and work-relatedness) utilised in compiling existing data sets (e.g. NHMD and NCIS) or by the conduct of specifically designed studies.

An example of the latter would be an ED and hospital in-patient study that specifically examines the extent and nature of work-related injury. This study could adopt a broader perspective on workplace culture by focusing of the relationship between identified work-related injury and workplace *safety* cultures. This broader perspective of workplace safety culture could incorporate the concept of workplace *alcohol* cultures and thus be consistent with the theory and concepts outlined in this document.

Methods for assessing alcohol use

Undertaking this project has prompted us to recognise more clearly than before that an important type of consequence is effects on work, such as work absence (due to hangover, alcohol-related injury, etc) or occupational injury.

We note that this type of consequence of alcohol consumption is not taken into account by most of the common instruments that measure consequences of consumption e.g. AUDIT. Consideration should be given to taking more account of work-related consequences by modifying or supplementing the commonly used instruments.

Policy and practice

The findings of this project have important implications for policy and practice on several levels. These are:

- the extent of the impact of alcohol on work and workplaces,
- the fact that much of the impact is little-recognised (for example, the consequences of infrequent high-level consumption on work productivity from workforce absenteeism and attending work under the influence of alcohol; and the prevalence of workers in some industries being abused, put in fear or assaulted by people probably affected by alcohol),
- that much of the problem can be seen as having implications for occupational health and safety. Employees working while affected by alcohol has long been recognised as having safety implications. The broader analysis presented here casts light on the risks to workers due to other people who are affected by alcohol (chiefly customers and clients) and effects on work absence, etc. of common but relatively unrecognised patterns of alcohol consumption (i.e. infrequent high-level consumption),
- an implication of this is that an approach to managing and reducing the adverse consequences for workers and enterprisers of alcohol use that focuses solely on preventing intoxication while working (e.g. through regulatory measures, testing, etc) will overlook much, perhaps most, of the problem,
- the potential to reduce this problem is by methods focusing on using workplace culture to influence behaviour. The workplace can be seen in two ways: (i) as a setting in which it is possible to identify and help individuals whose pattern of alcohol use is potentially harmful, both at work and elsewhere; and (ii) as a setting in which there are institutional reasons to take action concerning patterns of use of alcohol which impact on health, safety and productivity,
- the analysis presented in this report provides an overview of this issue. There is untapped potential in the NDSHS to undertake analyses specific to particular industries or sectors, or on specific aspects of the issue (e.g. economic costing of consequences of alcohol use for workers and workplaces).

Workforce development

To a large extent, the policy and practice implications identified from this study are workforce development issues; some with important occupational, health and safety implications and others which highlight the need for better informed management and the need for the implementation of appropriate policies and prevention strategies.

1. Target non-dependent risky drinkers

An important finding to emerge from this work was the elevated risk of negative workplace outcomes experienced by those who, from time to time, drink at risky levels. In contrast to the previous emphasis on identifying the relatively small number of alcohol-dependent workers, these data are consistent with the notion of a 'prevention paradox' by highlighting that most adverse alcohol-related events in the workplace are likely to stem from workers who drink heavily only occasionally or intermittently.

Drinking heavily infrequently (as opposed to more frequently) appears to carry a particular penalty and makes the individual more vulnerable to injury or other adverse effects than might be the case for a more experienced heavy drinker. Hence, there is a strong case to be made for the application of universal preventive interventions directed to all workers and designed to minimise risky drinking per se.

2. Occupational, Health and Safety

Infrequent or periodic high-level consumption is common behaviour engaged in by over a third of employed males and females. Individuals who engage in such patterns of drinking may represent the highest level of risk to safety, and compromise workplace productivity through high numbers of work absences and attending work under the influence of alcohol. The extent of the problem of infrequent high-level consumption in the workplace has previously been under-recognised and has important implications for the occupational health and safety of employees.

In addition, the drinking by others apart from employees and their co-workers (e.g. customers and clients) has important occupational health and safety implications. This is particularly the case for workplaces where alcohol is sold or consumed (e.g. hotels) or which deal with clients with acute or chronic alcohol problems (e.g. hospitals and other health services).

3. Duty of care

Employers owe a duty of care to all workers. Only part of the impact of alcohol on work and workplaces is directly related to employees' alcohol consumption. Large numbers of employees (particularly in the health and hospitality services) were found to be exposed to intimidation, verbal abuse and violence as a result of intoxicated patients, clients, and customers. This was particularly prominent in the health and hospitality industries. Intervention strategies are needed to reduce the risk to which many workers are exposed.

A particular duty of care is owed to those workers who are adolescents or very young adults, as the evidence suggests that the culture of particular working environments is influential in shaping the drinking patterns of young people. The shaping of such patterns can be a potent factor in the development of either positive or negative drinking patterns.

A duty of care is also highlighted in relation to women, and especially young women, in regard to their alcohol use and the manner in which it may be adversely affected by workplace influences. This report highlights risky levels of alcohol use by employed women in general, and women in various occupational categories. Workplace drinking cultures appear to play a prominent role in the development of such risky patterns of consumption.

4. Workplace productivity

This report has highlighted the impact that high levels of risky drinking has on the workplace in terms of absenteeism and, to a lesser extent, working under the influence of alcohol. The data provided in this report will be valuable to assist employers to gauge the impact of risky drinking on workplace efficiency and productivity.

5. Efficacious and cost-effective workplace alcohol policies and interventions

This report underscores the need for the implementation of effective and appropriate workplace polices to address risky work-related drinking. Chapter 6 outlines the evidence base for low cost strategies that can be implemented with relative ease across all workplaces.

The potential for highly cost effective strategies to address risky drinking patterns via the workplace has been largely overlooked in Australia. Substantial potential exists to redress this and to fully utilise the workplace as an ideal location to implement primary and secondary prevention strategies. Within Australian workplaces, substantial occupational health, safety and welfare legislation and structures exist that can readily accommodate alcohol- and other drug-related interventions.

The positive impact of interventions of known efficacy for individual workers would be substantial. There would also be a significant knock-on effect on workplace productivity. Moreover, the theory of social contagion would suggest that any improvements to an individual worker's risky drinking patterns would also extend to positively impact on their families, friends and associates.

6. General Practitioners' role in identification and brief interventions

Given the high level of alcohol-related absenteeism among intermittent risky or high risk drinkers, it suggests that there is scope for better preparation of General Practitioners (GPs) in this regard. While many/most workers do not require sick leave certificates for a single day off work, there is nonetheless, a very high presentation of alcohol-related sicknesses to GPs on Monday mornings (as well as in other instances). The data provided in the report are some of the most definitive available, and will be useful to underscore the potential role for GPs and early interventions.

7. Workplace culture

Policy and practice measures need to incorporate a broader perspective to reduce alcohol-related harm in the workplace. Interventions that integrate policy, treatment and prevention strategies and target workplace culture to influence behaviour are more likely to be effective in reducing alcohol-related harm. Addressing issues related to the culture of drinking within a working environment may also contribute to the reduction in the uptake of risky patterns of drinking by young Australians who have recently joined the workplace. These are an especially vulnerable group who, with an increase in expendable income, are subject to strong behaviour-shaping influences such as those found in the workplace.

An implication of this cultural approach and of the evidence concerning infrequent high consumption and the impact of customer and client drinking, is that approaches to managing or reducing adverse workplace consequences that focus solely on preventing intoxication while working (e.g. through regulatory measures, testing, etc) will overlook much, perhaps most of the problem.

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Appendix A

Assessment of design effects and clustering in the 2001 NDSHS

We were assisted in investigating clustering in the NDSHS by Professor David Steel, University of Wollongong, with whom we consulted.

The survey data, as supplied to us, did not include a single data item whose values reflect clustering as it applies to each record in the file. We made a Primary Sampling Unit (PSU) variable that should do so, as follows. Each record based on CATI collection was assigned a unique value. Each record based on the drop and collect method as applied outside capital cities was assigned the SLA of the respondent's address. All remaining records (i.e. those for the drop and collect method in capital cities, and all face to face interviews) were assigned a values specific to the CCD of the respondent's address. The survey data file did not contain a CCD variable, but it did contain a variable called 'standard error calculating unit' (SECU), from which we could obtain necessary CCD information. The SECU is not documented in the NDSHS technical report, but we were advised that it groups respondents by CCD, except for those in the CATI sample (Mark Cooper-Stanbury, personal communication, October 2005).

We used this derived variable to represent the PSUs of the survey in exploratory analyses designed to assess the impact of survey design effect on variance estimates (i.e. on the width of confidence intervals) for values typical of those presented in Chapter 3. For comparison, we did similar analyses using SLA and SECU to represent PSU, and without allowing for clustering.

Our expectations were (i) that analyses taking account of clustering would show wider confidence intervals than when analysed without allowing for clustering; and (ii) that estimates of survey design effect based on the theoretically correct PSU variable, constructed as described above, would lie between those based on SLA and those based on SECU.

In practice, we found small and cell-specific variation in estimation of variance when allowing for clustering using the theoretically optimal PSU variable. Variance for cells in table margins generally showed changes in the expected direction, but the changes were small (generally widening confidence intervals by a few percent). As expected, average design effect due to clustering on variance for cells in the body of tables was smaller than that for cells in table margins, though for some cells variance increased when clustering was allowed for, while for others it decreased. Estimates of survey design effect of clustering, based on the theoretically correct PSU variable, were generally smaller than those based on either the SLA or SECU, an unexpected finding.

Although the NDSHS sample design embodies an appreciable degree of clustering, most values for which we have reported CIs refer to quite small subsets of total survey observations, generally fewer than 10%. Consequently, the mean number of survey observations per PSU is considerably lower for the data that we have reported than for the total survey, resulting in smaller design effects of clustering. Where the average effect of clustering on cells within tables is small, then so should be the effect of clustering on tests of independence for those tables (i.e. p-values).

Reasons for the unexpected effect of the theoretically correct PSU variable in relation to the effects of using SLA and SECU to allow for clustering remain uncertain, and cast some doubt on whether the available data permit optimal allowance for clustering.

We opted to present variance estimates in Chapter 3 and Appendix B that are based on an analysis that does not allow for clustering.

For most tables in Chapter 3 and Appendix B, allowing for clustering would have a small effect on variance. Considering, for example, the part of Table B1 referring to males, allowing for clustering (in addition to stratification and weighting) can be expected to increase the width of CIs by an average of about 5% for margin cells and 1% for body cells. The effect on the F-statistic for independence is about 2%.

The effect of clustering is greatest for Table 3.4 (consumption profiles by states or territory of residence), because it refers to a relatively large subset of survey observations and its row dimension is part of the sample design. In this instance, allowing for clustering can be expected to increase the width of margin cell CIs by an average of about 9% for the short-term risk category and 11% for long-term risk, and for about 7% and 2%, respectively, for body cells. Allowing for clustering will reduce the F-statistic for independence by about 16%, resulting in a change in the p-value from 0.025 to 0.060.

Based on this analysis, we conclude that the effect of clustering in the design of the NDSHS is unlikely to result in more than about a 10% increase in the width of CIs for any of the reported marginal cells of tables, or in the average for body cells for a table (though change is larger for some individual body cells), and less than this for most reported values. Additional variance of this degree would not alter any of the inferences presented in this report, except for one inference concerning Table 3.4 (see footnote on page 36).

It is important to note that the approach taken to dealing with clustering has no effect on point estimates, only on the variance of the point estimates.

Appendix B

Table B1: Age and gender by short-term risk category for all employed respondents

Age	n unweighted (n weighted)	Abstainers* (95% CI)	Low risk (95%CI)	Short-term risk (risky and high risk combined)** At least yearly (95%CI)	At least monthly (95%CI)	At least weekly (95%CI)	Total
				MALES			
14–19	224 (201,894)	11.1% (7.4%–16.2%)	25.0% (18.9%–32.3%)	18.6% (13.2%–25.7%)	30.6% (23.9%–38.2%)	14.7% (10.2%–20.7%)	100%
20–29	1,230 (946,561)	6.9% (5.3%–8.9%)	28.7% (25.8%–31.9%)	22.7% (19.9%–25.6%)	28.0% (25.1%–31.0%)	13.8% (11.6%–16.3%)	100%
30–39	1,921 (1,248,934)	8.0% (6.7%–9.7%)	40.0% 37.4%–42.7%)	24.1% (21.9%–26.3%)	20.6% (18.6%–22.8%)	7.3% (6.0%–8.7%)	100%
40–49	1,792 (1,211,441)	10.4% (8.8%–12.2%)	51.3% (48.6%–54.0%)	18.0% (16.0%–20.1%)	13.7% (11.9%–15.7%)	6.7% (5.4%–8.2%)	100%
50–59	1,342 (888,990)	10.0% (8.2%–12.1%)	60.0% (56.8%–63.2%)	13.1% (11.0%–15.4%)	9.2% (7.5%–11.2%)	7.7% (6.2%–9.6%)	100%
60+	389 (214,816)	13.1% (9.8%–17.3%)	68.1% (62.7%–73.1%)	9.0% (6.2%–13.0%)	4.6% (2.8%–7.6%)	5.2% (3.1%–8.5%)	100%
Total	**6,898 (4,712,636)**	**9.1% (8.3%–10.0%)**	**45.1% (43.7%–46.5%)**	**19.2% (18.1%–20.3%)**	**17.9% (16.8%–19.0%)**	**8.7% (8.0%–9.6%)**	**100%**
				FEMALES			
14–19	193 (140,271)	12.0% (7.6%–18.4%)	23.3% (17.0%–30.9%)	11.2% (7.2%–17.0%)	29.0% (22.2%–36.8%)	24.6% (17.5%–33.3%)	100%
20–29	1,388 (719,331)	7.5% (6.0%–9.5%)	30.5% (27.7%–33.4%)	21.6% (19.2%–24.3%)	30.2% (27.4%–33.1%)	10.2% (8.4%–12.3%)	100%
30–39	1,894 (848,636)	12.6% (10.9%–14.6%)	44.6% (42.0%–47.3%)	22.2% (20.1%–24.4%)	15.9% (14.0%–17.9%)	4.7% (3.8%–5.9%)	100%
40–49	1,765 (940,714)	12.5% (10.8%–14.6%)	57.2% (54.4%–59.8%)	16.0% (14.1%–18.1%)	9.6% (8.1%–11.2%)	4.7% (3.7%–6.0%)	100%
50–59	1,229 (631,001)	15.5% (13.3%–18.1%)	65.3% (62.0%–68.4%)	10.4% (8.6%–12.6%)	5.0% (3.7%–6.5%)	3.8% (2.7%–5.3%)	100%
60+	213 (135,341)	24.8% (18.6%–32.3%)	66.1% (58.3%–73.0%)	3.5% (1.7%–6.9%)	4.0% (1.8%–8.5%)	1.6% (0.6%–4.6%)	100%
Total	**6,682 (3,415,293)**	**12.5% (11.6%–13.5%)**	**48.9% (47.5%–50.3%)**	**17.0% (16.0%–18.1%)**	**15.2% (14.2%–16.2%)**	**6.4% (5.7%–7.2%)**	**100%**
				PERSONS			
14–19	417 (342,166)	11.5% (8.5%–15.3%)	24.3% (19.7%–29.5%)	15.6% (11.8%–20.3%)	29.9% (25.0%–35.4%)	18.8% (14.6%–23.7%)	100%
20–29	2,618 (1,665,891)	7.2% (6.0%–8.5%)	29.5% (27.4%–31.7%)	22.2% (20.3%–24.2%)	28.9% (26.9%–31.0%)	12.2% (10.7%–13.9%)	100%
30–39	3,815 (2,097,570)	9.9% (8.8%–11.1%)	41.9% (40.0%–43.8%)	23.3% (21.8%–24.9%)	18.7% (17.2%–20.2%)	6.2% (5.4%–7.2%)	100%
40–49	3,557 (2,152,154)	11.3% (10.1%–12.7%)	53.9% (51.9%–55.8%)	17.1% (15.7%–18.6%)	11.9% (10.7%–13.2%)	5.8% (5.0%–6.8%)	100%
50–59	2,571 (1,519,991)	12.3% (10.8%–13.9%)	62.2% (59.9%–64.5%)	12.0% (10.5%–13.6%)	7.4% (6.3%–8.8%)	6.1% (5.1%–7.4%)	100%
60+	602 (350,157)	17.6% (14.4%–21.4%)	67.3% (62.9%–71.4%)	6.9% (4.9%–9.6%)	4.4% (2.9%–6.7%)	3.8% (2.4%–6.0%)	100%
Total	**13,580 (8,127,929)**	**10.6% (9.9%–11.2%)**	**46.7% (45.7%–47.7%)**	**18.3% (17.5%–19.1%)**	**16.7% (16.0%–17.5%)**	**7.8% (7.2%–8.3%)**	**100%**

*Had not consumed alcohol in the last 12 months. **Categories (at least yearly, at least monthy, at least weekly) are mutually exclusive.

Table B2: Age and gender by long-term risk category for all employed respondents

Age	n unweighted (n weighted)	Abstainers* (95% CI)	Low risk (95%CI)	Risky (95%CI)	High risk (95%CI)	Total
			MALES			
14–19	224 (201,894)	11.1% (7.4%–16.2%)	73.0% (66.0%–78.9%)	12.4% (8.4%–18.0%)	3.6% (1.6%–7.6%)	100%
20–29	1,230 (946,561)	6.9% (5.3%–8.9%)	79.1% (76.2%–81.7%)	9.5% (7.8%–11.7%)	4.5% (3.3%–6.2%)	100%
30–39	1,921 (1,248,934)	8.0% (6.7%–9.7%)	84.0% (81.9%–85.8%)	5.3% (4.2%–6.5%)	2.7% (2.0%–3.8%)	100%
40–49	1,792 (1,211,441)	10.4% (8.8%–12.2%)	80.8% (78.5%–82.9%)	6.3% (5.1%–7.7%)	2.5% (1.8%–3.5%)	100%
50–59	1,342 (888,990)	10.0% (8.2%–12.1%)	78.8% (76.0%–81.3%)	7.4% (5.8%–9.3%)	3.9% (2.9%–5.3%)	100%
60+	389 (214,816)	13.1% (9.8%–17.3%)	77.5% (72.4%–81.8%)	6.1% (3.9%–9.4%)	3.3% (1.7%–6.5%)	100%
Total	**6,898 (4,712,636)**	**9.1% (8.3%–10.0%)**	**80.4% (79.3%–81.5%)**	**7.1% (6.4%–7.9%)**	**3.3% (2.9%–3.9%)**	**100%**
			FEMALES			
14–19	193 (140,271)	12.0% (7.6%–18.4%)	60.4% (51.7%–68.4%)	18.1% (12.4%–25.6%)	9.5% (5.0%–17.5%)	100%
20–29	1,388 (719,331)	7.5% (6.0%–9.5%)	75.4% (72.5%–78.1%)	12.5% (10.5%–14.8%)	4.5% (3.4%–6.1%)	100%
30–39	1,894 (848,636)	12.6% (10.9%–14.6%)	77.6% (75.2%–79.8%)	8.2% (6.8%–9.7%)	1.7% (1.1%–2.4%)	100%
40–49	1,765 (940,714)	12.5% (10.8%–14.6%)	77.7% (75.3%–79.9%)	8.0% (6.7%–9.5%)	1.8% (1.2%–2.7%)	100%
50–59	1,229 (631,001)	15.5% (13.3%–18.1%)	75.9% (72.9%–78.6%)	6.8% (5.4%–8.6%)	1.7% (1.0%–2.9%)	100%
60+	213 (135,341)	24.8% (18.6%–32.3%)	68.8% (61.1%–75.6%)	6.1% (3.4%–10.6%)	0.3% (0.0%–2.3%)	100%
Total	**6,682 (3,415,293)**	**12.5% (11.6%–13.5%)**	**75.8% (74.5%–77.0%)**	**9.1% (8.3%–10.0%)**	**2.6% (2.1%–3.1%)**	**100%**
			PERSONS			
14–19	417 (342,166)	11.5% (8.5%–15.3%)	67.8% (62.3%–72.8%)	14.7% (11.2%–19.1%)	6.0% (3.6%–9.8%)	100%
20–29	2,618 (1,665,891)	7.2% (6.0%–8.5%)	77.5% (75.5%–79.4%)	10.8% (9.4%–12.3%)	4.5% (3.6%–5.6%)	100%
30–39	3,815 (2,097,570)	9.9% (8.8%–11.1%)	81.4% (79.8%–82.8%)	6.4% (5.6%–7.4%)	2.3% (1.8%–3.0%)	100%
40–49	3,557 (2,152,154)	11.3% (10.1%–12.7%)	79.4% (77.8%–81.0%)	7.0% (6.1%–8.0%)	2.2% (1.7%–2.8%)	100%
50–59	2,571 (1,519,991)	12.3% (10.8%–13.9%)	77.6% (75.6%–79.5%)	7.2% (6.0%–8.5%)	3.0% (2.3%–3.9%)	100%
60+	602 (350,157)	17.6% (14.4%–21.4%)	74.1% (69.9%–77.9%)	6.1% (4.3%–8.6%)	2.2% (1.1%–4.1%)	100%
Total	**13,580 (8,127,929)**	**10.6% (9.9%–11.2%)**	**78.5% (77.6%–79.3%)**	**8.0% (7.4%–8.5%)**	**3.0% (2.7%–3.4%)**	**100%**

*Had not consumed alcohol in the last 12 months.

Table B3: Age by short-term risk category (with separate risky and high risk levels) for male employed recent drinkers

			At least yearly*		At least monthly*		At least weekly*		
	n unweighted	Low risk	Risky	High risk	High risk	Risky	High risk	Risky	
Age	(n weighted)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	Total
14–19	193	28.1%	13.6%	7.4%	18.9%	15.5%	7.3%	9.3%	
	(179,521)	(21.3%–36.1%)	(8.5%–21.0%)	(4.2%–12.6%)	(13.2%–26.3%)	(10.4%–22.5%)	(4.2%–12.3%)	(5.6%–15.0%)	**100%**
20–29	1,148	30.9%	9.7%	14.6%	16.0%	14.0%	6.5%	8.3%	
	(881,320)	(27.7%–34.2%)	(7.8%–11.9%)	(12.3%–17.4%)	(13.7%–18.7%)	(11.8%–16.5%)	(5.0%–8.4%)	(6.5%–10.6%)	**100%**
30–39	1,774	43.5%	13.8%	12.4%	13.6%	8.8%	4.9%	3.0%	
	(1,148,471)	(40.8%–46.3%)	(12.0%–15.7%)	(10.7%–14.2%)	(11.8%–15.5%)	(7.4%–10.6%)	(3.9%–6.1%)	(2.1%–4.2%)	**100%**
40–49	1,622	57.3%	12.8%	7.3%	10.9%	4.4%	5.8%	1.6%	
	(1,085,595)	(54.4%–60.1%)	(11.0%–14.7%)	(6.0%–8.9%)	(9.2%–12.8%)	(3.3%–5.7%)	(4.6%–7.3%)	(1.1%–2.5%)	**100%**
50–59	1,210	66.7%	10.9%	3.6%	8.3%	1.9%	6.2%	2.4%	
	(800,508)	(63.4%–69.8%)	(8.9%–13.2%)	(2.6%–5.1%)	(6.7%–10.4%)	(1.2%–3.0%)	(4.8%–8.0%)	(1.5%–3.7%)	**100%**
60+	341	78.3%	8.1%	2.3%	4.5%	0.8%	5.4%	0.5%	
	(186,687)	(72.8%–83.0%)	(5.2%–12.3%)	(1.1%–5.0%)	(2.6%–7.7%)	(0.2%–3.2%)	(3.2%–9.1%)	(0.1%–3.5%)	**100%**
Total	**6,288**	**49.6%**	**11.9%**	**9.3%**	**12.3%**	**7.4%**	**5.8%**	**3.8%**	
	(4,282,102)	**(48.1%–51.1%)**	**(11.0%–12.9%)**	**(8.4%–10.2%)**	**(11.3%–13.3%)**	**(6.7%–8.2%)**	**(5.2%–6.5%)**	**(3.2%–4.4%)**	100%

*Categories (at least yearly, at least monthy, at least weekly) are mutually exclusive.

Table B4: Age by short-term risk category (with separate risky and high risk levels) for female employed recent drinkers

			At least yearly*		At least monthly*		At least weekly*		
	n unweighted	Low risk	Risky	High risk	High risk	Risky	High risk	Risky	
Age	(n weighted)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	Total
14–19	172	26.4%	6.2%	6.5%	17.9%	15.0%	12.5%	15.4%	
	(123,435)	(19.4%–34.9%)	(3.2%–11.8%)	(3.6%–11.5%)	(12.2%–25.3%)	(9.9%–22.3%)	(7.3%–20.6%)	(9.4%–24.2%)	**100%**
20–29	1,289	33.0%	12.0%	11.4%	16.4%	16.3%	5.9%	5.1%	
	(665,088)	(30.0%–36.1%)	(10.0%–14.3%)	(9.5%–13.6%)	(14.1%–18.9%)	(14.0%–18.8%)	(4.5%–7.6%)	(3.8%–6.8%)	**100%**
30–39	1,693	51.1%	14.8%	10.6%	11.5%	6.7%	3.5%	1.9%	
	(741,689)	(48.3%–53.8%)	(13.0%–16.8%)	(9.0%–12.4%)	(9.8%–13.4%)	(5.4%–8.3%)	(2.7%–4.6%)	(1.2%–2.8%)	**100%**
40–49	1,567	65.3%	13.1%	5.1%	8.3%	2.6%	3.8%	1.6%	
	(822,680)	(62.6%–68.0%)	(11.3%–15.2%)	(4.0%–6.6%)	(6.9%–10.0%)	(1.9%–3.7%)	(2.9%–5.1%)	(1.0%–2.5%)	**100%**
50–59	1,038	77.3%	9.9%	2.4%	4.1%	1.7%	3.5%	1.0%	
	(532,925)	(74.1%–80.1%)	(7.9%–12.3%)	(1.6%–3.8%)	(3.0%–5.8%)	(1.0%–2.9%)	(2.4%–5.1%)	(0.5%–2.0%)	**100%**
60+	164	87.9%	4.3%	0.3%	3.5%	1.8%	1.7%	0.4%	
	(101,766)	(81.2%–92.4%)	(2.1%–8.9%)	(0.0%–2.2%)	(1.3%–8.7%)	(0.5%–7.0%)	(0.5%–5.7%)	(0.1%–3.1%)	**100%**
Total	**5,923**	**55.9%**	**12.1%**	**7.3%**	**10.4%**	**7.0%**	**4.4%**	**2.9%**	
	(2,987,584)	**(54.4%–57.4%)**	**(11.2%–13.1%)**	**(6.6%–8.1%)**	**(9.5%–11.3%)**	**(6.3%–7.8%)**	**(3.9%–5.1%)**	**(2.4%–3.5%)**	100%

*Categories (at least yearly, at least monthy, at least weekly) are mutually exclusive.

Table B5: Industry classification by short-term risk category (with separate risky and high risk levels), for employed recent drinkers

Industry	n unweighted (n weighted)	Low risk (95%CI)	At least yearly* Risky (95%CI)	At least yearly* High risk (95%CI)	At least monthly* Risky (95%CI)	At least monthly* High risk (95%CI)	At least weekly* Risky (95%CI)	At least weekly* High risk (95%CI)	Total
Agriculture	273	51.4%	10.8%	5.6%	12.1%	6.8%	7.9%	5.3%	
	(193,456)	(44.4%–58.4%)	(7.1%–16.0%)	(3.3%–9.3%)	(8.2%–17.5%)	(4.2%–10.9%)	(4.9%–12.7%)	(2.5%–11.0%)	**100%**
Mining	127	42.6%	13.7%	10.4%	19.5%	4.4%	9.1%	0.3%	
	(67,186)	(32.4%–53.4%)	(7.5%–23.6%)	(5.6%–18.5%)	(12.8%–28.4%)	(1.7%–10.7%)	(4.1%–19.1%)	(0.0%–2.2%)	**100%**
Manufacturing	1,083	49.6%	13.1%	9.3%	10.8%	5.5%	6.5%	5.3%	
	(764,712)	(46.1%–53.0%)	(10.8%–15.7%)	(7.5%–11.5%)	(8.8%–13.2%)	(4.0%–7.3%)	(4.9%–8.4%)	(3.9%–7.2%)	**100%**
Construction	786	48.7%	11.0%	8.3%	12.4%	8.9%	6.3%	4.4%	
	(500,855)	(44.6%–52.9%)	(8.8%–13.8%)	(6.3%–10.9%)	(9.8%–15.6%)	(6.8%–11.6%)	(4.5%–8.7%)	(3.0%–6.4%)	**100%**
Wholesale	203	48.1%	12.5%	10.1%	13.9%	7.1%	4.2%	4.2%	
	(130,285)	(40.2%–56.1%)	(7.8%–19.3%)	(6.4%–15.6%)	(9.5%–20.0%)	(4.0%–12.3%)	(2.2%–7.9%)	(1.9%–8.9%)	**100%**
Retail	1,279	51.8%	8.2%	5.7%	13.4%	9.5%	6.2%	5.2%	
	(821,988)	(48.4%–55.1%)	(6.7%–10.1%)	(4.4%–7.3%)	(11.3%–15.9%)	(7.7%–11.6%)	(4.8%–8.0%)	(3.7%–7.2%)	**100%**
Hospitality	436	46.0%	9.3%	5.7%	10.5%	11.9%	8.8%	7.7%	
	(245,074)	(40.2%–52.0%)	(6.3%–13.4%)	(3.8%–8.7%)	(7.4%–14.8%)	(8.7%–16.3%)	(6.0%–12.6%)	(5.1%–11.6%)	**100%**
Transport	574	48.5%	12.3%	9.6%	12.0%	8.0%	5.7%	3.9%	
	(357,325)	(43.5%–53.4%)	(9.4%–15.9%)	(6.6%–13.9%)	(9.2%–15.5%)	(5.7%–11.2%)	(3.9%–8.4%)	(2.3%–6.6%)	**100%**
Financial	1,871	51.3%	11.8%	8.8%	11.9%	8.2%	5.1%	2.8%	
	(1,076,369)	(48.6%–53.9%)	(10.2%–13.7%)	(7.4%–10.5%)	(10.3%–13.7%)	(6.8%–9.9%)	(4.1%–6.4%)	(2.0%–3.9%)	**100%**
Education	1,000	65.6%	12.3%	4.5%	10.0%	3.4%	3.2%	1.1%	
	(553,698)	(61.9%–69.0%)	(10.0%–14.9%)	(3.2%–6.3%)	(8.0%–12.4%)	(2.3%–5.0%)	(2.2%–4.7%)	(0.5%–2.2%)	**100%**
Admin and Defence	752	53.4%	12.4%	9.4%	12.3%	5.0%	5.6%	2.0%	
	(321,680)	(48.6%–58.1%)	(9.8%–15.5%)	(7.0%–12.5%)	(9.1%–16.3%)	(3.4%–7.2%)	(3.6%–8.7%)	(1.0%–4.1%)	**100%**
Services	2,234	57.4%	12.4%	8.1%	9.9%	5.2%	4.7%	2.3%	
	(1,188,199)	(55.0%–59.9%)	(10.9%–14.1%)	(6.9%–9.5%)	(8.5%–11.4%)	(4.2%–6.4%)	(3.7%–5.9%)	(1.7%–3.3%)	**100%**
Total	**10,618**	**53.0%**	**11.6%**	**7.8%**	**11.5%**	**6.9%**	**5.6%**	**3.6%**	
	(6,220,827)	**(51.8%–54.1%)**	**(10.8%–12.3%)**	**(7.2%–8.4%)**	**(10.8%–12.3%)**	**(6.4%–7.6%)**	**(5.1%–6.2%)**	**(3.2%–4.1%)**	**100%**

*Categories (at least yearly, at least monthy, at least weekly) are mutually exclusive.

Table B6: Occupation classification by short-term risk category (with separate risky and high risk levels) for employed recent drinkers

			At least yearly*		At least monthly*		At least weekly*		
	n unweighted	Low risk	Risky	High risk	Risky	High risk	Risky	High risk	
Occupation	(n weighted)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	(95%CI)	Total
Managers	1,326	52.3%	13.4%	7.9%	12.9%	6.5%	4.8%	2.2%	
	(778,316)	(49.1%–55.5%)	(11.4%–15.7%)	(6.4%–9.8%)	(10.9%–15.3%)	(5.1%–8.3%)	(3.5%–6.4%)	(1.3%–3.5%)	**100%**
Profess'ls	3,615	56.5%	13.4%	7.9%	10.9%	5.1%	4.5%	1.6%	
	(1,947,715)	(54.5%–58.4%)	(12.2%–14.8%)	(6.9%–9.1%)	(9.8%–12.2%)	(4.3%–6.1%)	(3.8%–5.4%)	(1.2%–2.2%)	**100%**
Trades	879	44.6%	11.6%	8.1%	12.8%	8.8%	7.4%	6.6%	
persons	(613,943)	(40.7%–48.6%)	(9.3%–14.4%)	(6.3%–10.5%)	(10.3%–15.8%)	(6.8%–11.4%)	(5.6%–9.6%)	(4.8%–9.1%)	**100%**
Skilled workers	3,073	53.9%	9.9%	7.2%	11.5%	7.9%	6.0%	3.6%	
	(1,788,252)	(51.8%–56.1%)	(8.7%–11.2%)	(6.2%–8.5%)	(10.2%–12.9%)	(6.8%–9.1%)	(5.0%–7.0%)	(2.9%–4.5%)	**100%**
Unskilled workers	1,650	50.3%	8.7%	8.1%	11.4%	8.1%	6.8%	6.7%	
	(1,055,035)	(47.4%–53.1%)	(7.2%–10.5%)	(6.6%–9.9%)	(9.7%–13.3%)	(6.7%–9.8%)	(5.4%–8.4%)	(5.2%–8.5%)	**100%**
Total	**10,543**	**53.0%**	**11.4%**	**7.8%**	**11.6%**	**7.0%**	**5.6%**	**3.6%**	
	(6,183,261)	**(51.8%–54.1%)**	**(10.7%–12.2%)**	**(7.2%–8.4%)**	**(10.9%–12.4%)**	**(6.4%–7.6%)**	**(5.1%–6.2%)**	**(3.2%–4.1%)**	**100%**

*Categories (at least yearly, at least monthy, at least weekly) are mutually exclusive.

Table B7: Attributable proportions for alcohol, Australia by condition, age group and sex

		Age group												
		0	0–9	0–14	1–14	10–14	15–29	15–64	30–44	45–59	60–74	60+	65+	75+
acute pancreatitis	Females	.	.	0	.	.	0.263	.	0.263	0.263	0.263	.	.	0.263
	Males	.	.	0	.	.	0.263	.	0.263	0.263	0.263	.	.	0.263
alcoholic psychosis	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcohol abuse	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcohol dependence	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcoholic cardiomyopathy	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcoholic gastritis	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcoholic liver cirrhosis	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcoholic pancreatitis	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcoholic polyneuropathy	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
alcohol poisoning	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
aspiration	Females	.	.	1	.	.	1	.	1	1	1	.	.	1
	Males	.	.	1	.	.	1	.	1	1	1	.	.	1
assault	Females	.	.	0.500	.	.	0.500	.	0.500	0.500	0.500	.	.	0.500
	Males	.	.	0.500	.	.	0.500	.	0.500	0.500	0.500	.	.	0.500
child abuse	Females	.	.	0.177	.	.	0	.	0	0	0	.	.	0
	Males	.	.	0.177	.	.	0	.	0	0	0	.	.	0
cholelithiasis	Females	.	.	0.000	.	.	-0.214	.	-0.198	-0.176	-0.182	.	.	-0.124
	Males	.	.	0.000	.	.	-0.223	.	-0.220	-0.219	-0.198	.	.	-0.161

continued

Table B7 continued: Attributable proportions for alcohol, Australia by condition, age group and sex

		Age group												
		0	0–9	0–14	1–14	10–14	15–29	15–64	30–44	45–59	60–74	60+	65+	75+
chronic pancreatitis	Females	.	.	0	.	.	0.856	.	0.856	0.856	0.856	.	.	0.856
	Males	.	.	0	.	.	0.856	.	0.856	0.856	0.856	.	.	0.856
drowning	Females	.	0	.	.	0.034	0.347	.	0.530	0.450	.	0.337	.	.
	Males	.	0	.	.	0.034	0.347	.	0.530	0.450	.	0.337	.	.
epilepsy	Females	.	.	0	.	.	0.166	.	0.166	0.166	0.166	.	.	0.166
	Males	.	.	0	.	.	0.166	.	0.166	0.166	0.166	.	.	0.166
falls	Females	.	.	0	.	.	.	0.130	.	.	.	.	0.037	.
	Males	.	.	0	.	.	.	0.206	.	.	.	.	0.112	.
female breast cancer	Females	.	.	0	.	.	0.141	.	0.126	0.116	0.116	.	.	0.082
	Males	.	.	0	.	.	0	.	0	0	0	.	.	0
fire injuries	Females	.	.	0	.	.	0.470	.	0.470	0.470	0.470	.	.	0.470
	Males	.	.	0	.	.	0.470	.	0.470	0.470	0.470	.	.	0.470
gastro-oesophageal haemorrhage	Females	.	.	0	.	.	0.500	.	0.500	0.500	0.500	.	.	0.500
	Males	.	.	0	.	.	0.500	.	0.500	0.500	0.500	.	.	0.500
haemorrhagic stroke	Females	.	.	0	.	.	0.010	.	-0.243	-0.206	-0.303	.	.	-0.304
	Males	.	.	0	.	.	0.268	.	0.252	0.257	0.239	.	.	0.193
heart failure	Females	.	.	0	.	.	0	.	0	0	0	.	.	0
	Males	.	.	0	.	.	0	.	0	0	0	.	.	0
hypertension	Females	.	.	0	.	.	-0.034	.	-0.082	-0.072	-0.093	.	.	-0.084
	Males	.	.	0	.	.	0.091	.	0.072	0.081	0.072	.	.	0.037
ischaemic heart disease	Females	.	.	0	.	.	-0.165	.	-0.172	-0.152	-0.164	.	.	-0.119
	Males	.	.	0	.	.	-0.178	.	-0.188	-0.180	-0.166	.	.	-0.148
ischaemic stroke	Females	.	.	0	.	.	-0.545	.	-0.609	-0.517	-0.582	.	.	-0.390
	Males	.	.	0	.	.	0.015	.	-0.006	0.004	0.000	.	.	-0.023
laryngeal cancer	Females	.	.	0	.	.	0.511	.	0.473	0.449	0.447	.	.	0.352
	Males	.	.	0	.	.	0.511	.	0.494	0.499	0.475	.	.	0.414
liver cancer	Females	.	.	0	.	.	0.390	.	0.347	0.325	0.319	.	.	0.234
	Males	.	.	0	.	.	0.386	.	0.364	0.371	0.349	.	.	0.288

continued

Table B7 continued: Attributable proportions for alcohol, Australia by condition, age group and sex

		Age group											
		0	0–9	0–14	1–14	10–14	15–29	15–64	30–44	45–59	60–74	60+	65+	75+
low birth weight	Females	-0.023	.	.	0	.	-0.023	.	-0.023	-0.023	0	.	.	0
	Males	-0.023	.	.	0	.	0	.	0	0	0	.	.	0
MVTA except pedestrian	Females	.	.	0.107	.	.	0.107	.	0.107	0.107	0.107	.	.	0.107
	Males	.	.	0.328	.	.	0.328	.	0.328	0.328	0.328	.	.	0.328
MVTA pedestrian	Females	.	.	0.170	.	.	0.170	.	0.170	0.170	0.170	.	.	0.170
	Males	.	.	0	.	.	0.400	.	0.400	0.400	0.400	.	.	0.400
occupational machine injuries	Females	.	.	0	.	.	0.078	.	0.078	0.078	0.078	.	.	0.078
	Males	.	.	0	.	.	0.078	.	0.078	0.078	0.078	.	.	0.078
oesophageal cancer	Females	.	.	0	.	.	0.452	.	0.429	0.405	0.410	.	.	0.329
	Males	.	.	0	.	.	0.461	.	0.455	0.455	0.434	.	.	0.383
oesophageal varices	Females	.	.	0	.	.	0.600	.	0.496	0.474	0.429	.	.	0.264
	Males	.	.	0	.	.	0.573	.	0.506	0.535	0.503	.	.	0.364
oropharyngeal cancer	Females	.	.	0	.	.	0.371	.	0.323	0.302	0.299	.	.	0.219
	Males	.	.	0	.	.	0.376	.	0.358	0.367	0.343	.	.	0.271
psoriasis	Females	.	.	0	.	.	0.335	.	0.330	0.308	0.319	.	.	0.256
	Males	.	.	0	.	.	0.347	.	0.351	0.347	0.329	.	.	0.299
spontaneous abortion	Females	.	.	0	.	.	0.045	.	0.045	0.045	0	.	.	0
	Males	.	.	0	.	.	0	.	0	0	0	.	.	0
suicide	Females	.	.	0	.	.	0.323	.	0.296	0.276	0.275	.	.	0.206
	Males	.	.	0	.	.	0.324	.	0.312	0.314	0.295	.	.	0.251
supraventricular cardiac dysrhythmias	Females	.	.	0	.	.	0.345	.	0.329	0.307	0.311	.	.	0.242
	Males	.	.	0	.	.	0.350	.	0.345	0.344	0.325	.	.	0.287
unspecified liver cirrhosis	Females	.	.	0	.	.	0	.	0	0	0	.	.	0
	Males	.	.	0	.	.	0	.	0	0	0	.	.	0
unspecified stroke	Females	.	.	0	.	.	-0.434	.	-0.536	-0.455	-0.526	.	.	-0.373
	Males	.	.	0	.	.	0.066	.	0.045	0.055	0.048	.	.	0.020

Source: These are the proportions used in Chikritzhs, Unwin et al. (2002b). They were supplied in electronic form for use in this project by Tanya Chikritzhs, NDRI.

INJURY RESEARCH & STATISTICS

Little is known regarding the alcohol consumption patterns of the Australian workforce and the impact these patterns have on workplace safety, workplace productivity, and worker well-being. This report addresses this lack of knowledge and represents one of the most comprehensive examinations of the role of alcohol in the Australian workplace undertaken to date.

Current data and research literature is examined to provide a comprehensive overview of the relationship between the workplace and alcohol use, the alcohol consumption patterns of the Australian workforce, and evidence of the extent of alcohol-related injury in the workplace. A focus was placed on the concept of *workplace culture*, which allows for innovative, broader and more flexible approaches to work-related alcohol use. The contents of this report provide an essential building block upon which to develop relevant policies and interventions related to workplace alcohol consumption.

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