

National Centre for Education and Training on Addiction (NCETA)

**Workplace mental illness and substance use
disorders in male-dominated industries:
A Systematic Literature Review**

Ann M Roche
Jane Fischer
Ken Pidd
Nicole Lee
Samantha Battams
Roger Nicholas

December 2012



NCETA

*Australia's National Research Centre
on AOD Workforce Development*



Flinders
UNIVERSITY

Acknowledgements

NCETA would like to acknowledge the support of beyondblue in funding this review. Research assistance was provided by Anje Scarfe, Vinita Duraisingam, Jacqui Cameron and Suzana Freegard and we are indebted to the important contributions they have made to this project. We are particularly indebted to Tania Steenson for the final preparation of the report, and also the administrative support provided by Tarryn Gagliardi.

NCETA

The National Centre for Education and Training on Addiction is an internationally recognised research centre that works as a catalyst for change in the alcohol and other drugs (AOD) field.

Our mission is to advance the capacity of organisations and workers to respond to alcohol- and drug-related problems. Our core business is the promotion of workforce development (WFD) principles, research and evaluation of effective practices; investigating the prevalence and effect of alcohol and other drug use in society; and the development and evaluation of prevention and intervention programs, policy and resources for workplaces and organisations.

NCETA is based at Flinders University and is a collaboration between the University, the Australian Government Department of Health and Ageing and the South Australia Department of Health.

Visit: www.nceta.flinders.edu.au

**Workplace mental illness and substance use
disorders in male-dominated industries:
A Systematic Literature Review**

Ann M Roche

Jane Fischer

Ken Pidd

Nicole Lee

Samantha Battams

Roger Nicholas

NCETA

December 2012

Overview

Beyondblue commissioned NCETA to undertake a systematic review of anxiety, depression and substance use disorders in Australian male-dominated industries. Male-dominated industries were defined as those that had a majority of male workers and comprised:

- Agriculture, forestry and fishing
- Building and construction
- Manufacturing
- Mining
- Transport, postal and warehousing
- Utilities.

Research on prevalence, awareness and attitudes, help-seeking, risk factors, and interventions was examined. Only 135 research articles were located and gaps documented.

Key findings from international and very limited Australian research indicated:

- overall, mental health disorders were not elevated in male dominated industries
- construction and mining industry workers may have elevated prevalence rates of depression and anxiety. Prevalence of mental health disorders varied substantially between occupational groups within the same industry
- some non-male-dominated industries/occupations may have higher mental health disorder prevalence rates than male-dominated industries/occupations
- suicide rates appear higher in some male-dominated industries such as agriculture, transport and construction
- a higher prevalence of problematic alcohol and other drug use exists among workers in male-dominated industries.

No studies were found that examined **awareness levels and attitudes** towards mental health and substance use disorders in male-dominated industries and there was limited research on **help-seeking** in male-dominated industries.

Risk factors for mental health and substance use disorders included:

- lack of supervisor support
- poor working conditions; job demands, job overload, job insecurity, work-life imbalance
- work setting factors conducive to risky alcohol or drug use.

Effective interventions were limited. Those that showed promise were largely multi-modal and included, alcohol screening, social support, peer interventions, workload adjustment, improved work environments, and policy implementation.

Gaps in the literature identified through this review included:

- consistent prevalence measures
- levels of workplace awareness and attitudes
- aetiological, causal or contributory factors
- effective measures to promote help-seeking
- characteristics of effective interventions.

Scope exists to extrapolate findings from related work on anxiety, depression and substance disorders, help-seeking behaviours, attitudes, risk factors, and interventions and build on initiatives occupational health and safety awareness in male-dominated industries to implement interventions.

Future research could involve secondary analyses of Australian national datasets and prospective longitudinal studies, primary cohort studies, and well controlled intervention studies. An opportunity exists to identify a common set of measures from the current knowledge base, and evaluate their implementation.

Contents

EXECUTIVE SUMMARY	9
1 INTRODUCTION	18
1.1 Mental Health Disorders and the Workplace	18
1.2 Substance Use and the Workforce.....	19
1.3 Work Stress and the Work Environment	21
1.4 Male-Dominated Industries	22
2 METHOD	23
2.1 Inclusion and Exclusion Criteria	23
2.2 Search Strategy	24
2.3 Screening, Extraction and Assessment.....	25
2.4 Data Analysis.....	27
3 FINDINGS	29
3.1 Prevalence.....	32
3.2 Awareness Levels and Attitudes	59
3.3 Risk Factors.....	59
3.4 Help-Seeking Behaviours and Barriers	67
3.5 Interventions	71
3.6 Gaps.....	75
4 DISCUSSION	77
4.1 Knowledge Translation and Dissemination	78
4.2 A Research Program	78
REFERENCES	80
APPENDIX A	
APPENDIX B	

Tables

Table 1	Prevalence of anxiety and depression disorders.....	12
Table 2	Proportions of Australian workers in select industries who drank at levels associated with single drinking occasion risk and lifetime risk, and who have used illicit drugs at least once in the last 12 months.....	13
Table 1.1	Proportions of Australian workers in select industries who drank at levels associated with single drinking occasion risk and lifetime risk, and who have used illicit drugs at least once in the last 12 months ¹	20
Table 1.2	Australian industries comprised of high proportions of male workers.....	22
Table 2.1	Initial inclusion and exclusion criteria.....	24
Table 2.2	Overview of the electronic databases searched in this systematic review	25
Table 2.3	Overview of the number of included and excluded articles	26
Table 2.4	NHMRC causal guidelines for levels of evidence and strength of recommendations	27
Table 3.1	Prevalence of mental health disorders in male-dominated industries	33
Table 3.2	Male and female prevalence rates for common mental disorders	40
Table 3.3	Prevalence of any work-related mental disorder by industry.....	41
Table 3.4	Australian and international prevalence of alcohol-related problems: selected comparisons	47
Table 3.5	Male and female prevalence rates for alcohol dependence	50
Table 3.6	Prevalence rates for alcohol dependence, using the CAGE	50
Table 3.7	Alcohol Abuse and dependence, lifetime prevalence rates.....	52
Table 3.8	Male and female crude prevalence rates for alcohol abuse.....	52
Table 3.9	Prevalence of problematic drinking, Level iii studies, using the AUDIT with ≥ 8 cut-off.....	54
Table 3.10	Prevalence of risky drinking in male-dominated industries (Level i evidence)	55
Table 3.11	Substance abuse and dependence, lifetime prevalence rates	57
Table 3.12	Proportion of employed respondents, 2004 NDSHS, who reported	58
Table 3.13	Twelve month rates of service use for mental health problems by mental disorder class	69
Table 3.14	Prevalence of service use among those with any 12 month DSM-IV alcohol use disorder in the 2007 MHWB survey	70
Table 4.1	Translating the evidence into practice: A public health approach.....	78
Table 4.2	A potential research program	79

Figures

Figure 2.1	Summary of Included and excluded articles	28
------------	---	----

MEASURES

Alcohol grams	10 grams is equivalent to one standard drink
AUDIT	Alcohol Use Disorders Identification Test. A score of ≥ 8 indicates a pattern of risky drinking/problematic drinking
CAGE	A test for Alcoholism, standing for: Cut Down, Annoyed By Criticism, Guilty About Drinking, Eye-opener Drinks. A score of ≥ 2 indicates alcohol dependence
CES-D	Centre for Epidemiologic Studies - Depression Scale
CIDI	The Composite International Diagnostic Interview
DASS	The Depression, Anxiety and Stress Scale
DAST	The Drug Abuse Screening Test
DSM-IV/III(R)	Diagnostic and Statistical Manual of Mental Disorders, IV indicates the fourth edition and III R indicates the third edition of the (revised) diagnostic manual
GHQ	General Health Questionnaire
HADS	The Hospital Anxiety and Depression Rating Scale
ICD9/10	International Classification of Diseases – 9/10
JSQ	Generic Job Stress Questionnaire
K10/K6	Kessler Psychological Distress Scale
MMPI	Minnesota Multiphasic Personality Inventory
PAI	Personality Assessment Inventory
PGWI	Psychological General Wellbeing Inventory
RCI-R	Revised Clinical Interview schedule
SMAST	Short Michigan Alcoholism Screening Test
Zung SDS	Zung Self-rated Depression Scale

ABBREVIATIONS

ABS	Australian Bureau of Statistics
ASCC	Australian Safety and Compensation Council
CI	Confidence Interval
COAG	Council of Australian Governments
EAP	Employee Assistance Program
HILDA	Household, Income and Labour Dynamics in Australia Survey
NCETA	National Centre for Education and Training on Addiction
NDSHS	National Drug Strategy Household Survey
NHMRC	National Health and Medical Research Council
NMHWB	National Mental Health and Wellbeing Survey
NIOSH	National Institute for Occupational Safety and Health
OR	Odds Ratio
SES	Socio-economic Status
RR	Relative Risk
WHO	World Health Organization

GLOSSARY OF TERMS¹

Term	Definition
Abuse of alcohol or other substances	'Psychoactive substance abuse' as defined in the DSM-111-R is 'a maladaptive pattern of use indicated by ... continued use despite knowledge of having a persistent or recurrent social, occupational, psychological or physical problem that is caused or exacerbated the use (or by) recurrent use in situations in which it is physically hazardous.' <i>WHO (2012) Lexicon of alcohol and drug terms.</i>
Alcohol dependence	Refers to 'a need for repeated doses of the drug to feel good or to avoid feeling bad.' <i>WHO (2012) Lexicon of alcohol and drug terms.</i>
Bias	Bias is a systematic deviation of a measurement from the 'true' value leading to either an over- or underestimation of the treatment effect. Bias can originate from many different sources, such as allocation of patients, measurement, interpretation, publication and review of data.
Case-control study	Patients with a certain outcome or disease and an appropriate group of controls without the outcome or disease are selected (usually with careful consideration of appropriate choice of controls, matching, etc.) And then information is obtained on whether the subjects have been exposed to the factor under investigation.
Clinical significance	A conclusion that an intervention has an effect of practical meaning to patients/community and health care providers.
Cohort study	Data are obtained from groups who have been exposed, or not exposed, to the new technology or factor of interest (e.g., from databases). Careful consideration is usually given to patient selection, choice of outcomes, appropriate controls, matching, etc. However, data on outcomes may be limited.
Comparative study	A study which includes a comparison or control group.
Confidence Interval (CI)	An interval within which the population parameter (the 'true' value) is expected to lie with a given degree of certainty (e.g., 95%).
Confounding	The measure of a treatment effect is distorted because of differences in variables between the treatment and control groups that are also related to the outcome. For example, if the treatment (or new intervention) is trialled in younger patients then it may appear to be more effective than the comparator, not because it is better, but because the younger patients had better outcomes.
Cross-sectional study	A study that examines the relationship between diseases (or other health related characteristics) and other variables of interest as they exist in a defined population at one particular time (i.e., exposure and outcomes are both measured at the same time).
Efficacy	The extent to which an intervention produces favourable outcomes under ideally controlled conditions such as in a randomised controlled trial.
Employment grade	Level of employment, rather than occupation category. The employment grade of civil servants was used to establish the social gradient effect in the Whitehall studies, see: http://www.ncbi.nlm.nih.gov/pubmed/744814 .
Evidence	Data about the effectiveness of a new treatment or intervention derived from studies comparing it with an appropriate alternative. Preferably the evidence is derived from a good quality randomised controlled trial, but it may not be.
Incidence	The number of new cases of a disease in a defined population, within a specified period of time.
Interventions (Public Health)	Refers to primary, secondary or tertiary level interventions to prevent health conditions arising (in the case of primary prevention) or mitigate the impact of having a mental health or substance abuse disorder (in the case of tertiary prevention).
Intervention (Study)	An intervention will generally be a therapeutic procedure such as treatment with a pharmaceutical agent, surgery, a dietary supplement, a dietary change or psychotherapy. Some other interventions are less obvious, such as early detection (screening), patient educational materials, or legislation. The key characteristic is that a person or their environment is manipulated in the hope of benefiting that person.

¹ Glasziou, P., Irwig, L., Bain, C., & Colditz, G. (2001). *Systematic reviews in health care. A practical guide.* Cambridge: Cambridge University Press.

Level of evidence	Study designs are often grouped into a hierarchy according to their validity, or degree to which they are not susceptible to bias. The hierarchy indicates which studies should be given most weight in an evaluation.
Male-dominated industry	<p>A “male-dominated” industry was defined as one in which there were an overwhelming number of male workers compared to female workers. The male-dominated industries of interest, as classified by the Australian and New Zealand Standard Industrial Classification (ANSIC 2006), were:</p> <ul style="list-style-type: none"> • Agriculture, Forestry and Fishing • Building and Construction • Manufacturing • Mining • Transport, Postal & Warehousing • Utilities
Observational studies	These are usually undertaken by investigators who are not involved in the clinical care of the patients being studied, and who are not using the technology under investigation in this group of patients.
Occupation	A person’s usual or principal work, especially as a means of earning a living
Odds Ratio (OR)	Ratio of the odds of the outcome in the treatment group to the corresponding odds in the control group.
Prevalence	The measure of the proportion of people in a population who have some attribute or disease at a given point in time or during some time period.
Problematic drinking	Drinking resulting in problems, individual or collective, health or social.’ <i>WHO (2012) Lexicon of alcohol and drug terms.</i>
P-Value	The probability (obtained from a statistical test) that the null hypothesis (that there is no treatment effect) is incorrectly rejected.
Randomised Controlled Trial (RCT)	An experimental comparison study in which participants are allocated to treatment/intervention or control/placebo groups using a random mechanism. Participants have an equal chance of being allocated to an intervention or control group and therefore allocation bias is eliminated.
Relative risk	Relative risk is the risk on an event (or of developing a disease) relative to exposure.
Substance use	Self-administration of a psychoactive substance.’ <i>WHO (2012) Lexicon of alcohol and drug terms.</i>
Social gradient	Refers to the different level of health according to socio-economic position; with the highest health status being at the highest socioeconomic level, whilst the lowest is at the lowest socioeconomic level, with health status varying according to each level of the socioeconomic spectrum.
Systematic review	The process of systematically locating, appraising and synthesising evidence from scientific studies.
Validity	<ul style="list-style-type: none"> • Of measurement: an expression of the degree to which a measurement measures what it purports to measure; it includes construct and content validity. • Of study: the degree to which the inferences drawn from the study are warranted when account is taken of the study methods, the representativeness of the study sample, and the nature of the population from which it is drawn (internal and external validity, applicability, generalisability).
Variance	A measure of the variation shown by a set of observations, defined by the sum of the squares of deviation from the mean, divided by the number of degrees of freedom in the set of observations.

EXECUTIVE SUMMARY

Scope of Project

This project involved a systematic review of the literature concerning anxiety, depression and substance use disorders in male-dominated industries. The research questions addressed are shown below, and pertained specifically to the clinical significance of these disorders.

Q1.	What are the prevalence rates of depression, anxiety and substance use disorders in male-dominated industries?
Q2.	What are the awareness levels and attitudes toward depression, anxiety and substance use disorders in male-dominated industries?
Q3.	What are the risk-factors for depression, anxiety and substance use disorders in male-dominated industries?
Q4.	What are the help-seeking behaviours and barriers for depression, anxiety and substance use disorders in male-dominated industries?
Q5.	What industry-specific interventions have been effective in addressing depression, anxiety and substance use disorders in the workplace?
Q6.	What are the evidence gaps related to work and depression, anxiety and substance use disorders in male-dominated industries?

A 'male-dominated' industry was defined as one in which there was a substantial majority of male workers compared to female workers. The male-dominated industries of interest, as classified by the Australian and New Zealand Standard Industrial Classification (ANSIC 2006), were:

- Agriculture, Forestry & Fishing
- Building & Construction
- Manufacturing
- Mining
- Transport, Postal & Warehousing
- Utilities.

Whilst there are large bodies of generic work on the prevalence of anxiety, depression and substance disorders, help-seeking behaviours, attitudes, risk factors, and related interventions, they were not the focus of this investigation. The focus here was exclusively on male-dominated industries.

Report Structure

This report presents the findings from the systematic review into 1) mental health disorders (depression and anxiety), and 2) substance use disorders in male-dominated industries. Chapter 1 contains an overview of salient background issues. The methods used in undertaking this review are outlined in Chapter 2. Chapter 3 presents the findings from the research questions. For each question, the evidence pertaining firstly to mental health and then substance use disorders is reported. The report concludes with Chapter 4 which discusses the meaning of the evidence and its implications for responding to depression, anxiety and substance use disorders in male-dominated industries in Australia.

Method

The review was conducted in accordance with NHMRC guidelines on undertaking a systematic review. Studies were included in the review if they were:

- Conducted in one of the nominated six male-dominated industries
- Measured clinically significant depression, anxiety and substance use
- Conducted in paid workplaces or with participants who were in paid work
- Primary studies in the English language.

Searches were undertaken of major electronic databases (CINAHL, Cochrane, Informat, PsycINFO, PubMed and Scopus), the grey literature and reference lists of retrieved papers from January 1990 to July 2012.

A total of 77,160 potential articles were located. After an initial screen using titles, abstracts, and where necessary the full article, 614 articles remained. They were then assessed for quality. Preference was given to higher quality studies and Australian studies wherever possible. This resulted in 135 articles being included in the analysis.

Key Findings

There is a dearth of research conducted within male-dominated industries that sheds light on the extent and nature of anxiety, depression and substance use disorders. In addition, little research evidence is available that could inform workplace interventions. Australian research was particularly lacking, but where possible in this review, Australian studies were weighted more heavily in the interpretation and recommendations for future programs, interventions and research.

Definitional and diagnostic issues surrounding mental health and substance misuse disorder problems also limit the capacity to make comparisons between studies and to extrapolate clear findings from the literature.

The lack of research in this area is at odds with:

- Increasing community concerns about mental health and substance misuse problems
- The growing understanding of the workplace as a potential source of ill health
- The potential of the workplace as a setting for health-related interventions.

Findings are presented for:

- Prevalence
- Awareness levels and attitudes
- Risk factors
- Help-seeking
- Interventions
- Gaps.

See Appendices A1-A4 for details and assessments of all articles included and excluded.

Mental Health Disorders

Australian research on the prevalence of mental health disorders among male-dominated industries was scarce. This limited the conclusions that could be drawn.

Available Australian research indicated that workers employed in the construction and mining industries may have elevated prevalence rates of depression and anxiety.

Variations between studies in diagnostic tools and screening measures, and differences in industry and occupational categories and definitions, made it difficult to draw definitive conclusions. Many studies failed to provide comparison data for total workforce populations or non-male-dominated industries/occupations, further limiting conclusions that could be drawn.

Mental health disorder prevalence rates varied between industry groups. Some male-dominated industries and occupations (e.g., construction and farming) had higher prevalence rates than non-male-dominated industries and occupations. The prevalence of mental health disorders also varied substantially between particular occupational groups (i.e., white and blue collar workers) within the same male-dominated industry.

Some non-male-dominated industries and occupations may have much higher mental health disorder prevalence rates than male-dominated industries and occupations. Women employed in some male-dominated industries may be more at risk of mental health disorders than males employed in male-dominated industries, or females employed in non-male-dominated industries.

The prevalence of mental health problems in male-dominated industries was assessed in three categories as shown in Table 1.

For other mental health disorders (excluding substance use) no Australian evidence was available. International evidence pointed to higher rates of 'other' mental health disorders for some male-dominated or manual professions (labourers, construction workers, manual workers), but highest rates were found in non-male-dominated professions.

Suicide

A detailed examination of differences in suicide rates between occupations was beyond the scope of the project. Nevertheless two studies showed a high incidence of suicide among male-dominated industries such as agriculture, transport and construction. One study demonstrated particularly high rates of suicide among young construction workers in Queensland.

Table 1. Prevalence of anxiety and depression disorders

Category		
A: Anxiety and depression <i>(assessed using clinical diagnostic tools)</i>	B: Anxiety or depression and other mental health disorders <i>(detected with validated screening instruments)</i>	C: Psychological wellbeing/distress <i>(assessed with validated screening instrument)</i>
Australian Studies		
No Australian clinical diagnostic evidence was found.	Mixed evidence. A lower rate was found among transport workers compared with a comparison group, while mining workers had substantially higher prevalence rates than the national population.	<ul style="list-style-type: none"> • Levels of psychological stress were lower in male-dominated occupations than other occupations. • Farmers had significantly lower levels of psychological distress than non-farmers. • Prevalence of psychological distress in male-dominated occupations was higher than the total workforce but lower than for some non-male dominated occupations.
International Studies		
Mixed evidence with no clear pattern for a higher prevalence of depression and anxiety among workers in male-dominated industries.	<p>Differences found according to occupational category. However, it is difficult to draw conclusions as:</p> <ul style="list-style-type: none"> • Differences in prevalence rates may not be significant • Prevalence rates were not compared with other industries or with the general population. 	<ul style="list-style-type: none"> • One study found higher rates of psychological stress among farmers compared to non-farmers • Another found higher rates of psychological distress among oil rig workers, but with no comparative group.

Substance Use Disorders

Problematic alcohol and other drug use

Higher levels of problematic alcohol and drug use were found among workers in male-dominated industries; reflecting general population patterns of alcohol and drug use among men and young male adults in particular. There is likely to be a complex interplay between the characteristics of individuals attracted to work in these male-dominated industries and the characteristics of the workplaces and work roles which contribute to higher levels of problematic alcohol and other drug use.

Alcohol

Of the 45 substance use studies examined, a general pattern emerged of higher levels of drinking and alcohol-related problems, including dependence and alcohol abuse, among various male-dominated industries. The industries with higher prevalence levels of alcohol-related problems varied but problems appeared to be more concentrated in the construction industry and among manual workers. Workers in manufacturing, mining, transportation and farming/forestry/fishing also featured among higher prevalence groups.

Different forms of problematic alcohol use were examined and key findings are presented in Table 2.

Table 2. Alcohol-related problems and disorders

Alcohol-Related Problems and Disorders				
Abuse	Dependence	Alcohol abuse and dependence combined	Problem drinking	Risky drinking
<p>International evidence points to higher rates (compared with the general population) among workers in:</p> <ul style="list-style-type: none"> • Manufacturing • Transportation • Construction. 	<p>International evidence points to higher than population average prevalence rates among:</p> <ul style="list-style-type: none"> • Male labourers • Male precision production/craft/repair workers • Male and female manual workers/trades workers • Male and female farmers • Male and female forestry and fishing industry workers • Male and female machine operators/assemblers. 	<p>International evidence suggests higher than average rates among workers in:</p> <ul style="list-style-type: none"> • Construction • Utilities • Manufacturing • Farming. 	<p>Australian and International evidence points to higher than average rates of problem drinking among workers in:</p> <ul style="list-style-type: none"> • Construction • Transportation • Forestry • Mining • Manufacturing • Transport. 	<p>Australian evidence points to a high prevalence of risky drinking among workers in:</p> <ul style="list-style-type: none"> • Mining • Construction • Transport • Farmers/forestry/fishing workers.

Substance use/dependence (drugs other than alcohol)

National Australian data on substance use in the last 12 months indicated workers in the construction industry appeared to have substantially higher levels of substance use than workers in other male-dominated industries or the Australian workforce overall.

Australian evidence concerning the high prevalence of abuse and dependence among construction workers was consistent with international evidence.

Awareness Levels and Attitudes

No evidence was located that specifically addressed awareness levels and attitudes towards mental health and substance use disorders in male-dominated industries. Consequently no conclusions could be drawn on the basis of currently available evidence. This is a clear gap in the research and it warrants attention and the development of a program of research specifically focussed on these issues.

Risk Factors

Similar risk factors were identified for both mental health and substance use disorders in male-dominated industries. These risk factors include:

- Work/life imbalance
- Working conditions, including excessive job demands, increased overtime, poor workplace supervision, employment changes
- Individual attitudes and expectations towards their work and workplace.

Help-Seeking Behaviours and Barriers

Little information was available concerning help-seeking in relation to mental health and substance misuse disorders among workers in male-dominated industries. Addressing this evidence gap warrants attention and the development of a program of research to address these issues.

The available international evidence suggests that, among male-dominated industries, those who are likely to seek help for anxiety and depression:

- had an awareness that others had noticed their ill-health and had suggested that they seek help
- had previously sought help for emotional problems
- had a reliance on trusted friends
- had noticed that their depression and anxiety had become more severe
- had had work difficulties, including work absenteeism and poor work performance evaluations
- were single, aged under 45 and living in a city.

No studies were located on help-seeking for substance use disorders in male-dominated industries.

Interventions

The studies identified were of variable quality. Most used a whole of workplace approach and implemented a menu of interventions. This made it difficult to determine whether individual components or the suite of intervention activities were required to achieve positive outcomes.

Interventions that appeared to be effective are included in the box below.

Effective interventions - anxiety and depression	Effective interventions - alcohol and other substance use disorders
<ul style="list-style-type: none"> • Information • Social support • Access to treatment and advice • Managerial education • Team based approaches to improving work environments • Addressing absenteeism • Addressing excessive workloads and providing relief periods from heavy workloads. 	<ul style="list-style-type: none"> • Screening for risky alcohol use, which may reduce alcohol consumption • Peer based workplace interventions aimed at changing attitudes to drinking by staff and management to reduce injury rates • Secondary prevention counselling for risky drinkers • Workplace policies on drug use, and Employee Assistance Program (EAP) services, which can reduce rates of injury.

Evidence Gaps

This review revealed the following gaps in the knowledge base available to inform responses to depression, anxiety and substance misuse problems in male-dominated industries.

Prevalence

Data concerning the prevalence of depression and anxiety in male-dominated industries is limited. It is unclear whether male-dominated industries have higher prevalence rates of these disorders than other industries. There is a need for better quality Australian data which examines the prevalence rates of mental health disorders in male-dominated industries.

Future studies should consider variations in prevalence by:

- Industry
- Gender
- Location (urban, regional, rural, remote)
- Work-related risk factors (e.g., job demand, job overload, job security)
- Negative life events (e.g., death of close relative or divorce).

Awareness Levels and Attitudes

The evidence base in regard to awareness and attitudes related to mental health and substance use issues in male-dominated industries was poor. Further research on awareness and attitudes towards mental health and substance use in male-dominated industries is needed.

Aetiological, Causal and Contributory Factors

A range of factors warrant further examination, including whether:

- working in select male-dominated industries independently predicts anxiety, depression and substance use disorders
- particular socio-demographic characteristics of workers attracted to working in male-dominated industries contribute to the likelihood of workers being more anxious, depressed or to using alcohol and other substances
- changing industry, or changing occupations within the same industry, alters the incidence of anxiety, depression, the use of alcohol and other substances
- different industries have different job demands for the same occupation
- job demands/overload and job insecurity differentially impact men and women
- work-home interference impacts anxiety and depression.

Effective Measures to Promote Help-Seeking

Help-seeking behaviours are critically important to improvements in problems such as anxiety, depression and substance misuse. Identification of factors which promote help-seeking behaviours is required.

Characteristics of Effective Interventions

Little is known about interventions most likely to be effective in reducing the prevalence of anxiety, depression and substance misuse in male-dominated industries.

There are large bodies of work on the prevalence of anxiety, depression and substance disorders, help-seeking behaviours, attitudes, risk factors, and interventions in general. There is scope to extrapolate findings from these broader bodies of work where relevant to workers in male-dominated industries.

It is also essential that interventions are rigorously evaluated using well controlled study designs which identify the effective components of multimodal workplace interventions.

Next Steps

As well as conducting research to address the gaps identified above, a range of other steps can be undertaken.

In view of the dearth of good quality studies in this area there is a need to:

- enhance understanding of the prevalence of these problems by conducting secondary analyses of Australian national datasets, such as the Australian National Drug Strategy Household Survey, National Health and Wellbeing Mental Health Survey, and HILDA
- establish the prevalence and further investigate the aetiology of these problems by conducting secondary analyses of prospective longitudinal studies. In addition, cohort studies are needed as they provide the strongest evidence for causation and they can examine the relationships between individual and workplace factors.

Our current knowledge base is sufficient to support:

- addressing risk factors for mental health disorders by promoting supportive work environments, addressing workplace bullying, developing policies to prevent job demand and job overload
- raising awareness and offering support in the workplace for colleagues and their families with mental health problems/symptoms and substance abuse disorders
- promoting understanding of the impact of work conditions (e.g., poor work relations, high job demand and overload, low occupational status) on mental health and alcohol and other substance use problems
- addressing the role of workplace culture on alcohol and substance use
- setting a research agenda for mental disorders and substance use disorders
- raising awareness of the impact of mental health and substance abuse problems on individuals and the workplace (e.g., absenteeism).

Mechanisms and workplace cultures exist that are supportive of worker wellbeing and provide structures for developing and maintaining safe work places. There is scope to address mental health and substance use in male-dominated industries through tailored programs and interventions that build on current foundations.

1 INTRODUCTION

Mental health and substance use among Australian workers are areas of growing concern. To underscore the dimension of these issues, 20% of Australians meet the diagnostic criteria for a mental illness in a 12 month period and nearly half (46%) have experienced a mental illness at some time in their life (Australian Bureau of Statistics (ABS), 2008). The annual cost of mental illness in Australia is approximately \$20 billion which includes lost productivity and workforce participation (Council of Australian Governments (COAG), 2006).

Anxiety (14.4%) and affective disorders (6.2%) are among the most common mental health disorders and both are strongly associated with substance use problems. Depression (4.1%) is the most common affective disorder. Approximately one in 20 (5.1%) Australians aged 16-85 years of age had a substance use disorder in a 12 month period (Slade et al., 2009). Harmful use of alcohol (2.9%) and alcohol dependence (1.4%) are the most common substance disorders in Australia (Slade, et al., 2009), and between 16% and 20% of the population engage in risky drinking. There are significant associations between current risky alcohol use and other drug use disorders (OR 18.2) and between anxiety disorders and alcohol use disorders (OR 2.6) (Teesson et al., 2010).

Policy tools to address mental health (World Health Organization (WHO), 2005) and alcohol and drug (e.g., International Labour Office, 1996) issues in the workplace have been developed internationally. The European Commission (2011) has recently considered the impact of alcohol on the workplace.

High prevalence levels of mental health and substance use disorders among workers warrant closer attention than received to-date (Gabriel & Liimatainen, 2000). Substantial untapped potential exists to address both mental health and substance use in the workplace in Australia, particularly among male-dominated industries and occupations (LaMontagne, Louie, Keegel, Ostry, & Shaw, 2006; Pidd & Roche, 2008).

1.1 Mental Health Disorders and the Workplace

In Australia, work-related mental health disorders are the second most prevalent compensable occupational illness or injury (Safework Australia, 2011a). In 2008-09, they represented 4.8% of all serious compensation claims (defined as claims resulting in at least a one week absence from work) (Safework Australia, 2011a).

However, these statistics substantially underestimate the costs borne by the workplace. First, less than half of all workplace injury and illness claims receive compensation, with mental stress claims being the least likely to be compensated (Safework Australia, 2011b). Second, for a variety of reasons some workers who suffer a work-related mental illness may not claim compensation and may take normal sick leave entitlements, or leave their employment to avoid stressful conditions, or continue to work with diminished capacity (ASCC, 2006).

Finally, workers' compensation statistics only report mental illness arising from work-related issues and not mental illness caused by other factors. Thus, national indicators substantially underestimate the prevalence of mental health problems in the workplace.

Estimates of the cost of mental illness indicate that the workplace bears a substantial proportion of the social and economic burden associated with mental illness. Poor mental health in workers can negatively affect the workplace in a number of ways including; staff turnover, poor morale, low productivity, unsafe work practices and increased absenteeism (Harnois & Gabriel, 2000).

Workers affected by mental health and substance use problems are at substantially greater risk of; becoming disengaged from the workforce, being less productive (Lim, Sanderson, & Andrews, 2000), experiencing higher levels of physical health problems and accidents (Harnois & Gabriel, 2000). International studies have estimated that poor mental health is associated with 50-60% of all workplace absenteeism (Milczarek, Schneider, & Gonzalez, 2009). Thus, there are substantial social and economic imperatives to reduce the prevalence of mental illness and substance use within the Australian working population (Conti & Burton, 1994; Dewa & Lin, 2000).

There is a substantial body of national and international research indicating that the workplace can play an important role in promoting or hindering mental health and wellbeing. The workplace can promote mental health by providing regular activity, time structure, social contact, a sense of collective effort and social identity (Cercarelli, Allsop, Evans, & Velandar, 2012). Conversely, the workplace can also be a source of psychological stress and, as such, can negatively affect workers' mental health (Bonde, 2008). Workplace mental health promotion and prevention, along with interventions, may be required in order to provide support to workers with mental health problems, their families and colleagues, as well as preventing mental health problems from arising.

Many industries have been identified as high risk for work stress and other mental health issues. An initial secondary analysis of the 2007 National Mental Health and Wellbeing (NMHWB) survey data undertaken by NCETA indicates that particular industries have higher prevalence rates of any 12 month ICD-10 mental health disorder compared to the national prevalence rate (20%). These industries include agriculture (20.6%), construction (23.3%), mining (22.4%), and utilities (20.7%).

1.2 Substance Use and the Workforce

Over 90% of Australian workers drink alcohol and a significant percentage drink at short-term (9.4% weekly, 16.6% monthly) and long-term (11.6%) risk levels² (Pidd, Shtangey, & Roche, 2009). National Drug Strategy Household Survey (NDSHS) data analysis undertaken by NCETA also indicates that male-dominated industries have a higher than average prevalence of substance use (see Table 1.1).

² Using NHMRC 2001 Risky Drinking Guidelines.

Table 1.1 Proportions of Australian workers in select industries who drank at levels associated with single drinking occasion risk and lifetime risk, and who have used illicit drugs at least once in the last 12 months¹

Industry	Risky Drinking Single occasion risk* (at least wkly) %	Risky Drinking Lifetime risk* %	Any Illicit Drug Use (last 12 months) %
Agriculture	24.0 [#]	31.2 [#]	13.4
Construction	35.6 [#]	44.2 [#]	25 [#]
Mining	34.7 [#]	44.5 [#]	14.4
Manufacturing	23.6 [#]	27.5 [#]	12.1
Transport	26.0 [#]	31.9 [#]	15.6 [#]
Utilities	28.0 [#]	37.6 [#]	13.8
Total Population	15.9	20.1	14.7

¹ Source: Secondary analysis undertaken by NCETA of 2010 National Drug Strategy Household Survey data (AIHW, 2011)

* 2009 NHMRC guidelines # Industry prevalence rate higher than national prevalence rate

Prevalence of illicit drug use is also high among some groups of workers and highest among younger age groups who are also more vulnerable to mental health problems (Pidd, Roche, & Wilson, 2011). Use of illicit drugs occurs more frequently among the paid workforce than those not in paid employment. Amphetamine use, for instance, is almost twice as common among those in the paid workforce as those not in paid work (Roche, Pidd, Bywood, & Freeman, 2008).

The most commonly used illicit drugs in Australia are cannabis and amphetamines. Regular amphetamine use is often preceded by cannabis abuse and associated with a range of personal vulnerabilities including higher frequency of borderline and related personality disorders, lower educational attainment, greater welfare dependence and reduced likelihood of being in a relationship. Earlier onset of amphetamine use is also associated with anxiety and depression and with earlier use of cannabis and other drugs (Degenhardt, Coffey, Moran, Carlin, & Patton, 2007). A meta-analysis of amphetamine use in young people found consistent associations with; use of other substances, fewer years of education, engaging in risky sexual behaviour, the presence of psychiatric illness and family history of drug use (Russell et al., 2008). In addition, the 2007 NMHWB survey data indicated that approximately 30% of stimulant users reported that their drug use 'interferes with their work responsibilities'.

A substantial proportion of people with a lifetime stimulant use disorder have sought help for a substance use or mental health problem. This highlights that stimulant use may be a marker for a range of other problems including mood, anxiety and other substance use disorders. Prevalence data on substance use and mental health problems highlight the need for increased awareness, earlier screening and detection, and more effective interventions. The workplace offers considerable scope for the implementation of such initiatives.

A complex relationship can exist between mental health problems and substance abuse; drugs and alcohol may be used to ameliorate the symptoms of mental health problems and, conversely, can contribute to severity of symptoms. At other times, they can co-exist within

the same person in an apparently un-related way. The consequences of mental illness and substance use may be exacerbated when they occur concurrently.

1.3 Work Stress and the Work Environment

While this systematic review does not directly focus on issues of stress in the workplace it is an important background issue. 'Work stress' can be defined as negative psychological and physical responses to a mismatch between job requirements and the capabilities, needs, or resources of the worker (NIOSH, 1999). Work stress is associated with poor health, increased injury and accident rates and has been identified as a risk factor for mental illnesses such as major depression (Wang, 2005). Work stress is also associated with workers' alcohol and drug consumption patterns. In general, research indicates that many workers use alcohol and other drugs to alleviate the effects of work stress (Frone, 2008; Greenberg & Grunberg, 1995).

One systematic review of research concerning work stress (Stansfeld & Candy, 2006) indicated that key features of the workplace psychosocial environment (e.g., decision latitude, psychological and physical demands, social support and rewards) are key determinants of worker's mental health. Research (e.g., Bonde, 2008; Dorrian, Skinner, & Pisaniello, 2010; Stansfeld & Candy, 2006) on work stress has identified a range of risk factors including:

- Workloads (high or low), lack of control over pace of work
- Poor task design, lack of task variety, skill underutilisation
- Role ambiguity and role conflict
- Low levels of decision making, poorly defined organisational objectives
- Social/physical isolation poor communication with supervisors or co-workers
- Job insecurity, poor pay, low levels of career development
- Home-work conflict
- Poor work environments and poor work equipment quality.

The well-known Whitehall studies of civil servants in the UK, which illustrate the 'social determinants of health' also showed that employment grade (position in the workplace hierarchy) affects both physical and mental health in a manner that cannot be explained by the 'health selection' effect alone (i.e., the impact of poor health on employment grade) (Chandola, Bartley, Sacker, Jenkinson, & Marmot, 2003).

Since work roles and the work environment have such an influence on workers' mental health, the workplace is an important intervention and prevention setting. However, the workplace is also an important intervention and prevention setting for other reasons. The workplace provides ready access to large numbers of Australians (particularly 'hard to reach' groups for health promotion, such as men) and contains existing infrastructure and frameworks that could support prevention and intervention strategies. In addition, such strategies are likely to receive substantial employer support given the economic cost of poor mental health borne by the workplace. Moreover, the workplace offers the opportunity to develop tailored strategies that target specific high risk industries and occupational groups and to address pre-existing or work-related mental illness consistent with the health and safety responsibilities of organisations (Pidd & Roche, 2011).

1.4 Male-Dominated Industries

No synthesis of available research appears to have been undertaken to examine the relationship between work, mental illness and the effectiveness of workplace interventions in male-dominated industries. Table 1.2 indicates the industry groups that are comprised of predominantly male workers.

Table 1.2 Australian industries comprised of high proportions of male workers

Industry	ABS 2006 Census Data		ABS 2011 Census Data	
	Total workforce	Male	Total workforce	Male
	N	%	N	%
Agriculture	280,923	69.4%	249,828	70.0%
Construction	709,843	86.5%	828,912	87.8%
Mining	106,896	84.9%	176,562	82.6%
Manufacturing	952,004	74.0%	902,830	74.0%
Transport	422,793	77.8%	479,181	76.8%
Utilities	89,450	78.1%	115,610	76.1%

Source: Australian Census Data (Australian Bureau of Statistics (ABS), 2006 and 2012)

Given increasing concerns over the general population prevalence of anxiety, depression and substance use disorders and its associated impact upon productivity, a systematic review on what is known about these disorders in male-dominated industries was undertaken. The aim of this review was to systematically identify, assess and synthesise primary research concerning depression, anxiety and substance use disorders in male-dominated industries in relation to:

- Prevalence
- Awareness and attitudes
- Help-seeking and behaviours
- Risk factors
- Effectiveness of workplace interventions
- Evidence gaps.

The research questions addressed in the systematic review were as follows:

Q1.	What are the prevalence rates of depression, anxiety and substance use disorders in male-dominated industries?
Q2.	What are the awareness levels and attitudes toward depression, anxiety and substance use disorders in male-dominated industries?
Q3.	What are the risk factors for depression, anxiety and substance use disorders in male-dominated industries?
Q4.	What are the help-seeking behaviours and barriers for depression, anxiety and substance use disorders in male-dominated industries?
Q5.	What industry-specific interventions have been effective in addressing depression, anxiety and substance use disorders in the workplace?
Q6.	What are the evidence gaps related to work and depression, anxiety and substance use disorders in male-dominated industries?

2 METHOD

The methods and materials used in undertaking the systematic review are described below. Details of the study protocol are available in Appendix B1.

2.1 Inclusion and Exclusion Criteria

In conjunction with *beyondblue*, the following inclusion criteria were established:

- Studies based in predominantly male-dominated industries
- Studies that investigated aspects of clinically significant anxiety, depression or substance use
- Studies that were in the English language
- Studies that occurred between January 1990 and July 2012³.

Studies were excluded if they:

- Primarily investigated mental health issues other than anxiety, depression or substance use
- Examined volunteer workers
- Involved interventions not undertaken in the workplace (see Table 2.1).

³ A cut-off point of 1990 was selected as this was a watershed point in the development of national occupational health and safety and mental health strategies in Australia:

- The first National Mental Health Strategy was endorsed in April 1992 by the Australian Health Ministers' Conference (AHMC) as a framework to guide mental health reform.
- Commonwealth and equivalent State and Territory Disability Discrimination legislation was enacted in 1992 making it unlawful to discriminate against, harass or victimise people with disabilities or their associates – including in employment. Within the Act the term 'disability' was broadly defined to cover mental illness.
- The National Occupational Health and Safety Commission Act 1985 No. 35, set in legislation the duties of employers. These duties include ensuring 'so far as is practicable a working environment that is safe and without risks to health'. Over recent years, mental health has been incorporated in this definition of health.

Table 2.1 Initial inclusion and exclusion criteria

Criteria	Included	Excluded
Male-dominated industries	Agriculture; building and construction; mining; manufacturing; transport &/or utilities; fly-in fly-out workers	Other industries including defence, police, rescue and recovery workers, ambulance and paramedics Migrant workers who are not citizens
Language	English	Non-English
Gender	Any gender	n/a
Mental illness &/or substance use	Clinically significant depression, anxiety, substance use	Mental illness other than depression and anxiety disorders; tobacco
Outcomes of interest	Prevalence; awareness of; attitudes towards; help-seeking; risk/protective factors	—
Type of work	Paid work in developed countries including full-time, part-time, casual, temporary/ contract/transient; formal work	Volunteer work
Types of research	Primary research studies published in the English language	Non-primary research (e.g., literature reviews; government reports; industry reports) and studies not published in the English language
Types of interventions	Any workplace intervention or individual intervention within a workplace including screening and assessment, brief interventions, counselling, peer-based interventions, workplace cultural interventions, legislation/regulation/policy changes & occupational therapy	Non-workplace interventions

2.2 Search Strategy

A search strategy was developed based on inclusion and exclusion criteria. Searches were conducted using electronic databases and the grey literature. A limited number of potential citations were found through other means, such as hand searching reference lists of retrieved papers.

2.2.1 Electronic Database Searches

The electronic databases used included CINAHL, Cochrane Library, PubMed, PsycInfo, Informit and Scopus (Table 2.2). Searches used terms that combined MeSH (and other database thesaurus) headings, keyword terms and words in the text and titles were identified. These were systematically combined into 'search strings' (Appendix B2.1) to explore the various sets of clinical questions across all databases. For example, a search with the Medline electronic database would entail using search terms and Boolean terms used by Medline. Details of the records found using electronic databases are contained in Appendix B2.2.

Table 2.2 Overview of the electronic databases searched in this systematic review

Database	Description	Date Searched	Number Found
CINAHL	Contains Index and Abstracts. Covers nursing, biomedicine, health sciences librarianship, consumer health and 17 allied health disciplines.	14 August 2012	615
Cochrane	The Cochrane Library contains high-quality, independent evidence to inform healthcare decision-making. It includes reliable evidence from Cochrane and other systematic reviews, clinical trials and more.	23 July 2012	8,205
Informit	Cross-search across groups of databases by subject e.g., Health, Indigenous, Education, Social Sciences. This is primarily an Australasian database.	24 July 2012	2,011
PsycINFO	Includes citations and abstracts of articles in the field of psychology and related disciplines.	24 July 2012	15,311
PubMed	This is the free public version of Medline. It is intended for clinicians and has built-in search filters enabling quality search results.	23 July 2012	14,696
Scopus	A large international citation database which includes 100% Medline and 91.6% of Embase citations.	23 July 2012	2,385
Total Number of Electronic Database Citations Found			43,223

2.2.2 Grey Literature Search

In addition to the search strategy to locate peer reviewed literature, a further search was undertaken of the grey literature. Grey literature is *"information produced on all levels of government, academics, business and industry in electronic and print formats not controlled by commercial publishing i.e., where publishing is not the primary activity of the producing body"* (Brooklyn College Library, 2000). A combination of common search engines, library search engines and databases were used to identify grey literature. In addition to conventional search engines, websites and online databases, electronic forums or eForums and eLists were canvassed where possible. The total number of grey literature citations found was 33,861. Details of the grey literature search can be found in Appendix B2.3.

2.3 Screening, Extraction and Assessment

An overview of the potential number of records, the number of records remaining after each screening, assessed and included in the final analysis is provided below (Table 2.3). A total of 77,160 potential articles were found.

Table 2.3 Overview of the number of included and excluded articles

Stage	Data Source	Records		Subtotal	Total
		Mental Health	Substance Use		
Search	Electronic Database	20,046	23,177	43,223	77,160
	Grey Literature	-	-	33,861	
	Other	-	-	76	
First Screening	Electronic Database	3,187	1,146	4,333	4,604
	Grey Literature	-	-	255	
	Other	7	9	16	
Second Screening	Electronic Database	276	197	473	614
	Grey Literature	-	-	127	
	Other	5	9	14	
Articles included after extraction and quality assessment:					135

2.3.1 Screening

Following the identification of the initial pool of potential literature, each article was subjected to a two stage screening process.

At the first screen, two reviewers screened the article title and abstract for possible inclusion. An article was included if it met the following inclusion criteria:

- Work, workers, workplace, industry AND
- Health prevalence or aetiology/risk factors/attitudes/help-seeking or intervention AND
- Mental health or substance use.

A total of 4,604 articles met the inclusion criteria and went through to a second screen. A flow chart is provided at Appendix B3 showing the process undertaken in the second screen. The second screen included a review of the complete article. A total of 614 articles went through to the data extraction stage.

2.3.2 Data Extraction

A data extraction codebook was developed to ensure consistency between reviewers (Appendix B4.1).

2.3.3 Quality Assessment

After data was extracted from these articles, each article was assessed for quality. The quality assessment used the STROBE statement (Strengthening the Reporting of Observational Studies in Epidemiology) and the EPOC statement (Effective Practice and Organisation of Care Review Group) as a guide. The quality assessment guide and templates are provided in Appendix B4.2 and B4.3 respectively.

The following criteria were applied to determine the level of evidence (Table 2.4).

Table 2.4 NHMRC causal guidelines for levels of evidence and strength of recommendations

Categories of evidence for causal relationships and treatment	
Ia	Evidence from meta-analysis of randomised control trials
Ib	Evidence from at least one randomised controlled-trial
IIa	Evidence from at least one controlled study without randomisation
IIb	Evidence from at least one other type of quasi-experimental study
III	Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case-controlled studies
IV	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities
Categories of evidence for observational relationships	
i	Evidence from large representative population samples
ii	Evidence from small, well-designed, but not necessarily representative samples
iii	Evidence from non-representative surveys, case reports
iv	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities
Strength of recommendations	
A	Directly based on Category I evidence
B	Directly based on Category II evidence or extrapolated recommendation from Category I evidence
C	Directly based on Category III evidence or extrapolated recommendation from Category II evidence
D	Directly based on Category IV evidence or extrapolated recommendation from Category I, II, III evidence
S	Standard of care

2.4 Data Analysis

One hundred and thirty five articles were included in the final analysis.

To undertake the analysis, the articles were categorised and sorted. For each of the six research questions, articles were firstly sorted according to whether they were concerned with mental health, substance use or both. Each article was then categorised according to type of evidence, as follows:

- A. Articles where diagnostic criteria had been used to assess clinical conditions e.g., DSM-IV, ICD-10
- B. Articles where standardised and validated measures were used to indicate clinical conditions (e.g., AUDIT, CAGE, DAST etc).
- C. Articles which reported clear and measurable criteria. For example, risky drinking was defined as ≥ 5 drinks in a session (using 2009 NHMRC guidelines) or against a specified authority. For illicit drugs, the criteria applied were indicators of risk (e.g., injecting) or dependence (e.g., daily use; use at work).

A summary of the number of records found, screened, assessed for quality, excluded, and remaining in the final analysis is shown in Figure 2.1.

Key

MH: Mental Health SU: Substance Use MDI: Male-Dominated Industry

1st Screen = An article was included if it was concerned with work, workers, workplace, industry AND health prevalence of aetiology/risk factors/attitudes/help seeking of intervention AND mental health or substance use

2nd Screen = Refer to Appendix B

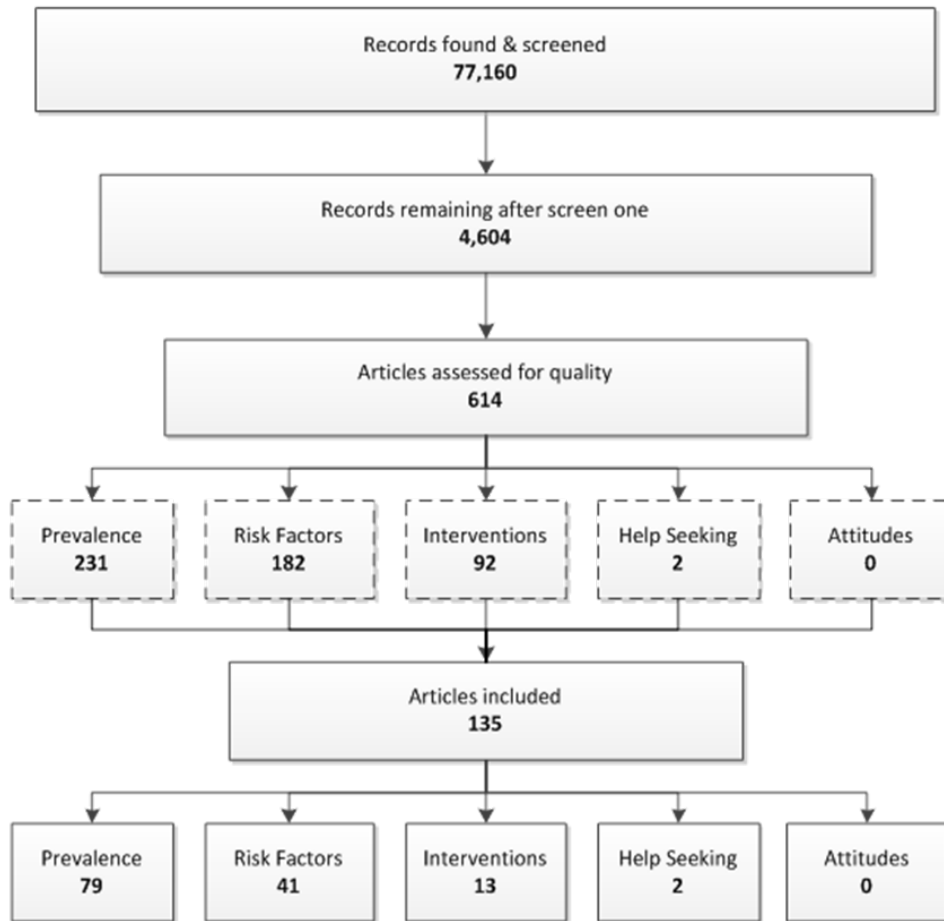


Figure 2.1 Summary of included and excluded articles

*Some papers are used in more than one category; hence the total does not tally to 138

The next section reports the findings from the systematic review for each question pertaining to prevalence, awareness and attitudes, risk factors, help-seeking behaviours, interventions and research gaps.

3 FINDINGS

This section presents the evidence for each of the six questions addressed in this systematic review. For each question summary findings are provided, implications outlined and supporting evidence described. Unless otherwise stated, all evidence refers to male-dominated industries.

A definitive pattern did not emerge in relation to mental health problems among workers in male-dominated industries. Other evidence indicated a clear relationship between alcohol and drug problems and mental health problems. A pattern emerged of higher levels of problematic alcohol and drug use among workers in male-dominated industries; reflecting general population patterns of alcohol and drug use among males and young male adults in particular.

There is a common co-morbidity between anxiety and drug use disorders (OR 2.6) and a significant association between current alcohol use and other drug disorders (OR 18.2) (Teesson et al., 2010). This represents a major challenge for the delivery of effective prevention and intervention services.

The evidence tables for each question and tables of excluded studies are contained in Appendix A. Key features of the evidence are displayed in the box below.

Question	Articles (N)	Evidence Characteristics
Prevalence	MH 34	<ul style="list-style-type: none"> No Australian studies reported prevalence rates for diagnosed mental health disorders (i.e., using established diagnostic tools such as the DSM or ICD) among male-dominated industries Seven Australian studies examined either suicide rates or mental health disorders using screening instruments, or levels of psychological distress. Much of the prevalence evidence was identified from international studies Variations in industry and occupation definitions and/or variations in types of screening instruments make it difficult to draw conclusions concerning prevalence rates A substantial number of studies did not control for socio-demographic and lifestyle factors which may contribute to variations in prevalence rates across industry groups.
	SU 45	<ul style="list-style-type: none"> No Australian studies were found that reported the prevalence of diagnosed alcohol or other substance use disorders in male-dominated industries The evidence on the prevalence of alcohol and substance use disorders in male-dominated industries is poor Studies suggest that alcohol abuse and dependence were particularly high in some male-dominated industries, including manufacturing and construction The country of origin of various studies influenced prevalence rates, underscoring the importance of cultural factors.

Question		Articles (N)	Evidence Characteristics
			•
Awareness	MH	0	No evidence was located that specifically addressed this question. Consequently no conclusions could be drawn on the basis of currently available evidence.
	SU	0	
Risk Factors			<ul style="list-style-type: none"> • Only one small Australian study was located, with a sample of Australian farmers. • Nine study populations were from Europe: a working population in south-east France, a general population working overtime in Norway, a general population in Great Britain, middle aged men who worked for Volvo in Sweden, women in Sweden working in different gender segregated professions, a general population in France, trade union members in Italy, unemployed former timber mill workers in Finland and forest industry employees in Finland. Three studies included populations from the USA: employees in an energy production factory, aluminium factory workers in 'heavy industry' and farm workers across two states. Study populations also included five from Japan: manufacturing workers in a camera factory, full time male blue collar workers in an energy factory, manufacturing workers across eight factories, employees across nine manufacturing factories and employees of a car manufacturer. Two other studies had populations from Asia: Chinese offshore platform workers and Malaysian automotive assembly workers. One study was from South Africa and included people working in the mining industry.
	MH	21	<ul style="list-style-type: none"> • The studies were primarily cross-sectional (Level iv evidence) and focused on a particular workplace (i.e., site) rather than an industry/workforce. Five studies were prospective cohort studies (level ii evidence). • Four studies used clinical measures for anxiety and depression, the DSM-III-R, the Revised Clinical Interview Schedule (RCI-R), the Hospital Anxiety and Depression Scale (HADS), the WHO Composite International Diagnostic Interview (CIDI) and the WHO International Classification of Diseases (ICD-9). Another used health insurance depression claims, based on doctors' diagnoses. Various self-report questionnaires were used as measures for anxiety and depression symptoms, including the General Health Questionnaire, Zung Self-Rated Depression Scale, Minnesota Multiphasic Personality Inventory, Depression Anxiety Stress Scales, and the Psychological General Wellbeing Inventory, Centre for Epidemiological Studies Depression Scale (CES-D), the Personality Assessment Inventory (PAI), the Generic Job Stress Questionnaire and a self-report questionnaire specifically designed for the particular study.
	SU	20	<ul style="list-style-type: none"> • 20 articles were found, derived from 12 separate studies • No Australian studies had strong enough evidence to be included • Studies were a mixture of cohort and cross-sectional study designs, with one prospective case-control study • Participants were randomly recruited to most studies • Alcohol use disorders were most commonly investigated.
Help-seeking	MH	2	<ul style="list-style-type: none"> • One cross-sectional study of US engineers who had met DSM-III criteria for major depression in the last 12 months • One descriptive qualitative study (N=10) of Queensland open cut mine
	SU	0	No evidence was located that addressed substance use. Consequently no

Question	Articles (N)	Evidence Characteristics
Interventions	MH	<p data-bbox="544 271 1246 297">conclusions could be drawn on the basis of currently available evidence.</p> <ul data-bbox="544 331 1343 663" style="list-style-type: none"> <li data-bbox="544 331 979 358">• There were no Australian based studies <li data-bbox="544 367 1326 394">• Participants were men in manufacturing and building/construction industries <li data-bbox="544 403 1326 501">• There are few well-controlled studies in this area and most studies used generic and multi-modal interventions, making it difficult to determine which components of the intervention were most effective <li data-bbox="544 510 1343 609">• Measures used included standardised measures of wellbeing and psychological stress such as the GHQ. Many studies measured absenteeism as their primary outcome. <li data-bbox="544 618 1034 645">• The quality of the studies in this group varied.
	SU	<ul data-bbox="544 674 1343 954" style="list-style-type: none"> <li data-bbox="544 674 979 701">• There were no Australian based studies <li data-bbox="544 710 1299 770">• Populations were men from multiple male-dominated industries including transport and aviation, construction and manufacturing <li data-bbox="544 779 1337 878">• There are few well-controlled studies in this area and most used generic and multi-modal interventions, making it difficult to determine which components of the intervention are effective <li data-bbox="544 887 1315 954">• Measures used included standardised measures of alcohol and other drug use, such as the AUDIT.

3.1 Prevalence

3.1.1 Mental Health Disorders

This section addresses part one of question one, the prevalence of mental health disorders in male-dominated industries.

Q1.1 What are the prevalence rates of depression and anxiety disorders in male-dominated industries?

- No Australian studies assessed the prevalence rates of mental health disorders in male-dominated industries using clinical diagnostic tools. The national prevalence rate⁴ for anxiety is 14.4% (females = 18%, males = 11%) and for depression is 4.1% (females = 5.1%, males = 3.1%).
- Australian prevalence rates in male-dominated industries (assessed with a screening instrument) were:
 - depression 3.3%-16%
 - anxiety 1.9%-13.9%
 - psychological distress 4.7%-9.2%.
- International prevalence rates for diagnosed conditions were:
 - depression 2.6%-11%
 - anxiety 1.3%-29%.
- International rates assessed with a screening instrument were:
 - depression 8.9%-28%
 - Anxiety 6.6%-15%.
- International prevalence rates for 'other diagnosed mental health disorders' ranged from 4.6%-16.4%.
- Prevalence rates vary according to industry. Some male-dominated industries have relatively high mental health disorder prevalence rates (e.g., construction); others have relatively low rates (e.g., utilities). Within the same industry, there may also be differences in rates according to location (i.e., city, rural).
- Prevalence rates also vary substantially between occupational categories (e.g., blue and white collar) within a single industry. This is consistent with the Whitehall studies (Stansfeld et al., 1999).
- Workers in select non-male-dominated industries and occupations (e.g., office workers, sales, education/teaching) may have substantially higher prevalence rates for mental disorders than those in male-dominated industries and occupations.
- There are Australian studies on prevalence of suicide in male-dominated industries. Australian transport, agriculture and construction industry workers are 1.8 to 2.2 times more likely to suicide than workers in other industries. However, suicide may not be indicative of mental disorder.
- Findings are summarised in Table 3.1.

⁴ 12 month symptoms.

Table 3.1 Prevalence of mental health disorders in male-dominated industries

Mental health disorder	Australian Studies		International Studies	
	General/comparison population	Male-dominated industry	General population	Male-dominated industry
Depression and anxiety and other mental health disorders assessed using clinical diagnostic tools (e.g., DSM, ICD)	Yearly prevalence Anxiety 14.4% ¹ <ul style="list-style-type: none"> Females 18% Males 11% Depression 4.1% ¹ <ul style="list-style-type: none"> Females 5.1% Males 3.1% 	—	Total Canadian workforce lifetime prevalence of depression - 13.1% ²	Canadian lifetime prevalence of depression for workers in: <ul style="list-style-type: none"> Transport 14% Utilities 13.8% Construction 12.7% Manufacturing 9.2% Primary industries 8.8% Education 16%²
			Canadian total workforce prevalence of anxiety symptoms 2.6% ³	Canadian prevalence of anxiety symptoms among workers working in: <ul style="list-style-type: none"> Farming 1.5% Crafts and trades 3.6% Management occupations 5.7%³
			—	White and blue collar Italian trade union members employed in utilities, manufacturing and transport were equally likely to be prescribed anti-depressant medication ⁴
			—	Finnish blue collar forestry workers were 1.6 times more likely to be hospitalised for depression than white collar forestry workers ⁵
			French workers recent anxiety disorder rates <ul style="list-style-type: none"> Males 17.4% Females 24.5%⁶ 	French farmers recent anxiety disorder rates <ul style="list-style-type: none"> Males 12.1% Females 15%⁶
			French workers lifetime prevalence of mood disorder <ul style="list-style-type: none"> Males 4.6% Females 12.8%⁶ 	French farmers lifetime prevalence of mood disorder <ul style="list-style-type: none"> Males 11.2% Females 15.4%⁶
			Danish workers odds ratio of affective disorders = 1.0 ⁷	Danish labourers odds ratio of affective disorders = 1.5 ⁷
			Male UK workers prevalence rate for common mental disorders 11% ⁸	Male UK skilled construction workers prevalence rate for common mental disorders 13% ⁸
			--	% of all clinical cases of work-related ill health reported by psychiatrists among workers in: <ul style="list-style-type: none"> Manufacturing 6% Construction 2% Mining and quarrying <1% Health and social work 25%⁹
--	Canadian resource industry workers disability rates from: <ul style="list-style-type: none"> Any mental disorder 2.1% Musculoskeletal 2% Injuries 2%¹⁰ 			

Mental health disorder	Australian Studies		International Studies	
	General/comparison population	Male-dominated industry	General population	Male-dominated industry
Depression, anxiety and psychological distress assessed with a screening instrument			--	US construction workers had an elevated risk (OR 2.6) of being diagnosed with schizophrenia ¹¹
			--	US construction workers were 1.7 times more likely than other blue collar workers to have been advised by a doctor that they had an emotional, nervous or psychiatric problem ¹²
	U.K. general population study Depression 5.8% Anxiety 5.7% ¹³	NSW transport industry workers ¹⁴ Depression 3.3% Anxiety 1.9%	All male French workers prevalence rate of depression 11% ¹⁵	Male French farmers prevalence rate of depression 13.5% ¹⁵
	Rural and remote Australian population ¹⁶ • Depression 5.4% • Anxiety 4.6%	WA Mining workers ¹⁷ • Depression 16% • Anxiety 10.4%	Depression rate among Norwegian non-farm workers • Males 9.3% • Females 7.3% ¹⁸	Depression rate among Norwegian farm workers • Males 17.3% • Females 13.2% ¹⁸
			Prevalence rates of depression among French utility engineers • Males 21.4% • Females 14.8% ¹⁹	Prevalence rates of depression among French utility workers who were: • Male craftsmen 33.2% • Female clerks 33% ¹⁹
				Prevalence rate of depression among Japanese manufacturing workers • Males 20%-26.8% • Females 26.5%-31.5% ²⁰
				Prevalence of depression among female poultry processing workers 47.8% ²¹
				Prevalence of depression among Japanese manufacturing workers 8.9%-9.4% ²²
				Prevalence of depression among Japanese transport workers 16.5% ²³
				Prevalence of depression among US oil rig workers 28% ²⁴
		Mean depression scores for Japanese • Males 12.2 • Females 13.4 ²⁵	Mean depression scores for Japanese manufacturing workers • Male 15.4 • Female 15.3 ²⁵	
			Prevalence rates among US oil rig workers for: • Anxiety 15% • Depression 28% ²⁶	

Mental health disorder	Australian Studies		International Studies	
	General/comparison population	Male-dominated industry	General population	Male-dominated industry
Psychological wellbeing/distress assessed with a validated screening instrument	Non-male-dominated industries located in rural and remote NSW - 12% ²⁷	Machinery operators, drivers and labourers 9.2% Technicians and trades workers 8.8% Farmers and farm managers 7.2% All from rural and remote areas in NSW ²⁷	UK Non-farm workers had GHQ-12 mean scores 9.5 ²⁸	UK Farm workers had GHQ-12 scores of 10.7 and 35% had scores that were indicative of psychiatric disorders ²⁸
	Rural Australians on electoral role who were not farmers K10=17.2 ²⁹	Rural Australians on electoral role who were farmers K10=16.3 ²⁹		
	Workers in Australian workplaces with more than 1000 employees with a K6 score greater than 12% - 4.5% ³⁰	Workers in Australian workplaces with more than 1000 employees with a K6 score greater than 12 who were: <ul style="list-style-type: none"> Precision production workers 5.1% Operators and labourers 5% Technical occupations 4.7%³⁰ 		

¹ 2007 NMHWB

² Thompson et al. (2011)

³ Dewa & Lin (2000)

⁴ D'errico et al. (2011)

⁵ Joensuu et al. (2010)

⁶ Cohidon et al. (2009a)

⁷ Wieclaw et al. (2005)

⁸ Stansfield et al. (2011)

⁹ Carder et al. (2009)

¹⁰ Dewa et al. (2010)

¹¹ Muntaner et al. (1991)

¹² Petersen and Zwerling (1998)

¹³ Crawford and Henry (2003) as cited in Hilton et al. (2009)

¹⁴ Hilton et al. (2009)

¹⁵ Cohidon et al. (2009)

¹⁶ AIHW (2006) as cited in Velandar et al. (2010)

¹⁷ Velandar et al. (2010)

¹⁸ Sanne et al. (2004)

¹⁹ Niedhammer et al. (1998)

²⁰ Inoue and Kawakami (2010)

²¹ Lipscombe et al. (2007)

²² Kawakami et al. (1995)

²³ Kawada and Suzuki (1992)

²⁴ Gann et al. (1990)

²⁵ Ikeda et al. (2009)

²⁶ Gann et al. (1990)

²⁷ Fragar et al. (2010)

²⁸ Houndsome et al. (2012)

²⁹ Judd et al. (2006)

³⁰ Hilton et al. (2008)

3.1.1.1 Supporting Evidence

Prevalence of mental health disorders were categorised and reviewed for 1) anxiety and depression and 2) 'other diagnosed mental health disorders'. Australian and international studies were examined and are reported separately. Available research is presented below in three categories (A, B, and C) and according to the level of evidence:

- Category A: used established clinical diagnostic tools (e.g., DSM, ICD)
- Category B: used screening tools or other type of indicators for anxiety and depression
- Category C: addressed the broader issue of psychological wellbeing.

The evidence tables for mental health prevalence are supplied in Appendix B1.1 Mental Health Prevalence.

Evidence Characteristics for Mental Health Prevalence

- 34 articles were found
- No Australian studies reported prevalence rates for diagnosed mental health disorders (i.e., using established diagnostic tools such as the DSM or ICD) among male-dominated industries
- Seven Australian studies examined either suicide rates or mental health disorders using screening instruments, or levels of psychological distress. Much of the prevalence evidence was identified from international studies
- Variations in industry and occupation definitions and/or variations in types of screening instruments make it difficult to draw conclusions concerning prevalence rates
- A substantial number of studies did not control for socio-demographic and lifestyle factors which may contribute to variations in prevalence rates across industry groups.

Australian Studies

Category A studies: **Depression and Anxiety**

Assessed using Clinical Diagnostic Tools (e.g., DSM, ICD)

No Australian studies were identified which reported prevalence rates for diagnosed mental health disorders among male-dominated dominated industries.

Category B studies: **Anxiety or Depression**

Detected with Validated Screening Instruments

Only two Australian studies (Level iii evidence) used validated screening instruments⁵ to assess anxiety and depression prevalence rates in select industries. Among NSW transport industry workers, prevalence of depression (3.3%) and anxiety (1.9%) was substantially lower than a comparative UK population (depression; 5.8%, anxiety; 5.7%) (Hilton et al., 2009). Conversely, prevalence rates among rural and remote WA mining workers for depression (16%) and anxiety (10.4%) were substantially higher than the national prevalence rate for depression (5.4%) and anxiety (4.6%) (Velandar et al., 2010).

⁵ Both Australian studies used the Depression, Anxiety, and Stress Scale (DASS).

Category C studies: *Psychological Wellbeing/Distress*

Assessed with Validated Screening Instruments

Three Australian studies reported the prevalence of psychological distress among workers in male-dominated occupations (Fragar et al., 2010; Judd et al., 2006; Hilton et al., 2008). Results were varied:

- One study (Level i evidence) found prevalence rates⁶ for psychological distress among workers located in rural and remote areas in NSW (7.2%-9.2%) were lower than non-male-dominated occupations (12%). Rates for various male-dominated occupations were:
 - 9.2% for machinery operators, drivers and labourers
 - 8.8% for technicians & trades workers, and
 - 7.2% for farmers and farm managers (Fragar et al., 2010).
- A Level iii evidence study reported that farmers had significantly (p.05) lower levels of psychological distress than non-farmers (K10 = 16.3 and 17.2 respectively) (Judd et al., 2006).
- A large study of 58 Australian workplaces with more than 1,000 employees (N = 60,566) (Level ii evidence) reported prevalence rates⁷ for 'high levels of psychological distress' (K6 score >12) among male-dominated occupations were slightly higher than the total workforce rate (4.5%), but lower than some non-male-dominated occupations (e.g., sales, had the highest prevalence rate at 6.7%) (Hilton et al., 2008).

Prevalence rates among male-dominated occupations were:

- 5.1% for precision production workers
- 5% for operators and labourers
- 4.7% for technical occupations.

Suicide Data

- Prevalence rates for suicide were reported in two Australian studies, both Queensland based (Heller et al., 2007; Anderson et al., 2010). It is noted that suicide is not necessarily a marker for mental disorder.
- The crude incidence rate for suicide in Queensland among male-dominated industry groups between 1990-2006 ranged from 18.6-24.1/100,000, compared to 10.6/100,000 in the total Queensland workforce and 18.5/100,000 in the Queensland population as a whole (Anderson et al., 2010). The male and female suicide rates for agriculture were 24.1/100,000, transport 19.1/100,000, and construction

⁶ Using the Kessler 10 (K10).

⁷ Using the Kessler 6 (K6).

18.6/100,000. Male suicide rates were 32.3/100,000 for agriculture, 20.4/100,000 for transport and 19.0/100,000 for construction, compared with 16.6/100,000 for the employed male Queensland population and 29.6/100,000 for all Queensland males. These data indicate that those working in male-dominated industries in Queensland were 1.76-2.2 times more likely to suicide than the employed population of Queensland as a whole. Males employed in male-dominated industries were 1.14-1.94 times more likely to suicide compared with all employed males.

- The suicide incidence rate in the Queensland commercial construction industry between 1995 and 2001 was 40.3/100,000, compared to the national rate among males of 27.6/100,000. The crude suicide rate in commercial construction ranged from 32/100,000 during 1995-1997 up to 57.8/100,000 in 1998. Compared with the Australian male and Queensland male suicide rates across the same periods, the construction industry rates were 46% and 25% greater respectively. In 1998 construction industry workers were 1.91 and 1.72 times more likely to die by suicide than males from Australia and Queensland respectively. Between 1995 and 2001, the suicide rate among 15-24 year old Queensland construction workers was 61.7/100,000: more than twice the national rate and approximately twice the Queensland rate for this age group. This study did not report data on other industries (Heller et al., 2007). Although slightly dated, this research highlights the potential for the workplace as a setting in which to implement suicide prevention and mental health prevention programs. These studies did not control for demographic factors known to be associated with suicide. International research which has controlled for socio-demographic factors has found no significant differences in suicide rates between men in the construction and other industries (Stack, 2001).

International Studies

Category A studies: Depression and Anxiety

Six international studies examined the prevalence of diagnosed depression and/or anxiety disorders in male-dominated industries. Prevalence rates were highly variable. Some non-male-dominated industries had higher prevalence rates than male-dominated industries.

- A study (Level ii evidence) of lifetime depression prevalence rates among Canadian workers in male-dominated industries ranged from 8.8%-14%, compared to 13.1% for the total workforce, but differences were not statistically significant across industry groups (Thompson et al., 2011). Lifetime depression prevalence rates for select industries were:
 - transport (14%)
 - utilities (13.8%)
 - construction (12.7%)
 - manufacturing (9.2%)
 - primary industries (8.8%)
 - education (16%).
- Prevalence rates for lifetime anxiety among workers in male-dominated industries ranged from 2.3%-7.2%, compared to 7% for the total Canadian workforce

(Thompson et al., 2011). Only the construction industry had a higher anxiety prevalence rate (7.2%) than the total workforce (7%). A non-male-dominated industry (knowledge services) had the highest lifetime anxiety prevalence rate (9.3%). Differences were not statistically significant across industry groups (Thompson et al., 2011).

- Another Canadian study (Level ii evidence) reported mean prevalence rates for anxiety symptoms of 2.6% for the total workforce; including farmers (1.5%), craft and trade workers (3.6%) and management occupations (5.7%) (Dewa & Lin, 2000).
- A study of Italian trade union members (Level iii evidence) employed in utilities, manufacturing, transport, and trades services reported that blue collar workers were no more likely than white collar workers to be prescribed anti-depressant medication (D'errico et al., 2011). However, a more rigorous study (Level i evidence) reported Finnish blue collar forestry workers were 1.6 times more likely than white collar forestry workers to be admitted to hospital for depression (Joensuu et al., 2010). This indicated that risk of depression may not only vary between male-dominated industries, but also between particular occupational groups (i.e., white and blue collar workers) within male-dominated industries. However, the discrepancy in findings between these two studies regarding medication and hospitalisation for depression among blue and white collar workers may suggest that blue collar workers sometimes had depression picked up at a later stage of their illness, when hospitalisation was required, or it may also have reflected differential access to types of health services. This is a possible area for future research.
- A rigorous study (Level i evidence) of French workers reported that male and female farmers (12.1%;15.1%, respectively) had lower rates of recent anxiety disorders (past six months) than men and women (17.4%; 25.5%, respectively) in the general workforce (Cohidon et al., 2009a). Occupations with the highest anxiety rates were male office workers (20.9%) and female manual workers (29%).
- A Swedish study (Level ii evidence) reported that there is a lower risk of severe anxiety disorders (as measured by the DSM-111-R) for women working in female-dominated occupations when compared with those working in gender-integrated occupations (Savikko, 2008). They also found no higher risk for any mental health or alcohol or drug problems among women in male-dominated occupations.

*Category A studies: **Other Mental Health Disorders** – Excluding Substance Use*

Eight international studies examined the prevalence of diagnosed 'other' mental health disorders in male-dominated industries. They found higher rates of 'other' mental health disorders for some male-dominated or manual professions (labourers, construction workers, manual workers), but highest rates were found in some non-male-dominated professions (sales, teaching).

- The Cohidon et al. (2009a) study (see above) reported prevalence rates for lifetime mood disorders among male (4.6%) and female (12.8%) French farmers, which were

lower than national prevalence rates for all male (11.2%) and female (15.4%) workers. The highest prevalence rates were for male office workers (12.5%) and female manual workers (16.4%) (Cohidon et al., 2009a).

- Dewa and Lin (2000) (see above) reported prevalence rates for affective disorders among farmers (0%) and skilled crafts and trades (0.7%) and compared these to the total workforce (0.7%). However, very small sample sizes made it difficult to draw conclusions.
- A large (N= 29,921) quality (Level i evidence) study of Danish workers reported that only female workers had an elevated risk of affective disorders (RR 1.5). Female labourers (RR 1.5) and female teaching associated professionals (RR 1.6) had the highest relative risk for affective disorders (Wieclaw et al., 2005).
- A rigorous study (Level i evidence) of UK workers reported that the prevalence rate for any common mental disorder among males employed in construction trades was higher than the rate for all male workers. The rate for craft and related occupations and plant and machine operatives was lower than the rate for all workers whilst sales occupations had the highest prevalence rate (17%) (Table 3.2) (Stansfeld et al., 2011).

Table 3.2 Male and female prevalence rates for common mental disorders

Occupation	All workers	Males	Females
Skilled construction trades*	--	13%	--
Craft & related trades	11%	--	--
Plant & machine operators	9%	8%	13%
Sales**	18%	16%	19%
Total workforce	13%	11%	17%

Source: Stansfeld et al., 2011

*higher than the total male workforce average

**higher than the total workforce average

- A well designed UK study (Level ii evidence) reported that the proportion of patients attending psychiatrists for work-related mental disorders who worked in male-dominated industries ranged from <1% (mining and quarrying) to 6% (manufacturing). The proportion of patients attending occupational physicians for work-related mental disorders who worked in male-dominated industries ranged from <1% (agriculture, hunting and forestry) to 12% (manufacturing). These percentages are far lower than the proportion of attendees who were from non-male dominated industries. Twenty five per cent of those attending psychiatrists and 37% of those attending occupational physicians for work-related mental health disorders were from health or social work occupations (Table 3.3) (Carder et al., 2009). Also see Hessey et al. (2010).

Table 3.3 Prevalence of any work-related mental disorder by industry

Industry	Psychiatrist diagnosis	Occupational physician diagnosis
Agriculture	1%	<1%
Mining	<1%	1%
Manufacturing	6%	12%
Construction	2%	1%
Transport	5%	5%
Utilities	<1%	3%
Health & social work	25%	37%

Source: Carder et al., 2009

- A study (Level iii evidence) of Canadian resource industry workers reported that the disability⁸ rate based upon having any mental disorder (2.1%) was similar to that for musculoskeletal (2%) and injury disorders (2%) (Dewa et al., 2010).
- A rigorous US study (Level I evidence) reported that US construction workers had an elevated risk (RR 2.6) of being diagnosed with schizophrenia (Muntaner et al., 1991).
- Another well-designed study (evidence ii Level) reported that US construction workers were 1.7 times more likely than other blue collar workers to have been advised by a doctor that they had an emotional, nervous, or psychiatric problem (Petersen & Zwering, 1998).

Category B studies: Anxiety and Depression

Fourteen international studies examined the prevalence of depression and anxiety in male-dominated industries and occupations using validated screening instruments. Some studies showed differences in prevalence rates within an industry, according to occupational category. It is difficult to draw conclusions from these studies as 1) differences in prevalence rates may not be significant, 2) prevalence rates are not compared among industries or 3) prevalence rates are not compared with the general population.

- A number of studies which estimated prevalence rates for the farming industry have been undertaken. A robust study (Level i evidence) of French workers reported that the prevalence rate for depression⁹ among male farmers (13.5%) was higher than that for all male workers (11%), while the prevalence rate for female farmers (10.4%) was slightly lower than for all female workers (10.6%) (Cohidon et al., 2009b). The occupation with the highest prevalence rate was non-male-dominated (i.e., clerks and sales workers; male=15.7%, female=12.3%). However, when adjusted for socio-demographic and health and life events, differences between occupational groups were not significant (Cohidon et al., 2009b). In contrast to findings in their previous study (Cohidon et al., 2009a), female farmers were less likely than males to suffer from depression (Cohidon et al., 2009b).
- A study of US farmers (Level i evidence) reported a prevalence rate of 9.8%¹⁰ however, no national workforce or non-farmer comparison prevalence rates were reported (Scarath et al., 2000). By contrast, a well-designed study (Level evidence ii)

⁸ Disability episode refers to an injury/illness that resulted in time off work.

⁹ Using the Center for Epidemiologic Studies Depression Scale (CES-D).

¹⁰ Using the Center for Epidemiologic Studies Depression Scale (CES-D).

of Norwegian workers reported the prevalence rate¹¹ for depression among male (17.3%) and female (13.2%) farmers was higher than non-farmers (male=9.3%, female=7.3%) (Sanne et al., 2004). Male farmers were twice and female farmers were 1.7 times more likely to meet depression criteria than non-farmers (Sanne et al., 2004). Similar to the findings of Cohidon et al. (2009b), these results also indicate female farmers may be less likely than male farmers to suffer depression (when assessed with a screening instrument). Higher mean anxiety scores¹² were found among male (4.8) and female (5.0) farmers than non-farmers (male=4.3, female=4.8), however differences were not statistically significant (Sanne et al., 2004).

- High prevalence rates for depression¹³ (Male = 24.9%, Female = 27.9%) were found in French utility industry workers (Niedhammer et al., 1998) (Level evidence ii). While this study did not compare prevalence rates with non-male-dominated industries or the national workforce, it did report that prevalence rates varied among occupational categories within the utilities industry. Male (21.4%) and female (14.8%) engineers had the lowest rates of depression whilst male craftsmen (33.2%) and female clerks (33%) had the highest rates (Niedhammer et al., 1998). This reflects the social gradient of health first found in the Whitehall studies on the social determinants of health (Stansfeld, 1999).
- High prevalence rates for depression¹⁴ were found among Japanese manufacturing workers (males = 20%-26.8%, females = 26.5%-31.5%) (Inoue & Kawakami, 2010), and female US poultry processing workers (47.8%) (Lipscomb et al., 2007) (both Level ii studies). Other studies have reported the prevalence for depression¹⁵ as 8.9%-9.4% among Japanese manufacturing workers (Kawakami et al., 1995), 16.5%¹⁶ among Japanese transport workers (Kawada & Suzuki, 1992), and 28%¹⁷ among UK oil rig workers (Gann et al., 1990) (all Level iii studies). Few conclusions can be drawn from these studies as they did not compare rates with non-male-dominated industries or national workforces.
- Mean depression scores for male (15.4) and female (15.3) Japanese manufacturing workers were reported (Nakata et al., 2006) but were not significantly different to each other. However, another study which used the same data set reported that the mean depression score for men and women was higher than the mean for the national male (12.2) and female (13.4) workforce (Ikeda et al., 2009).
- A study (Level evidence iii) of UK oil rig workers reported prevalence rates¹⁸ for anxiety (15%) and depression (28%) (Gann et al., 1990). No comparison rates were provided, however the mean depression scores was lower for offshore workers

¹¹ Using the Hospital Anxiety and Depression Scale (HADS).

¹² Using the Hospital Anxiety and Depression Scale (HADS).

¹³ Using the Center for Epidemiologic Studies Depression Scale (CES-D).

¹⁴ Using the Center for Epidemiologic Studies Depression Scale (CES-D).

¹⁵ Using the Zung Self-rating Depression Scale (SDS).

¹⁶ Using the Zung Self-rating Depression Scale (SDS).

¹⁷ Using the Goldberg anxiety and depression scale.

¹⁸ Using the Goldberg anxiety and depression scale.

(range 0.8-1.6) compared to onshore workers (range 0.8-2.5). Conversely, mean anxiety scores by job type were similar for offshore (range 1.8-3.1) and onshore workers (range 1.6-3.3) (Gann et al., 1990).

Category C studies: *Psychological Wellbeing/Distress*

Two international studies with small, non-representative samples (Level iii evidence) examined the prevalence of psychological wellbeing/distress among male-dominated industries using validated screening instruments.

- In one study, UK farmers had significantly higher mean GHQ-12 scores (10.7) compared to non-farmers (9.5) and 35% of farmers had GHQ-12 scores indicative of psychiatric disorders (Hounscome et al., 2012). In the other study, the mean GHQ-12 score for Chinese oil rig workers was 10.2, however no comparison scores for the general Chinese workforce or those in non-male-dominated industries were reported (Chen et al., 2009).

3.1.1.2 Implications

There is a need for better quality Australian data which considers the prevalence rates of mental health disorders in male-dominated industries.

Due to the 'social gradient' effect, studies should consider prevalence of mental disorders according to occupational grade/category. These variables can then be distinguished from variations in prevalence:

- by industry
- according to location (urban, regional, rural, remote)
- based on other work risk factors (e.g., job demand, job overload, job security).

Further research is required to better understand how negative life events (e.g., major life events such as death of close relative or divorce) are associated with mental health and substance use disorders.

Existing evidence suggests that rates of anxiety and depression differ according to industry, job category and region, thus policy responses should be duly tailored to such factors. For example, the construction industry is one where both rates of mental health problems and alcohol related problems appeared to be high. Attention should also be paid to non-male-dominated industries where work related anxiety and depression appears to be high (e.g., education, sales).

3.1.2 Substance Use Disorders Prevalence

This section addresses part two of question one, the prevalence of substance use disorders in male-dominated industries.

Q1.2 What are the prevalence rates of substance use disorders in male-dominated industries?

Alcohol-Related Disorders

No Australian alcohol dependence prevalence rates were found for male-dominated industries. The general Australian population prevalence of life-time alcohol abuse and dependence is 18.3% and 3.9% respectively, and statistically significantly more common among males and younger adults than females and older adults.

International prevalence rates of alcohol-related disorders in male-dominated industries:

- Alcohol dependence:¹⁹
 - 12.8%-15.6% (males) 1.4%-7.5% (females)
[vs US general population prevalence 13.2% (males) and 5.9% (females)]
 - 6.11%-18%, using CAGE in workplace studies.
- Alcohol abuse²⁰ in four male-dominated occupations in Canada, using the SMAST ranged from 20.5% (trades), 24.6% (manufacturing), 25.8% (transportation) to 40.5% (construction).
- Alcohol abuse and alcohol dependence combined: 7.2 -15.6%.
- Problematic drinking: 0.0 -51.0%.²¹
- Risky drinking: 1.4-13.8%.²²

Alcohol abuse and or dependence prevalence rates for the following male-dominated industries ranged:

- Construction 15.6%-40.5%
- Manufacturing 9.5%-24.6%
- Mining 7.2%.

Australian prevalence rates for problematic drinking for the mining and construction industry ranged from 37.7%-51%, compared to a risky drinking (in the last month) prevalence rate of 16.6% for the Australian working population, Australian risky drinking (in the last month) prevalence rates for the following male-dominated industries were:

- Construction 19.4%
- Manufacturing 14.8%
- Mining 20.3%
- Agriculture 16.9%
- Transport 17.4.

cont...

¹⁹ Alcohol dependence refers to 'a need for repeated doses of the drug to feel good or to avoid feeling bad.' *WHO (2012) Lexicon of alcohol and drug terms.*

²⁰ Abuse of alcohol or other substances, or 'psychoactive substance abuse' as defined in the DSM-111-R is 'a maladaptive pattern of use indicated by ... continued use despite knowledge of having a persistent or recurrent social, occupational, psychological or physical problem that is caused or exacerbated the use (or by) recurrent use in situations in which it is physically hazardous.' *WHO (2012) Lexicon of alcohol and drug terms.*

²¹ Problematic drinking is 'drinking resulting in problems, individual or collective, health or social.' *WHO (2012) Lexicon of alcohol and drug terms.*

²² Risky drinking as per NHMRC guidelines.

Other Substance Use Disorders (excluding alcohol)

No Australian substance use disorder prevalence rates were found for male-dominated industries. The general Australian population prevalence of life-time substance use disorders is 7.5% and prevalence is higher in males and younger adults.

International prevalence rates of substance dependence (excluding alcohol) were 1.7%-11%, compared to the general population rate of 4.9%.

Combined substance abuse and substance dependence in an international population was 1.3%-5.1% compared to the general population rate of 2.6%.

Male-dominated industry substance use disorders prevalence rates(excluding alcohol) were:

- mining 1.3%
- manufacturing 2.4%-3.1%
- construction 5.1%-11%.

Australian prevalence rates for substance use²³ were high in construction and transport industries.

3.1.2.1 Supporting Evidence

The review yielded 45 articles on the prevalence of substance use disorders in male-dominated industries. From these 45 articles, alcohol-related disorder prevalence data was obtained from 36 articles, substance use disorder prevalence data from 11, and two articles provided combined alcohol and substance use prevalence data.

The evidence tables for substance use prevalence are provided in Appendix B1.2.

Evidence Characteristics for Substance Use Disorders Prevalence

- 45 articles were found
- No Australian studies were found that reported the prevalence of diagnosed alcohol or other substance use disorders in male-dominated industries
- The evidence on the prevalence of alcohol and substance use disorders in male-dominated industries is poor
- Studies suggest that alcohol abuse and dependence were particularly high in some male-dominated industries, including manufacturing and construction
- The country of origin of various studies influenced prevalence rates, underscoring the importance of cultural factors.

²³ Substance use refers to 'self-administration of a psychoactive substance.' WHO (2012) *Lexicon of alcohol and drug terms*.

Alcohol-Related Disorders

The prevalence of potential alcohol problems among workers in male-dominated industries was assessed against five categories:

1. alcohol dependence
2. alcohol abuse
3. combined dependence and abuse
4. problematic drinking
5. risky drinking.

Studies of alcohol prevalence problems comprised participants from either general populations or male-dominated industries. General population studies concerned with alcohol abuse or dependence used the DSM-III, DSM-IV or ICD-9 to diagnose substance use disorders or the CAGE.²⁴ Workplace based studies concerned with problematic drinking most commonly used the AUDIT.²⁵ Studies examining the prevalence of risky drinking used a diverse array of measures.

A general pattern emerged of higher levels of drinking and alcohol-related problems, including dependence and alcohol abuse, among various male-dominated industries. The industries with higher prevalence levels of alcohol-related problems varied but problems appeared to be more concentrated in the construction industry and among manual workers. Workers in manufacturing, mining, transportation and farming/forestry/fishing also featured among higher prevalence groups.

The following table compares selected Australian and international prevalence rates for alcohol-related problems (dependence, abuse, problem drinking and risky drinking). The table shows that there was no published Australian prevalence data on dependence and abuse (Table 3.4).

²⁴ CAGE is an instrument where a score of ≥ 2 cutoff is indicative of alcohol dependence.

²⁵ AUDIT is an instrument where a score of ≥ 8 cutoff is indicative of problematic drinking.

Table 3.4 Australian and international prevalence of alcohol-related problems: selected comparisons

Alcohol-related problems	Australian Studies		International Studies	
	General/comparison population	Male-dominated industries	General population	Male-dominated industries
Dependence	1.4% General population ¹	—	U.S.² Male workers 13.2% Female workers 5.9%	U.S.² Male workers 12.8%-15.6% Female workers 1.4%-7.5% Male Labourers 15.2% Male farmers, forestry, fishing 13.8% Male machine operators 13.4% Female farmers, forestry, fishing 7.5% Female labourers 6.9% Female machine operators 6.5%
			Hong Kong³ Males 2.3% Females 0.7%	Hong Kong³ Male manual workers 3.6% Female manual workers 0.0%
Abuse	2.9% General population ¹	—	Hong Kong³ Males 5.3% Females 1.4%	Hong Kong³ Male manual workers 7.5% Female manual workers 0.6%
	—	—	Canada⁴ Workers 21%	Canada⁴ Manufacturing workers 24.6% Transportation/communication workers 25.8% Construction workers 40.5%
Dependence and abuse combined	4.3% General population ¹	—	U.S.⁵ Male and female workers 9.2%	U.S.⁵ 9.4% Utilities workers 9.5% Manufacturing workers 15.6% Construction workers
Dependence and abuse combined	—	—	U.S.⁶ Male workers 11.4% Female workers 2.5%	U.S.⁶ Construction labourers <ul style="list-style-type: none"> • Males 29.1% • Females 0% Other construction trades <ul style="list-style-type: none"> • Males 18.7% • Females 0% Transportation <ul style="list-style-type: none"> • Males 19% • Females 0% Farm workers <ul style="list-style-type: none"> • Males 26.6% • Females 0%

Alcohol-related problems	Australian Studies		International Studies	
	General/comparison population	Male-dominated industries	General population	Male-dominated industries
Problem drinking	—	—	Canada ⁷ Male and female workers 11%	Canada ⁷ Male and female workers <ul style="list-style-type: none"> • Construction 18% • Transportation 12% • Forestry / mining 17%
			Canada ⁸ Lifetime prevalence male and female workers 4.6%	Canada ⁸ Lifetime prevalence male and female workers <ul style="list-style-type: none"> • Manufacturing 4.6% • Transportation 4.3% • Construction 10.2% • Utilities 0%
Risky drinking	Male and female workers ⁹ 19.2%	Construction 18.6% ⁹ Mining 24% ⁹ Manufacturing 19.9% ⁹	—	—

¹ Teesson et al. (2010)

² Harford et al. 1992)

³ Kim et al. (2008)

⁴ Macdonald & Wells (1996)

⁵ Larsen et al. (2007)

⁶ Mandell et al. (1992)

⁷ Hodgins et al. (2009)

⁸ Thompson et al. (2011)

⁹ Pidd et al. (2008)

Alcohol Dependence

No Australian studies identified the prevalence of alcohol dependence in male-dominated industries. In the general Australian population, prevalence of life-time alcohol abuse and dependence is 18.3% and 3.9% respectively, and statistically significantly more common in males and younger adults (Teesson et al., 2010).

There were no Australian studies of alcohol dependence in male-dominated industries. The general Australian population prevalence of life-time dependence is 3.9%, and is statistically significantly more common in males and younger adults.

Two international studies (Level i evidence) indicated higher than population average prevalence of alcohol dependence for US **male labourers, farmers/forestry/fishing, machine operators/assemblers, and precision production/craft/repair workers and female farmers/forestry/fishing, labourers, and machine operators** (Harford et al., 1992) (see Table 3.5).

Similarly, alcohol dependence levels in male and female **manual workers/tradesmen** in Hong Kong were approximately 8 and 3 times greater (respectively) than the study population (Kim et al., 2008).

Alcohol dependence prevalence was reported in two international studies. One United States study (Harford et al., 1992) provided evidence from a large representative population study (Level i evidence). Another was a small, well designed study (Level i evidence) undertaken in Hong Kong (Kim et al., 2008).

- In the US study, alcohol dependence ranged from 12.8%-15.6% for males and 1.4%-7.5% for females in male-dominated industries, compared to 13.2% for males and 5.9% for females in the general study population. Prevalence rates were higher for male workers in 4 out of 5 industry groups (labourers, farmers/forestry/fishing, machine operators/assemblers, and precision production/craft/repair workers); and for 3 out of 5 female workers (farmers/forestry/fishing, labourers, and machine operators) compared to the comparison population (Table 3.5) (Harford et al., 1992)
- In a study of manual workers/tradesmen in Hong Kong, prevalence rates for alcohol dependence were lower: 3.6% for males and 0% for females; compared to 2.3% for males and 0.7% for females in the study population (Kim et al., 2008). That is, alcohol dependence levels were approximately 60% greater for male manual and trade workers compared to the study population.

Table 3.5 Male and female prevalence rates for alcohol dependence

Precision Production, Craft, Repair %		Machine Operators, Assemblers %		Transportation, Material Moving %		Farmers, Forestry, Fishing %		Labourers %		Comparison Study Population %	
M	F	M	F	M	F	M	F	M	F	M	F
15.6	4.8	13.4	6.5	12.8	1.4	13.8	7.5	15.2	6.9	13.2	5.9

Source: Harford et al., 1992

A further four studies reported prevalence rates among male-dominated industry workers for likely alcohol dependence from non-representative studies (Level iii evidence), using the CAGE. Prevalence estimates of likely alcohol dependence ranged from 6.1% to 18%. There were no comparison populations in these studies (Table 3.6).

Table 3.6 Prevalence rates for alcohol dependence, using the CAGE

Author	Industry/Occupation	Prevalence %
Peretti-Watel, 2009	Clerks & Manual Workers	9.0
Moore & Greenberg, 2000	Manufacturing	11.6
Amick et al., 1999	Paper Manufacturer, Chemical, Insurance, Building & Utility Co's.	18.0
Bamberger et al., 2006	Older Transportation, Manufacturing, Construction Workers	6.1

Alcohol Abuse

Life-time alcohol abuse rate in the general Australian population is 18.3%. No Australian studies in male-dominated industries were found.

Alcohol abuse rates among **manual/trade workers** in Hong Kong were approximately two to three times higher than the study population rates (Kim et al., 2008). In Canada (Macdonald and Wells, 1996) alcohol abuse rates were higher among **manufacturing, transportation and construction** workers than the general population (Macdonald and Wells, 2006). The alcohol abuse rates of construction workers were approximately double the general population rate. These were both Level ii studies.

Two studies were identified in regard to alcohol abuse. These were small, well designed studies conducted in Hong Kong (Kim et al., 2008) and Canada (Macdonald and Wells, 1996) (Level ii evidence):

- Prevalence of alcohol abuse in manual/trade workers in Hong Kong, according to DSM-IV clinical diagnostic criteria, was 7.5% for males and 0.6% for females. These

alcohol abuse rates were higher than the study population rates of 5.3% for males and 1.4% for females (Kim et al., 2008).

- Variations in the prevalence of alcohol abuse were found among four male-dominated occupations in Canada, using the SMAST:
 - 20.5% (trades)
 - **24.6% (manufacturing)**
 - **25.8% (transportation)**
 - **40.5% (construction).**

These rates were all higher than the working population prevalence of 21.0% with the exception of workers in trade occupations (Macdonald and Wells, 2006). The prevalence of alcohol abuse among construction workers was approximately twice as high as the general population rate.

Combined Alcohol Abuse and Alcohol Dependence

Alcohol abuse and dependence rates (combined) in six male-dominated industries found that **utilities, manufacturing and construction** workers had higher than average prevalence rates for combined alcohol and drug (Larson et al., 2007).

Alcohol abuse and dependence rates were also found to be up to two to three times the general population rate for **construction labourers, farm workers and construction workers** in a US study (Mandell et al., 1992).

The prevalence of combined alcohol abuse and dependence was found in three studies (Larson et al., 2007; Diala et al., 2004; Mandell et al., 1992), each with large representative samples (Level I evidence). These three studies all used DSM diagnosis criteria:

- The combined alcohol abuse and dependence rate in six male-dominated industries in the Larson et al. (2007) study ranged from:
 - 7.2% (mining)
 - 8.1% (transport)
 - 8.8% (agriculture/fishing)
 - **9.4% (utilities)**
 - **9.5% (manufacturing)**
 - **15.6% (construction).**

The working population prevalence was 9.2% in this study (Larson et al., 2007). That is, utilities, manufacturing and construction had higher than average prevalence rates for combined alcohol abuse and dependence.

The lifetime prevalence rates of combined alcohol abuse and dependence among labourers and craftsmen varied by geographical location suggesting an interaction between occupation type and geographic location (Table 3.7) (Diala et al., 2004).

Table 3.7 Alcohol Abuse and dependence, lifetime prevalence rates

Location	Labourers %	Craftsmen %
Metro	8.7	12.0
Urban	10.1	15.9
Rural	7.1	23.8

Source: Diala et al., 2004

Prevalence of alcohol abuse and dependence rates among four male-dominated industries was found to be substantially greater compared to the general population. Alcohol abuse and dependence rates were up to two to three times the general population rate for construction labourers (29%), farm workers (27%) and construction workers (19%). These rates were notably different for females. In a US study, prevalence rates for males were much higher than for females in all male-dominated industries reported (Mandell et al., 1992) (Table 3.8).

Table 3.8 Male and female crude prevalence rates for alcohol abuse

Construction %		Transportation %		Farm Workers %		Construction Labourers %		General Population %	
M	F	M	F	M	F	M	F	M	F
18.8	0.00	19.0	0.00	26.67	0.00	29.17	0.00	11.5	2.5

Source: Mandell et al., 1992

Problematic Drinking

Two male-dominated Canadian industries, **transportation and forestry/mining** had higher prevalence rates of problem drinking than the study population (Hodgins et al., 2009); and in a study of five male-dominated industries (Thompson et al., 2011) **construction and manufacturing** had problematic drinking levels 2 and 5 times (respectively) higher than their comparison population.

In a series of other studies problem drinking ranged from 27% to 51% among **construction workers** (Biggs et al., 2012 Cunradi et al., 2008), **construction apprentices** (Pidd et al., 2006), **miners** (Lenings et al., 1997), **industrial workers** (Silva et al., 2003) and **transportation workers** (Hilton et al., 2009).

A total of 11 studies addressed problem drinking in male-dominated industries.

Two small, well designed studies from Canada (Hodgins et al., 2009; Thompson et al., 2011) provided level ii evidence. Both of these studies used the AUDIT, with a score of ≥ 8 cut-off indicating problematic drinking.

- Prevalence of problem drinking in six male-dominated industries (Hodgins et al., 2009) 8%-17%:
 - 8% (utilities)
 - 9% (farmers, fishing)
 - 10.0% (manufacturing)
 - **12.0% (transportation)**
 - **17% (forestry/mining)**
 - **18% (construction).**

Transportation, forestry/mining and construction had higher prevalence rates than the study population (11.0%).

- The prevalence of problem drinking in five male-dominated industries in the Thompson et al. (2011) study ranged from:
 - 0.0% (utilities)
 - 4.3% (transport)
 - 4.4% (primary industries)
 - **4.6% (manufacturing)**
 - **10.2% (construction).**

In comparison, prevalence in the study population was 4.6%. Construction had a prevalence level twice that of the comparison population.

Prevalence rates for problematic drinking were also reported in eight non-representative studies (Level iii evidence). Using the AUDIT, the prevalence rate for problematic drinking

ranged from 11.3% to 51.0%. While comparison data were not available for these eight studies, prevalence rates for problem drinking that exceeded 20% place these workers among the heaviest and riskiest drinkers.

Construction workers featured prominently in three of these eight studies. These findings echo those of Banwell et al. (2006) who found that 19% of Australian construction industry workers reported ever having had a problem since working in the industry and 4% reported a problem in the past month (Table 3.9).

Table 3.9 Prevalence of problematic drinking, Level iii studies, using the AUDIT with ≥ 8 cut-off

Author	Industry/Occupation	Prevalence %
Biggs et al., 2012*	Construction	51 .0
Pidd et al., 2006*	Construction Apprentices	45.0
Lenings et al., 1997*	Miners (males only)	37.7
Silva et al., 2003	Industrial workers	31.1
Cunradi et al., 2008	Construction	29.0
Hilton et al., 2009	Transportation	26.8
Dos Santos et al., 2007	Garbage collection workers	15.0
Hermansson et al., 2002	Transportation	11.3

* Australian Studies

Amongst transport, manufacturing and construction workers nearing retirement the prevalence of heavy drinking was 16.8% and six months later after retirement 14.9% This study suggests that patterns of drinking developed during one’s working life may persist into retirement and older age (Level iii evidence) (Bacharach et al., 2004).

Risky Drinking

A nationally representative Australian study (Pidd et al., 2008) found strong evidence that prevalence rates for risky drinking in male-dominated industries was higher than the general population rate and particularly for **mining, construction, transport and farmers/forestry/fishing workers.**

Strong evidence (Level i) regarding the prevalence of risky drinking in male-dominated industries was found in five studies. Three were Australian studies (Pidd et al., 2006; Pidd et al., 2008; Velandar et al., 2010) and two were conducted in the United States (Caban-Martinez et al., 2011; Dawson, 1994). The prevalence of risky drinking in these five Level i studies ranged from 1.4% to 44.9%. A broad range of measures were used to indicate risky

drinking. One Australian study (Pidd et al., 2008) provided strong evidence that prevalence rates for risky drinking in male-dominated industries was higher than the general population rate (Table 3.10), and particularly so for mining, construction, transport and farmers/forestry/fishing workers.

Table 3.10 Prevalence of risky drinking in male-dominated industries (Level i evidence)

Author, Year	Measure	Prevalence %							
		Manuf'g	Construction	Precision Production Craft, Repair	Machine Operators, Assemblers, Inspectors	Transport/ Material Moving	Farmers, Forestry, Fishing	Mining	Gen Pop
Caban-Martinez et al., 2011*	M: ≥ 10 per week F: ≥ 7 per week OR ≥ 5 or more drinks at one sitting, 1 or more times in a year	NR	NR	M: 12.2 F: 1.4	M:13.0 F: 5.9	M: 13.8 F: 8.8	M:12.0 F:3.7	NR	8.2 [#]
Dawson, 1994	≥5+ drinks in one session, ≥1 times a year.	NR	NR	9.6	7.3	7.2	7.4	NR	NR
Pidd et al., 2008	Risky drinking [†] at least monthly or weekly	24.7	33.7	NR	NR	26.9	29.5	29.5	26.0
Velander et al., 2010	Risky drinking in last year	NA	NA	NA	NA	NA	NA	M: 44.9 F: 23.9	
Pidd et al., 2001	Working under the influence of alcohol in last year	NR	6.0	NR	NR	7.2	NR	NR	5.6

*In young adults 18-24 years old; NR: Not Reported; NA: Not Applicable; [#]in employed youth

[†] 2001 NHMRC Guidelines males >6; females >4 in a session

Prevalence was also reported for risky drinking by farmers, which showed that prevalence for risky drinking was higher amongst male farmers (43.5%) compared to non-farming males (39.1%) but that risky drinking was lower among female farmers (25.67%) than non-farm females (30.3%) (Eather et al., 2011).

3.1.3 Substance Use Disorders (Excluding Alcohol)

For drugs other than alcohol, a large representative population (Level i evidence) (Pidd et al., 2006) found the prevalence of substance use for **construction and transportation workers** was half as much to almost twice the level in the general population. More recent national Australian data (Pidd et al., 2008) (Level i evidence) on substance use in the last 12 months found workers in the **construction industry** appear to have substantially higher levels of substance use than either workers in other male-dominated industries or the Australian workforce overall.

An examination of the combined prevalence of drug abuse and dependence in six male-dominated industries (Larson et al., 2007) found that only **construction workers** had a higher prevalence rate than the comparable study population at almost double the average rate.

The prevalence of potential drug problems among workers in male-dominated industries was assessed against three categories:

- Drug dependence
- Combined drug dependence and drug abuse
- Substance use.

Drug Dependence

There were no Australian studies examining the prevalence of drug dependence among workers in male-dominated industries. Drug dependence prevalence was reported in one international study undertaken in the United States. The prevalence of drug dependence in five male-dominated industries in this small, well designed study (Thompson et al., 2011) which used the DAST, ranged from:

- 1.7% (transportation)
- 3.4% (utilities)
- 3.1% (manufacturing)
- **5.3% (primary industries)**
- **11.0% (construction).**

Construction and primary industries workers had higher prevalence rates than the general population where prevalence of substance use disorders was 4.9%.

3.1.3.1 Combined Prevalence of Substance Abuse and Substance Dependence

Evidence from two US studies (Larson et al., 2007; Diala et al., 2004) based on DSM diagnostic criteria and with large representative samples (Level I evidence) reported a combined prevalence of drug abuse and dependence.

- Combined prevalence of drug abuse and dependence in six male-dominated industries reported by Larson et al., (2007) ranged from:
 - 1.3% (mining)
 - 1.9% (utilities)
 - 2.2% (transport)
 - 2.3% (agriculture/fishing)
 - 2.4% (manufacturing)
 - **5.1% (construction).**

Only construction had a higher prevalence rate than the comparable study population (2.6%).

There is also evidence that prevalence of drug abuse and dependence also differs within male-dominated industries along geographical lines (Table 3.11) (Diala et al., 2004).

Table 3.11 Substance abuse and dependence, lifetime prevalence rates

Location	Labourers %	Craftsmen %
Metro	9.8	10.0
Urban	7.7	18.9
Rural	8.2	24.9

Source: Diala et al., 2004

3.1.3.2 Substance Use

One Australian study (Level I evidence) provided the most recent prevalence for substance use in the last 12 months in various industries (Pidd et al., 2008) and specifically cannabis and amphetamine use (Table 3.12). Prevalence of substance use for construction and transportation workers was half as much to almost twice as much as the general population prevalence in the same study (0.9%).

Table 3.12 Proportion of employed respondents, 2004 NDSHS, who reported any drug use in the last 12 months by industry and gender

Industry	Females		Males		All	
	%	CI	%	CI	%	CI
Agriculture	5.8	2.9-11.3	19.3	14.3-25.6	15.8	11.9-20.6
Mining	27.8	12.2-51.6	10.1	5.9-16.6	12.0	7.7-18.3
Manufacturing	12.9	9.3-17.6	18.7	16.0-21.7	17.2	14.9-19.7
Construction	10.0	6.6-14.8	26.3	23.1-29.7	24.2	21.2-27.4
Transport	11.0	6.3-18.5	20.2	16.2-22.3	17.4	15.5-19.5
All workers	13.3	12.3-14.4	20.7	19.4-22.0	17.5	16.5-18.5

Source: Pidd et al., 2008

3.1.4 Alcohol and Substance Use Disorders Combined

One study reported a combined prevalence for alcohol and other substance use disorders.

- A large representative Canadian sample (Level i evidence), using the CID1, across four occupational groups reported a prevalence range of:
 - 1.1% (craft)
 - **2.8% (foremen)**
 - **3.3% (farmers)**
 - **3.4% (labourers).**

In the comparable general population the prevalence of alcohol and drug disorders was 1.2% (Dewa and Lin, 2000).

3.1.4.1 Implications

There is a need to conduct Level i evidence studies of the prevalence of alcohol and substance use disorders in Australian male-dominated industries. The data suggests that there are cultural variations in terms of alcohol dependence and abuse, highlighting the importance of undertaking Australian based studies. This evidence also suggests that:

- Strategies to reduce the prevalence of substance use disorders should be tailored to the needs of specific male-dominated industries. For example, it appears that alcohol abuse/dependence is higher in the construction and manufacturing industries.
- Prevention programs for young workers transiting into the workforce and for those transiting out due to retirement or ill health may reduce the prevalence of risky and problematic use in these age groups.

3.2 Awareness Levels and Attitudes

This section addresses question two on awareness levels and attitudes in relation to depression, anxiety and substance use disorders in male-dominated industries.

Q2. What are the awareness levels and attitudes towards depression, anxiety and substance use disorders in male-dominated industries?

In male-dominated industries, awareness levels and attitudes towards depression, anxiety and substance use disorders were uncertain. No evidence was located that specifically addressed this question. Consequently, no conclusions could be drawn on the basis of currently available evidence. Addressing this gap warrants attention and the development of a program of research specifically focused on these issues.

3.2.1 Implications

There is a significant research gap regarding awareness levels and attitudes towards depression, anxiety and substance use disorders in male-dominated industries.

In order to gain a more thorough understanding of this issue there is a need to:

- Extrapolate findings from the broader mental health and men's health research evidence
- Conduct descriptive research to determine awareness levels and attitudes towards mental health and substance use disorders in male-dominated industries.

3.3 Risk Factors

This section addresses question three on risk factors for depression, anxiety and substance use disorders in male-dominated industries.

Q3. What are the risk factors for depression, anxiety disorders and substance use disorders in male-dominated industries?

The systematic review identified a broad range of risk factors for depression, anxiety disorders and substance use disorders in male-dominated industries. The evidence for depression, anxiety disorders and for substance use disorders was similar. The evidence has been combined below.

Individual:

- Demographic characteristics:
 - Being a younger worker
 - Being more junior in the work team, unit, company
 - Being male
- Life experiences
 - Negative life events (e.g., death of a close family member, divorce)
- Individual characteristics:
 - Job unsuitability
 - Attitudes towards work, associated with job security
 - Positive alcohol expectancies
 - Expectations of, or actual job changes
- Disparity in occupational status:
 - Manual workers were more at risk than non-manual workers
 - Unskilled workers were at significantly more risk than skilled workers
 - Lower status occupations were significantly more likely to be at risk than higher status occupations
 - Blue collar workers were at significantly more at risk than white collar workers.

Team:

- Poor workplace relationships:
 - Lack of line manager support
 - Poor supervision combined with job stress
 - General lack of support and cooperation at work
- Permissive drinking norms.

Work:

- Work demands; job demands and job overload
- Poor employment conditions and job insecurity
- Limited work role; inability to use one's skills/decision-making capacity.

Individual/Workplace Interface:

- Work/life imbalance (e.g., little time to unwind after or see family between shifts, unpredictable work hours, excessive overtime)
- Job demands/overtime/negative work-related life events.

3.3.1 Supporting Evidence

3.3.1.1 Mental Health Disorders

The systematic review of risk factors for mental health disorders in male-dominated industries identified 21 studies, most of which were cross-sectional in nature (Level iv evidence). Only a limited number of studies used clinical measures (i.e., objective measures of mental health disorders), and most instead relied upon self-reports of participants – which may have led to under- or over-reporting of symptoms.

Evidence Characteristics for Mental Health Disorders Risk Factors

- 21 articles were found.
- Only one small Australian study was located, with a sample of Australian farmers.
- Nine study populations were from Europe: a working population in south-east France, a general population working overtime in Norway, a general population in Great Britain, middle aged men who worked for Volvo in Sweden, women in Sweden working in different gender segregated professions, a general population in France, trade union members in Italy, unemployed former timber mill workers in Finland and forest industry employees in Finland. Three studies included populations from the USA: employees in an energy production factory, aluminium factory workers in 'heavy industry' and farm workers across two states. Study populations also included five from Japan: manufacturing workers in a camera factory, full time male blue collar workers in an energy factory, manufacturing workers across eight factories, employees across nine manufacturing factories and employees of a car manufacturer. Two other studies had populations from Asia: Chinese offshore platform workers and Malaysian automotive assembly workers. One study was from South Africa and included people working in the mining industry.
- The studies were primarily cross-sectional (Level iv evidence) and focused on a particular workplace (i.e., site) rather than an industry/workforce. Five studies were prospective cohort studies (Level ii evidence).
- Four studies used clinical measures for anxiety and depression, the DSM-III-R, the Revised Clinical Interview Schedule (RCI-R), the Hospital Anxiety and Depression Scale (HADS), the WHO Composite International Diagnostic Interview (CIDI) and the WHO International Classification of Diseases (ICD-9). Another used health insurance depression claims, based on doctors' diagnoses. Various self-report questionnaires were used as measures for anxiety and depression symptoms, including the General Health Questionnaire, Zung Self-Rated Depression Scale, Minnesota Multiphasic Personality Inventory, Depression Anxiety Stress Scales, and the Psychological General Wellbeing Inventory, Centre for Epidemiological Studies Depression Scale (CES-D), the Personality Assessment Inventory (PAI), the Generic Job Stress Questionnaire and a self-report questionnaire specifically designed for the particular study.

From the studies examined, positive human relations at work, including social support (Rose et al., 2006; Oldfield et al., 2007; Rusli et al., 2008; Joensuu et al., 2010) and instrumental support (i.e., technical support) (Oldfield et al., 2007) were important factors related to psychological wellbeing. Protective factors for reduced psychological distress identified in the review included:

- Regular physical exercise, sufficient sleep and appropriate working hours (Ezoe et al., 1994)
- Higher self-reported health status (Scarth et al., 2000).

By comparison job overload, job demands, working overtime and other life events were positively associated with mental ill health. The risk factor mental health evidence table is provided in Appendix A.2.1 Mental Health Risk Factors.

Risk factors for depression and anxiety disorders in male-dominated industries identified from the systematic review included:

Mental Health	Risk Factors	Examples
Individual	<p>Life events</p> <p>Degree of fit to a worker's skills and abilities</p> <p>Job insecurity</p>	<ul style="list-style-type: none"> • Death of a spouse, divorce or separation, death of a close family member, serious personal illness or injury (Rose et al., 2006; Cohidon et al., 2009) • Legal problems, substantial income decline and sentimental loss (Scarath et al., 2000). • Lack of skill discretion and variety in the working role (ability to use one's skills) • Low level of autonomy • Lack of work variety, semi-routine occupations (Kawakami et al., 1992; Oldfield et al., 2007; Meltzer et al., 2010; Joensuu et al., 2010). • Expectations of undesirable job change or actual job changes (Meltzer et al., 2010).
Team	Poor workplace relationships	<ul style="list-style-type: none"> • Poor human relations or interpersonal conflict at work (Kawakami et al., 1992, Inoue et al., 2010) • Not having the respect of a line manager (Meltzer et al., 2010) • Absence of cooperation at work (Cohidon et al., 2010) • Workplace bullying (Niedhammer et al., 2006)
Work	Job overload and job demands	<ul style="list-style-type: none"> • Pressure and working conditions; the frequency of working fast, without error, with conflicting demands; time pressures (Cohidon et al., 2010; D'Errico et al., 2011; Ieneco et al., 2010; Kleppa et al., 2008; Oldfield et al., 2007) • Excessive amounts of overtime worked (Kleppa et al., 2008; D'Errico et al., 2011; Oldfield et al., 2007; Rusli et al., 2008) • Working atypical hours (Cohidon et al., 2010; D'Errico et al., 2011; Oldfield et al., 2007) • These factors were more strongly associated with heavy manual labour and shift work and lower levels of skills and education (D'Errico et al., 2011).
Work-home interference	<p>Role conflict</p> <p>Changes in work-life balance</p>	<ul style="list-style-type: none"> • Conflict between work and family roles (see McShane et al., 2009; Oldfield et al., 2007; Chen et al., 2009). • Actual negative work-related life changes (business readjustment, change to a different line of work, change in responsibilities at work or change in working hours and conditions), especially for blue collar workers (Rose et al., 2006) • Recent job loss was associated with depression (Mallinckrodt et al., 1992).

The evidence is inconsistent in regard to whether older age is a risk factor for depression. Two studies reported older age to be a protective factor for depression among employed men (Kawada et al., 2009; Ieneco et al., 2010) whilst another found that older men were more likely to report depressive symptoms (Maffeo et al., 1990).

Some studies drew conclusions about women in male-dominated industry or workplaces. Risk and protective factors considered were overtime, job status and level of gender segregation. Women working overtime were particularly susceptible to anxiety and depression symptoms (Kleppa et al., 2008). There was lower risk of severe anxiety disorders among women working in female-dominated occupations, compared to women working in gender integrated occupations (Savikko et al., 2008). In one study based in the nuclear

industry, where higher status jobs were generally linked to less depressive symptoms, more depressive symptoms were found among women with a higher salary (Maffeo et al., 1990). Whilst one study identified higher rates of diagnoses of depression for women working in male-dominated occupations (Iennaco et al., 2010), other studies did not show higher rates of mental disorders for women (Maffeo et al., 1990; Savikko et al., 2008).

One study showed that interpersonal conflict at work was associated with depression, particularly for males of higher socio-economic status (SES) when compared to males in lower SES occupations. However this trend was not the same for women (Inoue et al., 2010). Women appeared more resilient to interpersonal conflict at work (Inoue et al., 2010), but in other studies were found to be more susceptible to depressive symptoms compared to men when they observed bullying in the workplace (Niedhammer et al., 2006).

Notable features of the evidence in regard to risk factors for mental illness in male-dominated industries:

- Many studies focused on a particular workplace/company or industry, and did not address male-dominated industries in general
- Most studies were cross-sectional, thus at a 'lower level' of evidence
- Overall, workplace culture was not a factor considered by the studies as a contributor or risk factor.

3.3.1.2 Substance Use Disorders

The review yielded 20 articles on risk factors for substance use disorders in male-dominated industries. These articles were derived from 12 different studies. Except for one article they all investigated risk factors for alcohol use disorders. There were three cohort (Level i and ii evidence) and two case-control studies (Level iii evidence), and others were cross-sectional studies (Level iv evidence). These studies investigated different risk factors and used different alcohol use disorders measures.

Evidence characteristics of Risk Factors for Substance Use Disorders

- 20 articles were found, derived from 12 separate studies
- No Australian studies had strong enough evidence to be included
- Studies were a mixture of cohort and cross-sectional study designs, with one prospective case-control study
- Participants were randomly recruited to most studies
- Alcohol use disorders were most commonly investigated.

Studies conducted with general populations investigated "occupation" as a risk factor for a clinical diagnosis of alcohol use disorders, as measured by the DSM-III or ICD-9. Studies

conducted in workplaces investigated a range of occupational stressors and workplace characteristics as risk factors for alcohol use disorders which were measured using indicator tools, such as the CAGE and AUDIT. The substance use disorder risk factor evidence table is provided in Appendix A2.2 Substance Use Risk Factors.

Risk factors for alcohol-related disorders in male-dominated industries were:

Alcohol-Related Risk Factors		Examples
Individual	Occupational Status	<ul style="list-style-type: none"> Manual workers statistically more at risk than non-manual workers (Hemmingsson et al., 1997; Hemmingsson and Ringback 2001) Unskilled workers were significantly more at risk than skilled workers (Hemmingsson et al., 1998) Persons employed in lower status occupations were significantly more likely than those in higher status occupations to be at risk (Chum et al., 1995) Blue collar workers were significantly more at risk than white collar workers (Marchand, 2008).
	Work Attitudes	<ul style="list-style-type: none"> Poor attitudes towards work (Thompson et al., 2009) Positive alcohol expectancies²⁶ (Bacharach et al., 2008).
	Demographic characteristics	<ul style="list-style-type: none"> Younger workers (Cunradi et al., 2009; Hiro et al., 2007) More junior in the work team, unit, company (Delaney et al., 2002) Male (Bacharach et al., 2002).
Teams	Workplace cultural factors	<ul style="list-style-type: none"> Job attitudes, job stress, job value, unpredictable work-time (Thompson et al., 2009) Permissive drinking norms (Bacharach et al., 2002).
Work	Workplace stressors	<ul style="list-style-type: none"> Job overload and job demands (Ragland et al., 2000; Thompson et al., 2009) Imbalance between job stress and workplace support (Ragland et al., 2000; Hiro et al., 2007) Poor supervision (Bamberger and Bacharach, 2006) Under-utilisation of skills and actual decision-making capacity (Delaney et al., 2002; Marchand, 2008) High work demands (Marchand, 2008).
Work-home interference	Work/life imbalance	<ul style="list-style-type: none"> Having little time to unwind after finishing work (Delaney et al., 2002; Patterson et al., 2005; Marchand, 2008).

Age (younger), gender (male), marital status (single/divorced), education (low) and income (low) were identified as characteristics that mediate the association between work and alcohol-related disorders (Chum et al., 1995; Grunberg et al., 1998; Moore et al., 2000; Bacharach et al., 2002; Bamberger and Bacharach 2006; Delaney et al., 2002). These socio-demographic characteristics may increase the likelihood of risky/harmful drinking behaviours or alcohol-related disorders.

The systematic review yielded only one article on risk factors for substance use disorders (other than alcohol) in male-dominated industries. This article concerned a general population study of males and females aged 18 years and over living in Alberta, Canada who had been employed at some point in the preceding 12 months in a broad range of occupations and industries (Thompson et al., 2009). Attitudes towards work, proximity to work, stress, job value, inconsistency in number of hours worked in a week, level of personal

²⁶ Alcohol expectancies are the belief that drinking will lead to positive, pleasurable experiences.

liability for accidents occurring in and around work-sites (e.g., train drivers) after hours and personal liability risk were identified as risk factors for substance use disorders, but were disproportionately distributed across male-dominated industries.

Notable features of the evidence were that few studies examined risk factors for alcohol and/or substance use disorders in male-dominated industries.

3.3.2 Implications

This review highlighted the importance of interventions designed to minimise risks for anxiety, depression and substance use disorders in male-dominated industries addressing individual, team, work and work/home interface factors. These may be addressed individually or as part of a more systematic approach, incorporating workplace demographic characteristics, workplace culture and individual and workplace stressors.

Employment grade is an established risk factor for mental health and substance use that cannot be explained by the 'health selection' effect (i.e., where poor health/disability leads to lower employment grade) (see Chandola et al., 2003).

Further research into risk and protective factors in male-dominated industries is warranted, particularly in regard to substances other than alcohol. The type of future research required includes:

- Prospective cohort studies to establish aetiology
- Studies of factors known to be associated with work-place mental health (e.g., employment grade, job demands, job insecurity)
- The impact of the global economic crisis on job insecurity and subsequent mental health problems
- Examination of "job unsuitability" and lack of skill discretion/autonomy as factors related to depressive symptoms. Further examination may include the association between job unsuitability, depression and career change/change across industry, and obstacles to career change. It has been previously shown that people change careers to ensure that their personality matches their work environment (Donohue, 2006)²⁷
- Examination of different job demands across industries. How do job demands interact with employment grade? How do these job demands differentially impact upon men and women, both in terms of work-home interference and anxiety and depression?

²⁷ Donohue, R. (2006). 'Person-environment congruence in relation to career change and career persistence,' *Journal of Vocational Behaviour*, 68, 504-515.

3.4 Help-Seeking Behaviours and Barriers

This section addresses question four on help-seeking behaviours and barriers to help-seeking for depression, anxiety and substance use disorders in male-dominated industries.

Q4. What are the help-seeking behaviours and barriers for depression, anxiety disorders and substance use in male-dominated industries?

Characteristics of help-seekers in male-dominated industries for anxiety and depression are:

- An awareness that others had noticed their ill-health and had suggested that they seek help
- Had previously sought help for emotional problems
- Reliance on trusted friends
- Noticed that their depression and anxiety had become more severe
- Had work difficulties, including work absenteeism and poor work performance evaluations
- Being single, aged under 45 and living in a city.

No studies were located on help-seeking for substance use disorders in male-dominated industries.

3.4.1 Supporting Evidence

There were two studies on help-seeking by workers in male-dominated industries. The help-seeking evidence table is provided in Appendix A3 Mental Health Help-seeking.

3.4.1.1 Mental Health

The first study examined engineers from a large US company (Level iii evidence) (Dew et al., 1991). In this cross-sectional study, participants (N=186) (Dew et al., 1991) had met DSM-III criteria for major depression in the last 12 months, of whom 59 (32%) had sought professional help.

Characteristics of help-seekers in this study were:

- Awareness that others had noticed their ill-health and had suggested that they seek help
- Previously sought help for emotional problems
- Difficulties at work, including work absenteeism and having received poor work performance evaluations
- Less likely to be married.

The second study was a descriptive qualitative study (Level iv evidence) of open cut mine workers (N=10) in Queensland (McClean, 2012). This study identified lack of help-seeking behaviour among miners and a reliance on trusted friends at the mine site (rather than seeking help from a formal program). This study suggests that workplace relationships are crucial, especially where men are reluctant to engage in help-seeking behaviour from formal programs.

A Supplementary Search

In view of the apparent gap in the evidence concerning help-seeking behaviours, a supplementary electronic database search, omitting the search term “male-dominated” industry/ies, was undertaken. The purpose of the supplementary search was to locate existing literature reviews on men’s general help-seeking behaviours for anxiety, depression and substance use not directly tailored to male-dominated industries. Hence, searches on men’s help-seeking behaviour for health concerns were undertaken using PubMed, PsycINFO, CINAHL, Scopus and Informat electronic databases.

This approach yielded four literature reviews (Moller-Leimkuhler, 2002; Galdas et al., 2005; Jackson et al., 2007; Robertson et al., 2005), an Australian commentary in the Medical Journal of Australia (Smith, Braunack-Mayer & Wittert, 2006) and one Australian article derived from the Florey Adelaide Male Ageing Study (Smith, Braunack-Mayer, Wittert and Warin, 2008).

These literature reviews consistently reported that there was little research on men’s help-seeking behaviours (Galdas 2005; Smith et al., 2006; Robertson et al., 2008). In particular, there was a lack of research into how and why men seek help. The existing systematic literature reviews provided a broad overview of men’s help-seeking behaviours in general, but little evidence in regard to men’s help-seeking for mental health concerns. They identified socio-demographic factors which encouraged help-seeking, including being single (Dew et al., 1991) aged under 45 and living in a city (Moller-Leimkuhler, 2002).

In general, men who were at a more severe stage of mental illness were more likely to seek help than those who were psychologically distressed (Moller-Leimkuhler, 2002). This is consistent with Galdas et al. (2005) who found that men delayed help-seeking for mental health concerns. Other factors that positively influenced the willingness of men to seek help, included previous positive health service experiences and if they could maintain daily activities whilst seeking treatment/help (e.g., pursue leisure activities, maintain work role, and functional tasks such as driving) (Smith et al., 2008).

Health service utilisation among the general Australian population for mental health problems in a 12 month period has been examined (Burgess et al., 2009). Approximately a third of the population with a mental health problem sought support from services (Table 3.13). Rates of help-seeking are less than optimal and more common among people over 25, females, and those experiencing problems with anxiety, depression and substance use. Support was most commonly sought from a general practitioner.

Table 3.13 Twelve month rates of service use for mental health problems by mental disorder class

Any service use	No 12 month mental disorder (EPC = 12 817.5)		Any 12 month affective disorder (EPC = 995.9)		Any 12 month anxiety disorder (EPC = 2 303.0)		Any 12 month substance use disorder (EPC = 819.8)		Any 12 month mental disorder‡ (EPC = 3 197.8)	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
	6.1	5.3–7.0	58.6	49.9–67.4	37.8	33.1–42.6	24.0	16.5–31.4	34.9	31.3–38.5
Any community-based service use	6.1	5.2–6.9	58.1	49.4–66.8	37.4	32.6–42.2	23.8	16.3–31.2	34.6	30.9–38.2
General practitioner	3.9	3.2–4.6	45.9	38.4–53.4	25.9	22.1–29.7	16.4	11.7–21.2	24.7	21.8–27.6
Psychiatrist	0.9	0.6–1.2	13.8	9.0–18.6	9.0	5.4–12.7	5.8	3.0–8.6	7.9	5.2–10.7
Psychologist	1.1	0.8–1.4	23.2	17.7–28.7	14.0	11.0–17.0	9.1	5.0–13.1	13.2	11.0–15.4
Mental health professionals	0.8	0.6–1.1	16.0	11.1–20.9	8.3	6.2–10.5	8.9	4.2–13.6	7.7	6.0–9.4
Other health professional¶	1.4	0.9–1.8	11.6	7.9–15.2	7.5	5.5–9.5	5.7	2.3–9.0	6.6	5.0–8.2
Mental health hospitalization	0.3	0.1–0.5	7.2	3.8–10.7	2.7	1.3–4.1	4.1	1.0–7.3	2.6	1.5–3.7
No service use††	93.9	92.4–95.4	41.4	33.2–49.5	62.2	56.6–67.7	76.0	65.6–86.5	65.1	60.4–69.8

Source: Burgess et al., 2009.

CI, confidence interval; EPC, estimated population count ('000). †Persons who met criteria for diagnosis of a lifetime mental disorder (with hierarchy) and had symptoms in the 12 months prior to interview. ‡A person may have more than one mental disorder, therefore components when added may not add to the total shown. §Includes 'mental health nurse' and 'other professional providing specialist mental health services'. ¶Includes 'specialist doctor or surgeon', 'other professional providing general services' and 'complementary/alternative therapist'. ††Includes 'not stated'.

3.4.1.2 Substance Use

No evidence was found in relation to men's help-seeking for alcohol and other substance use. This is an important gap in the evidence concerning our understanding about preventing and treating alcohol and other substance use problems among workers in male-dominated industries. As noted in earlier chapters, problematic alcohol and substance use tends to be more prevalent among workers, and especially males workers, within male-dominated industries.

There is however, general population data on help-seeking behaviours for alcohol use disorders from the NMHWB (Table 3.14). This data shows gender differences for help-seeking, with males less likely to seek assistance than females for alcohol use disorders. Interestingly, whilst males were less likely to visit a general practitioner than females, they were slightly more likely to visit a psychologist than females. Further, the proportion of males visiting any mental health professional was only slightly lower than that for females. This data suggests that whilst men are less likely than women to seek assistance in general, in the case of problems related to alcohol their help-seeking behaviours were not consistently dissimilar to females.

Table 3.14 Prevalence of service use among those with any 12 month DSM-IV alcohol use disorder in the 2007 MHWB survey

Service Use	12 month any alcohol use disorder					
	Males N=230		Females N=118		Total N=348	
	5.9 (0.5)		2.7 (0.3)		4.3 (0.3)	
	%	SE	%	SE	%	SE
General practitioner	11.5	2.9	20.9	4.5	14.5	2.4
Psychiatrist	4.2	2.0	4.5	1.8	4.3	1.4
Psychologist	10.3	3.3	8.6	2.4	9.8	2.2
Mental health professional^a	16.4	4.9	16.7	4.2	16.5	3.5
Other health professional^b	6.5	2.8	1.8	1.0	5.0	2.0
Mental health hospitalisation	5.2	2.6	2.1	1.3	4.2	1.8
Any service use	20.4	4.8	26.6	4.9	22.4	3.6

Source: Teesson et al., 2010

^aIncludes mental health nurse and other professional providing mental health services. ^bIncludes specialist doctor or surgeon, other professional providing general services and complementary or alternative therapist. SE: standard error.

3.4.2 Implications

The review has highlighted that relatively little work has been undertaken on help-seeking specifically in relation to help-seeking by workers within male-dominated industries. Nonetheless, from the existing general systematic reviews among males and help-seeking at large a number of important findings emerged. For instance, the role that ‘others’ can play in prompting a colleague to seek help was important. It underscores the scope for interventions that encourage colleagues to support each other and to speak up and take a proactive stance when a co-worker might be experiencing problems.

The role that the workplace itself can also play was also highlighted with respect to awareness of indicators, or ‘flags’, of potential need for support among vulnerable groups of workers. This included work performance issues and absenteeism, especially when occurring among older married workers who were among the least likely groups to seek help.

3.5 Interventions

This section addresses question five on what industry specific interventions have been effective in male-dominated industries workplaces. For a description of the mental health and substance use evidence for interventions see Appendix A4 Interventions.

Q 5. What industry-specific interventions have been effective in addressing depression, anxiety and substance use in the workplace?

The studies identified were of variable quality. Most used a whole of workplace approach and implemented a menu of interventions. This made it difficult to determine whether individual components or the suite of intervention activities were required to achieve positive outcomes.

Interventions for anxiety and depression that appeared to be effective included:

- Information
- Social support
- Access to treatment and advice
- Managerial education
- Team based approaches to improving work environments
- Addressing absenteeism
- Addressing excessive workloads and providing relief periods from heavy workloads.

Effective interventions for alcohol and other substance use disorders were:

- Screening for risky alcohol use, which may reduce alcohol consumption
- Peer based workplace interventions aimed at changing attitudes to drinking by staff and management to reduce injury rates
- Secondary prevention counselling for risky drinkers
- Workplace policies on drug use, and Employee Assistance Program (EAP) services, which can reduce rates of injury.

3.5.1 Supporting Evidence

3.5.1.1 *Mental Health Disorders*

Evidence Characteristics for Mental Health Disorder Interventions

- Five relevant articles were found that met the inclusion criteria
- There were no Australian based studies
- Participants were men in manufacturing and building/construction industries
- There are few well-controlled studies in this area and most studies used generic and multi-modal interventions, making it difficult to determine which components of the intervention were most effective
- Measures used included standardised measures of wellbeing and psychological stress such as the GHQ. Many studies measured absenteeism as their primary outcome.
- The quality of the studies in this group varied.

There were significant gaps in the literature in this area. Few studies have been conducted and very few were well-controlled studies. Many did not measure clinical mental health symptoms and focused instead on health and wellbeing. Most included multimodal interventions making it difficult to determine the effective components of interventions. Key findings from the five studies that were identified that met inclusion criteria are as follows.

Workers in a manufacturing company were randomly assigned to a participatory workplace mental health and productivity program, which included problem solving and team based approaches to improving work environments and job processes, or to a no intervention control group (Tsutsumi et al., 2000). General health and work performance measures were found to have deteriorated in the control group and did not change in the intervention group. The authors suggest that this program had a protective effect on mental health and job performance.

A group of 287 manufacturing workers in Japan were followed up over one year and the relationship between job stress and recovery from mental illness examined (Mino et al., 2000). A relationship between job responsibility and recovery was found and it was concluded that relief from excessive responsibility at work may enhance recovery in mentally ill workers.

A case study of an organisational mental health care program, which included social support, treatment support and managerial education on mental health issues, found significant reductions in sickness absence days – shorter absences increased slightly but longer absences decreased significantly (Shimizu et al., 2003).

A study in Finland randomly assigned 1,341 building and construction workers at high and intermediate risk of sickness absence to either an occupational health program or usual care (Taimela et al., 2008). There was a significant reduction in sickness absence in the high risk but not the intermediate risk group. The authors concluded that identifying and responding to people at high risk of sickness absence is effective in reducing absences.

The same research team (Taimela et al., 2010) using a subsample of the same data concluded that the intervention was especially effective for workers who were certain that they would not be able to continue working in their current job due to health-related reasons, comorbidities or severe physical impairment at work.

3.5.1.2 *Substance Use Disorders*

Evidence Characteristics for Substance Use Disorder Interventions

- Eight articles were found that met inclusion criteria
- There were no Australian based studies
- Populations were men from multiple male-dominated industries including transport and aviation, construction and manufacturing
- There are few well-controlled studies in this area and most used generic and multi-modal interventions, making it difficult to determine which components of the intervention are effective
- Measures used included standardised measures of alcohol and other drug use, such as the AUDIT.

The literature in this area is sparse with few good quality well-controlled studies. A number of studies examined the efficacy of peer care or peer based interventions.

Voluntary alcohol screening plus a 15 minute brief intervention and screening plus comprehensive intervention in a transport workplace was compared. All groups reduced their drinking, suggesting that alcohol screening is a powerful intervention in itself in workplaces (Hermannson et al., 2010).

Two 4-hour intervention programs – team awareness focused on stress reduction and help-seeking or choices in health promotion focused on healthy alternatives to drinking – were compared (Patterson et al., 2005). Neither intervention had an impact on drinking rates, but there was an increase in stress reduction behaviours.

A brief intervention consisting of individual health assessments, brief intervention and motivational interview with an assessment only control was compared (Richmond et al., 2000) A significant benefit was found for women but not for men in reducing alcohol consumption.

A peer care program was examined, which included changing workplace behaviours and attitudes to substance use through peer and managerial support, as well as random drug testing (Miller et al., 2007). The study found a significant reduction in injury rates estimated to be worth \$48 million. The authors suggest that the combination of these interventions produced the change. Other studies (Sieck & Heirich, 2010) showed no benefit from random drug testing and the literature overall (e.g., Pidd & Roche, 2011) shows drug testing in the workplace to have little or no impact on drug use or injury levels. Therefore it is likely that the peer based intervention was the main catalyst for change in the Miller et al. (2007) study. Another study by Sieck & Heirich (2010) compared random alcohol and drug testing, proactive wellness counselling and an enhanced Employee Assistance Program (EAP) for high risk drinkers and found benefits for counselling and EAP but not for alcohol and drug testing.

Spicer and Miller (2005) using the same data as the Miller et al., (2007) study above conducted a retrospective records audit of injury rates after the introduction of a peer care intervention involving changing workplace behaviours and attitudes to substance use through peer or union support plus training for workers to recognise and refer colleagues to treatment. They found that for every worker covered by the program, injury rates declined by 0.16% per month, suggesting that peer based programs may be effective in reducing injuries at work.

An intervention program was assessed which was based at two sites of a large manufacturing company in the US and involved 1) peer based intervention, 2) policy changes and 3) alcohol and other drug education among workers. This assessment found a reduction in alcohol consumption, but not drug use, and fewer at risk behaviours at the intervention site compared to the control site (Stoltzfus & Benson, 1994).

Wickizer et al. (2004) evaluated a public drug free program that included regulations around policy development, the introduction of EAP, supervisor training, employee education to recognise colleagues with problems, and drug testing. Two hundred and sixty companies that enrolled in the program were compared with 20,500 non-intervention companies. The intervention was significantly associated with reduced injury rates and reduced serious injury rates, especially in the construction industry.

Overall, it appears that screening for risky drinking (for example using the AUDIT), but not conducting brief interventions per se, may have a positive impact on the general workforce. Secondary prevention and low intensity intervention activities may be effective for those identified as risky drinkers.

Health and wellbeing promotion activities, which were examined in a number of studies, and drug testing, did not appear to have an impact on drinking rates.

3.5.2 Implications

- Screening and low intensity interventions may have some impact on alcohol consumption if targeted at risky drinkers
- Low intensity multimodal workplace interventions may be effective in reducing absenteeism in male-dominated workplaces
- Workplace interventions that address attitudes toward drinking may be effective in reducing injury rates
- Further research to identify specific and effective interventions to address alcohol and drug use in the workplace, both at the individual and workplace level, is needed
- Further research using well controlled study designs, which foster an understanding of the effective components of multimodal interventions, is required.

3.6 Gaps

The review found that Australian evidence concerning the five research questions above was at best patchy and at worst non-existent. There are various limitations in the available evidence.

The evidence gaps arising from this review into male-dominated industries include the following.

3.6.1 Prevalence

Information addressing the prevalence of anxiety, depression and substance use in male-dominated industries was patchy, with evidence gaps in relation to:

1. Prevalence rates determined by diagnostic criteria and for alcohol and other drugs by dependence or abuse criteria
2. Differences by gender, age, locality (city, regional, rural, remote), employment grade and occupation within and between industries.

3.6.2 Aetiology/Causation

No studies were identified that addressed aetiological or causal/contributory factors in relation to:

1. Whether working in select male-dominated industries independently predicted anxiety, depression and substance use disorders
2. Whether particular socio-demographic characteristics contributed to the likelihood of workers being more anxious, depressed or to use alcohol and other substances
3. Whether changing industry, or changing occupations within the same industry, alter the incidence of anxiety, depression, the use of alcohol and other substances
4. How different industries have different job demands for the same occupation
5. How job demands/overload and job insecurity differentially impact men and women, in terms of work-home interference and anxiety and depression.

3.6.3 Ability to develop and implement supportive work environments

1. What are the awareness levels, attitudes, help-seeking behaviours and barriers towards anxiety, depression, alcohol and other substance use amongst employees and employers in male-dominated industries?
2. What formal and informal support is available for women and other 'minority' groups in male-dominated industries?
3. What formal and informal mechanisms/process/support do individual workplaces (employers and employees) have available to them to raise awareness, to support staff and minimise barriers to anxiety, depression, alcohol misuse and other substance use disorders?
4. What is the level of willingness among workplaces to participate in interventions to reduce anxiety, depression and substance use?

3.6.4 Interventions

The question in regard to interventions and their effectiveness is particularly important. This review was able to shed limited light on this issue. An important gap is identifying whether:

1. Workplace interventions reduce the burden of mental health illness on individuals, the workplace and the wider economy?
2. Workplace interventions are cost-effective?

4 DISCUSSION

The systematic review found that mental health research focusing on male-dominated industries was scarce, particularly in the Australian context. Despite this, the evidence reviewed highlighted potential areas for policy, practice and future research development.

The available data on alcohol and drug use in male-dominated industries was stronger and provided somewhat clearer indications of areas where future initiatives may be directed.

Key areas where workplace policy and practice issues may be addressed in light of the findings of this review of the evidence included the following:

- The importance of addressing risk factors for mental health disorders in male-dominated workplaces that incorporated:
 - promoting supportive work environments
 - promoting positive relationships
 - peer support and workplace social support
 - managing conflict
 - addressing workplace bullying
 - providing supportive supervision
 - having clear job roles
 - developing policies to prevent job demand and job overload
- The scope for education and awareness initiatives that addressed risky drinking and mental health to facilitate workers to support colleagues
- The important potential role of colleagues, friends and family in promoting help-seeking behaviour was highlighted in the literature
- The potential benefits of mental health/substance use promotion and awareness campaigns at the workplace level
- The need to address excessive job demands (i.e., job overload, excessive shift work) across industries, through policy and practice, (e.g., good management practices, rosters which allow sleep recovery and permit family time between shifts)
- Alcohol screening programs and related strategies may address the impact of workplace culture on alcohol consumption
- The need for workplace policies which facilitate closer examination of the relationship between mental disorders, substance abuse disorders and male-dominated industries
- The need to target particular industries for substance use awareness campaigns, e.g., manufacturing, construction, transportation
- The need for responses that address the relationship between alcohol and other drug use and occupational injuries
- Awareness and support for family and colleagues with mental health problems/symptoms and substance abuse disorders in the workplace
- The role of culture, including workplace culture, on alcohol and substance use
- The impact of mental health and substance abuse problems on individuals (e.g., occupational injury) and the workplace (e.g., absenteeism)

- Promoting understanding of the impact of work conditions (poor work relations, high job demand and overload, low occupational status) on mental health and drug and alcohol problems
- Setting a research agenda for mental health disorders and substance use disorders.

4.1 Knowledge Translation and Dissemination

A possible program for translating and disseminating the evidence identified in this review is provided in the following table. This program takes a public health approach and outlines a range of potential primary, secondary and tertiary initiatives that reflect the evidence highlighted herein (Table 4.1).

Table 4.1 Translating the evidence into practice: A public health approach

Approach	Aim	Initiatives
Primary prevention	To prevent mental illness and substance use disorders before their onset through raising awareness by building workplace capacity in male-dominated industries.	<ul style="list-style-type: none"> • Include information on male-dominated industries within current <i>beyondblue</i> campaigns e.g.,: Men’s Health and Youth <i>beyondblue</i> • Tailor mental health promotion and awareness campaigns for male-dominated industries, particularly construction and manufacturing • Raise awareness within workplaces about anxiety, depression and substance use in the workplace. • Support policy and legislation that prevents employee perceptions of job overload and job demand.
Secondary prevention	<p>To identify and subsequently support employees at risk.</p> <p>To identify workplace conditions that may place employees at risk.</p>	<ul style="list-style-type: none"> • Target workers in male-dominated industries in campaigns e.g.,: “R U OK? Day” • Provide peers and identified workplace role-models (e.g., union delegates, older male and female workers, occupational health & safety officers) with information to promote awareness of mental health and substance abuse issues for supporting their colleagues who are at risk • Address excessive workloads and provide relief periods from heavy workloads, ensure time off with family between shifts.
Tertiary prevention	To implement strategies which mitigate the negative effects of mental health and substance abuse disorders on the individual and workplace.	<ul style="list-style-type: none"> • Identify risky drinkers and people with anxiety and depression through workplace screening programs • Incorporate mental health and substance use disorders evidence into the Employee Assistance Program (EAP) services to facilitate the management of these concerns.

4.2 A Research Program

Many areas for future research were identified by this review. They include the need for quality evidence and research which considers mental health and substance use disorders across industries, research into protective factors for mental health and substance abuse and research into strategies which may lead to cultural change. A potential research program to develop the evidence base regarding male-dominated industries is provided below. This program addresses would cover encouraging research quality, developing prevalence measures, establishing causality and trialling good quality intervention studies (Table 4.2).

Table 4.2 A potential research program

Research Quality	
Aim	To improve the quality of research on male-dominated industries.
Objective	To encourage, promote and support the incorporation of validated measures in research. For example approaching current studies to include validated mental health and substance measures in their research, e.g., Australian Coal and Energy Survey.
Descriptive Research	
Aim	To describe the occurrence and context of risk and protective factors in male-dominated industries.
Objectives	<p>To encourage, promote and support research into:</p> <ul style="list-style-type: none"> • Specific populations (e.g., young workers, workers nearing retirement, women) • Behaviours (e.g., help-seeking, awareness, attitudes) • Comparisons between different workplaces (fly-in fly-out operations, public and private) and business types (micro, small, medium, large) • Job demand/overload between industries • The role of gender in male-dominated industry in effective intervention • Policy, workplace-based and individual predictors of success in interventions. <p>To encourage, promote and support research into workplace capacity building for reducing mental health and substance use disorders in the workplace by determining:</p> <ul style="list-style-type: none"> • The availability and accessibility of formal and informal support mechanisms • Willingness of workplaces to participate in mental health and substance use interventions.
Causation Research	
Aim	To determine whether certain risk and protective factors 'cause', 'result' or 'prevent' anxiety, depression and substance use disorders amongst workers in male-dominated industries.
Objectives	<p>To determine whether working in male-dominated industries independently predicts anxiety, depression and substance use disorders? Or</p> <ul style="list-style-type: none"> • Are there particular socio-demographic characteristics of this population which make them more likely to become anxious, depressed or to use alcohol and other substances? • Does changing industry, or changing occupation within the same industry, alter the incidence of anxiety, depression, the use of alcohol and other substances? <p>To determine whether it is feasible, and if so, to conduct secondary data analysis of Australian and New Zealand cohort studies to examine aetiology of young workers' substance use and mental health.</p>
Intervention Research	
Aim	To identify interventions that prevent, or minimise, mental health and substance use disorders amongst workers in male-dominated industries.
Objectives	<p>To encourage, promote and support the development of workplace based interventions to reduce mental health and substance use concerns in male-dominated industries. For example a peer based workplace intervention – aimed at workplace role-models (e.g., union delegates, older male and female workers, health & safety officers) to increase their capacity to support other employees.</p> <p>To support work into whether workplace interventions reduce the burden of illness and injury on individuals, the workplace and the wider economy.</p>

REFERENCES

- ASCC. (2006). *Work-related mental disorders in Australia*. Canberra: Australian Safety & Compensation Council.
- Australian Bureau of Statistics (ABS). (2006). *2006 Census Community Profile Series*. Canberra: Australian Bureau of Statistics.
- Australian Bureau of Statistics (ABS). (2008). *National Survey of Mental Health and Wellbeing: Summary of Results, 2007*. Sydney: ABS.
- Bonde, J. P. (2008). Psychosocial factors at work and risk of depression: A systematic review of the epidemiological evidence. *Occup Environ Med*, 65(7), 438-445.
- Brooklyn College Library. (2000). The Role of Grey Literature in the Sciences. Retrieved from <http://library.brooklyn.cuny.edu/access/greyliter.htm>
- Cercarelli, R., Allsop, S., Evans, M., & Velandar, F. (2012). *Reducing alcohol-related harm in the workplace*. Melbourne: VicHealth.
- Chandola, T., Bartley, M., Sacker, A., Jenkinson, C., & Marmot, M. (2003). Health selection in the Whitehall II study, UK. *Social Science & Medicine*, 56(10), 2059 - 2072.
- Conti, D. J., & Burton, W. N. (1994). The Economic-Impact of Depression in a Workplace. *Journal of Occupational and Environmental Medicine*, 36(9), 983-988.
- Council of Australian Governments (COAG). (2006). *National Action Plan for Mental Health 2006-2011*. Canberra: COAG.
- Degenhardt, L., Coffey, C., Moran, P., Carlin, J. B., & Patton, G. C. (2007). The predictors and consequences of adolescent amphetamine use: findings from the Victoria Adolescent Health Cohort Study. *Addiction*, 102(7), 1076-1084.
- Dewa, C. S., & Lin, E. (2000). Chronic physical illness, psychiatric disorder and disability in the workplace. *Soc Sci Med*, 51(1), 41-50.
- Dorrian, J., Skinner, N., & Pisaniello, S. (2010). *Work Quality, not just Quantity: Work-Related Predictors of Psychological Distress, Work-Family Interaction and Alcohol Consumption*. Adelaide: Centre for Work + Life, University of South Australia.
- European Commission. (2011). *Alcohol, work and productivity: Scientific opinion of the science group of the European alcohol and health forum*: European Commission.
- Frone, M. R. (2008). Are work stressors related to employee substance use? The importance of temporal context in assessments of alcohol and illicit drug use. *Journal of Applied Psychology*, 93, 199-206.
- Gabriel, P., & Liimatainen, M. (2000). *Mental health in the workplace*. Geneva: International Labour Office (ILO).
- Greenberg, E. S., & Grunberg, L. (1995). Work alienation and problem alcohol behavior. *Journal of Health and Social Behavior*, 36, 83-102.
- Harnois, G., & Gabriel, P. (2000). *Mental health and work: Impact, issues and good practices*. Geneva: World Health Organization (WHO) and the International Labour Organisation (ILO).
- International Labour Office. (1996). *Management of alcohol- and drug-related issues in the workplace. An ILO code of practice*. Geneva: International Labour Office (ILO).
- LaMontagne, A. D., Louie, A., Keegel, T., Ostry, A., & Shaw, A. (2006). *Workplace Stress in Victoria: Developing a Systems Approach*. Melbourne: Victorian Health Promotion Foundation.
- Lim, D., Sanderson, K., & Andrews, G. (2000). Lost productivity among full-time workers with mental disorders. *The Journal of Mental Health Policy and Economics*, 3(3), 139-146.
- Milczarek, M., Schneider, E., & Gonzalez, E. R. (2009). *OSH in figures: stress at work - facts and figures*. Luxembourg: European Agency for Safety and Health at Work.
- NIOSH. (1999). STRESS...At Work. Retrieved 1 March, 2012, from <http://www.cdc.gov/niosh/docs/99-101/>
- Pidd, K., & Roche, A. M. (2008). Changing workplace cultures: An integrated model for the prevention and treatment of alcohol-related problems. In D. Moore & P. Dietze (Eds.), *Drugs and Public Health* (pp. 49-59). Melbourne, Australia: Oxford.

- Pidd, K., & Roche, A. M. (2011). *Workplace Drug Testing: Evidence and Issues*. Adelaide: NCETA.
- Pidd, K., Roche, A. M., & Wilson, P. (2011). *Young Workers and Workplace Safety: Guidelines for managing alcohol and other drug risk*. Adelaide, South Australia: National Centre for Education and Training on Addiction (NCETA), Flinders University.
- Pidd, K., Shtangey, V., & Roche, A. M. (2009). *Alcohol Use in the Australian Workforce: Prevalence, patterns, & implications. Findings from a secondary analysis of 2004 NDSHS data*. Adelaide: National Centre for Education and Training on Addiction (NCETA), Flinders University.
- Roche, A. M., Pidd, K., Bywood, P., & Freeman, T. (2008). Methamphetamine use among Australian workers and its implications for prevention. *Drug and Alcohol Review*, 27(3), 334-341.
- Russell, K., Dryden, D., Liang, Y., Friesen, C., O'Gorman, K., Durec, T., et al. (2008). Risk factors for methamphetamine use in youth: a systematic review. *BMC Pediatrics*, 8(1), 48.
- Safework Australia. (2011a). *Compendium of workers compensation statistics: Australia 2008-09*. Canberra: Safework Australia.
- Safework Australia. (2011b). *Work-related injuries in Australia: who did and didn't receive compensation in 2009-10*. Canberra: Safework Australia.
- Slade, T., Johnston, A., Teesson, M., Whiteford, H., Burgess, P., Pirkis, J., et al. (2009). *The Mental Health of Australians 2: Report on the 2007 National Survey of Mental Health and Wellbeing*. Canberra: Department of Health and Ageing.
- Stansfeld, S., & Candy, B. (2006). Psychosocial work environment and mental health--a meta-analytic review. *Scandinavian journal of work, environment & health*, 32(6), 443-462.
- Teesson, M., Hall, W., Slade, T., Mills, K., Grove, R., Mewton, L., et al. (2010). Prevalence and correlates of DSM-IV alcohol abuse and dependence in Australia: findings of the 2007 National Survey of Mental Health and Wellbeing. *Addiction*, 105(12), 2085-2094.
- Wang, J. (2005). Work stress as a risk factor for major depressive episode(s). *Psychological Medicine*, 35(06), 865-871.
- World Health Organization (WHO). (2005). *Mental health policies and programmes in the workplace*. Geneva, Switzerland: World Health Organization, Department of Mental Health and Substance Abuse.