



MFS HEALTH & WELLBEING STUDY



THE UNIVERSITY
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CENTRE FOR TRAUMATIC
STRESS STUDIES



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1 Introduction

As an organisation, the South Australian Metropolitan Fire Service (MFS) aims to recruit a healthy workforce and to sustain the capacity of fire officers throughout their careers. Due to the occupational hazards involved in firefighting and the increasing risk of illness over the lifespan however, it is inevitable that health-related impairments will emerge in the workforce. It is critical that these patterns of emerging morbidity are anticipated and managed, both to maintain the operational capacity of the fire service as well as protect the health and welfare of its members. The MFS Health and Wellbeing Study undertaken by the Centre for Traumatic Stress Studies (CTSS) was designed to map the mental and physical health of the current MFS workforce so as to assist in the recruitment and ongoing management of health and welfare of its firefighters.

The methodology chosen was modelled on the 2010 Australian Defence Force Mental Health Prevalence and Wellbeing Study (McFarlane et al., 2011). The use of a similar methodology allows comparisons between these two workforces both of which have a strong focus on sustaining operational fitness and capacity. The core measures were drawn from the 2007 National Mental Health and Wellbeing Survey of the Australian community (Australian Bureau of Statistics, 2008), which in turn was modelled on many international studies co-ordinated by the World Health Organisation. Thus, the health of MFS members could also be assessed within the context of the broader Australian community.

There are two particular challenges involved in a firefighter's career. First, by the very nature of the work, crews are called to incidents that confer significant risk to their physical wellbeing. Suppressing fires and other toxic hazard containments pose obvious risks of injury. Additionally, firefighters' roles in assisting in the aftermath of motor vehicle accidents involves retrieval and rescue operations, which can also be hazardous environments. Furthermore, performing these roles requires the maintenance of high levels of physical fitness. Hence, in characterising the capacity of the fire service it is important to map the physical health of members, including injuries sustained. Aside from physical health, the second primary challenge in maintaining firefighter health and wellbeing is the less tangible but equally real threat of psychological strain and traumatic stress. Inevitably, firefighters will encounter situations in which people have either been overcome by smoke inhalation and died or been grievously injured/burned. There is significant psychological risk associated with the experiences of attempted rescues and witnessing of severe injury and death. In particular, incidents involving children and/or multiple fatalities represent a significant long-term risk to firefighters' mental health. Additionally, the very real threat of injury and death to the firefighters themselves represents enduring psychological stress in the occupation. Consequently, it is critical to map the cumulative burden and long-term costs of these exposures over the course of a firefighter's career.

In summary, this report maps the health and resilience of the MFS workforce so as to assist with recruitment and occupational sustainability, as well as the transition to retirement for those who are no longer fit for duty. The anonymous nature of this survey in particular means that the health of the population can be more realistically mapped compared with a simple examination of workers' compensation and other MFS health records. To this end, this report provides an accurate picture of the hazards and risks in the context of the injuries reported.

Against this background, it is important that the findings from the current report are set in the context of the broader scientific literature so as to identify the similarities and differences in key issues. Accordingly, a literature review was conducted and is detailed in the following section.

1.1 Background

Firefighters are regularly exposed to traumatic events due to the nature of their work (Bryant & Harvey, 1996). These exposures include actual and the risk of catastrophic injury to self or co-worker, dealing with gruesome victim incidents, rendering aid to seriously injured vulnerable victims, suffering minor injuries to the self and exposure to death and dying (Beaton et al., 1998). Accordingly, there is a known risk of substance use disorders, posttraumatic stress disorder (PTSD) (Del Ben, 2006; Haslam & Mallon, 2003; North et al., 2002), and depression in firefighters worldwide (Meyer et al., 2012), although the prevalence of these disorders in firefighters remains unclear. Given that firefighters who have developed a psychiatric disorder may have changed careers or retired from the occupation (known as the *healthy worker effect*), existing prevalence estimates in active duty firefighters is likely to be an underestimation (Harvey et al. (2016). Furthermore, there is very limited research specifically into firefighter health, particularly compared with other occupational groups such as military personnel. Determining the true psychological morbidity of firefighters is critical, not only because of the suffering endured but also in order to establish the actual health burden of this occupation in terms of costs to compensation systems (Berger et al., 2012). The current study is the first to address this issue by investigating the prevalence of disorder in an entire firefighter population, the South Australian Metropolitan Fire Service (MFS).

Aside from determining psychological morbidity, it is also important to identify those at risk of both physical and mental disorders, as this risk is not borne equally across a workforce (Plat et al., 2012). There has been very little research identifying risk factors in Australian fire services. The patterns of risk appear to vary between countries and states, in part due to different prevention strategies, flexibility of employment, availability of treatment with minimal administrative barriers and the availability of workers' compensation. Further, cumulative burden of stress exposure can lead to a substantial risk of psychiatric disorders, including major depressive disorder, PTSD and alcohol abuse (Armstrong et al., 2016; Harvey et al., 2016; McFarlane, 2010a; Pinto et al., 2015) which have implications when managing an ageing workforce of firefighters. Characterising this risk has critical implications for prevention and occupational health and safety policy.

1.2 Mental disorder prevalence

The following section reviews prevalence estimates of mental disorder in firefighter workforces and other, similar occupational groups. Of note, the prevalence estimates are highly variable across studies and are likely influenced by factors such as the measures and criteria used for classifying disorder, the type of groups surveyed and the degree to which they are representative of the greater workforce population. The current research programme is unique in that prevalence rates were determined by structured, clinical interview, which is considered the gold standard for identifying and classifying disorder, and the rates are representative of the entire MFS population.

1.2.1 Depression

Emergency service and firefighter research has also investigated the prevalence of depression in these occupational groups. Rates of probable depression in current and retired firefighters in the sample from the NSW metropolitan fire service were 4.9% and 18.1%, respectively (Harvey et al., 2016). In the Australian general population, the prevalence of any 12-month affective disorder is 6.2%, with 4.1% having a depressive episode (Slade et al., 2009). In terms of international estimates, studies of firefighter groups have shown at least moderate degree of depression symptoms in 3.5%-21.1% (Carey et al., 2011; Chung & Park, 2011; Meyer et al., 2012; Saijo et al., 2012; Sakuma et al., 2015) in self-selected samples.

1.2.2 PTSD

Given the risk of trauma exposure in the emergency services, it is perhaps unsurprising that the international research into firefighter health has primarily focused on PTSD. International prevalence estimates of PTSD have ranged from 5-24% (Del Ben, 2006; Haslam & Mallon, 2003; North et al., 2002; Berninger et al., 2010; Katsavouni et al., 2015; Wagner et al., 1998). A systematic review of the evidence from a broad range of emergency services, including firefighters, demonstrated personnel have an increased risk of developing PTSD in the course of their working career compared with the general population, in fact more than double (Berger et al., 2012). This review concluded that the worldwide prevalence of PTSD in emergency services was in the order of 10%, compared with 1.3-3.5% in the general population of diverse countries.

Australian prevalence estimates from firefighter populations appear higher but this research has largely focused on volunteer workforces exposed to major bushfires. For example, Bryant & Harvey (1996) examined the rates of PTSD in a sample of Australian volunteer firefighters and reported a prevalence of 26% using self-report questionnaires. McFarlane (1986) had earlier studied Country Fire Service (CFS) volunteers after the Ash Wednesday Bushfires and found that 30% were probably suffering from PTSD, based on interview validation of questionnaire data. However, most full-time Australian firefighting and related activity is conducted in an urban environment by professional firefighters such as the MFS. Although the potential threats are the same for all firefighters, professional contingents such as the MFS will tend to be exposed to traumatic stress more frequently and over a longer time period. Harvey et al. (2016) surveyed the metropolitan fire service from New South Wales, although these estimates were not weighted to represent the entire population. Based on self-report measures, they found rates of probable PTSD of 7.7% and 17.9% in current and retired firefighters, respectively. In terms of comparison with the general Australian population, Slade et al. (2009) reported a 12-month PTSD rate of 6.4%.

1.2.3 Alcohol misuse

Alcohol misuse, although difficult to compare across studies due to great variation in its classification, has been reported to range between 10-60% in firefighters internationally. Meyer et al. (2012) for example, examined a small trauma-exposed sample of US metropolitan firefighters and reported probable alcohol abuse rates of 10.6%. Other studies report binge drinking rates of up to 60%, and rates of lifetime alcohol dependence of up to 37% (Carey et al., 2011). Most importantly, there is a high degree of co-morbidity between alcohol abuse and dependence and both PTSD and Depression (Carey et al., 2011; Kaufmann et al., 2013). In terms of Australian estimates, in the NSW metropolitan fire service, rates of heavy drinking (classed as more than 42 alcoholic drinks during a typical week) were reported at 4.1% and 7.2% in current serving and retired firefighters, respectively (Harvey et al., 2016). Once again, these rates seem higher than in the Australian community, which found 2.9% of Australians report harmful alcohol use and 1.4% have alcohol dependence (Slade et al. (2009).

1.2.4 Suicidality

Very few studies have reported the prevalence of suicidality in firefighters. Stanley et al. (2015) conducted a web-based survey in the US and found that 46.8% of a self-selected sample of current and retired firefighters reported suicidal ideation since becoming a firefighter. This rate is remarkably high, especially alongside population based lifetime estimates from the US (13.5%) (Kessler et al., 1999) and Australia (13.3%) (Slade et al., 2009). As a self-selected sample, the rate reported in Stanley et al (2015) study is almost certainly higher than a representative population sample would produce. The true prevalence may still be higher than in the general population in light of higher prevalence of psychiatric disorder in emergency service workers (Berger et al., 2012) and the known risk of suicide associated with psychopathology. However, a systematic review of suicidality studies of various types of emergency service personnel (including firefighters) showed mixed findings with respect to comparisons with estimates from the general community (Stanley et al., 2016). Research into the Australian military population (which is an occupational group also at risk of traumatic exposures and psychiatric symptomology) showed higher rates of suicidal ideation compared with a matched sample from the general population (McFarlane et al., 2011).

In the Stanley et al. (2015) study of firefighters, suicidal ideation was predicted by younger age, lower rank, fewer years of service, being a current rather than retired firefighter, being a volunteer firefighter rather than full-time firefighter, being a member of a department that provides emergency services, having responded to a suicide attempt or death on the job and having had a cancer diagnosis. Married firefighters were more likely to report suicide attempts and also non-suicide self-injury than those who were divorced/separated or never married. Firefighters who were ex-serving military personnel were also more likely to report lifetime suicidal ideation, plans, attempts and non-suicide self-injury compared with active military service members, who were in turn more likely to report plans, attempts and non-suicide self-injury than Reservist (National Guard) personnel.

Aside from demographic or occupational risk factors, importantly, there is a known relationship between suicide and psychiatric disorder. In the general community, approximately 90% of people who attempt suicide have a psychiatric disorder (Krysinska & Lester, 2010; Marshall et al., 2001; Oquendo et al., 2005). Mood disorders are an antecedent to 30–90% of suicide mortalities (Arsenault-Lapierre et al., 2004; Rihmer, 2007; Kang & Biullman, 2008). Substance-related disorders are also present in 26–55% of those who die by

suicide and are the second highest group of mental disorders associated with suicide (Rihmer, 2007).

1.3 Physical health

1.3.1 Physical health conditions

Aside from physical injuries, firefighters may also be at risk of other physical conditions. Perhaps the most obvious physical health risks relate to smoke inhalation, which is a common occurrence in a firefighter's career. Furthermore, in the context of the MFS, which is an ageing workforce, diseases associated with ageing such as osteoarthritis, hypertension and hyperlipidaemia are also likely to be relevant and require monitoring (Zimmerman, 2012). Little research has been conducted regarding the physical medical health of firefighter populations, particularly as they compare with the general population. Daniels et al. (2014) conducted a large scale, records-based analysis of cancer and mortality risk in a cohort of US firefighters compared with the general population and found that although mortality rates for firefighters were as expected, cancer rates were higher, particularly in the cases of digestive and respiratory cancers. Conversely, Wolkow et al. (2014) found that Australian male volunteer firefighters were at no greater risk of coronary heart disease than males in the general Australian population and female firefighters were less at risk. It is currently unknown how the physical health of active, full time Australian firefighters compares with the general population.

Age is an obvious risk factor in general for certain conditions, such as osteoarthritis, hypertension, hyperlipidaemia and obesity, which also require monitoring (Zimmerman, 2012). Furthermore, PTSD and major depressive disorder are also risk factors for these conditions, including cardiovascular disease (Edmondson & Cohen, 2013), hyperlipidaemia and hypertension (Levine et al., 2014). PTSD and depression also have a significant association with somatic symptoms such as pain and fatigue which are important sources of disability in occupational environments (Gupta, 2013; Katsavouni et al., 2015). Taken together, this emphasises the importance of simultaneously monitoring physical and mental disorders.

1.3.2 Physical injuries

Firefighters are at risk of physical injury due to the nature of their work. To investigate the prevalence of physical injuries in full-time firefighters, Jahnke et al. (2013a) surveyed 462 personnel from 11 different fire departments in central USA. One fifth (20.1%) of these firefighters reported suffering one workplace injury in the past year, 3% reported two injuries, and 1.7% reported three or more injuries in the previous year. One third (33.3%) of injuries occurred during training exercises, and of these injuries, most were related to physical exercise (81.1%). Aside from training-related injuries, other injuries primarily occurred during fire or rescue operations (27.9%), during non-fire call outs (17.1%) or other duties such as inspections (13.5%). The majority of injuries were musculoskeletal (i.e., dislocations, sprains or strains), and superficial injuries/open wounds. Katsavouni et al. (2015) found similarly that acute lumbago, strains, and ankle injuries were the most prevalent injuries in a large sample of 3289 Greek firefighters, and low back pain was the most prevalent chronic musculoskeletal injury/condition. The most common mechanisms for injury in this study were falls/slips/trips, high intensity, insufficient technique, and fatigue.

Findings are mixed regarding risk factors for physical injuries. Jahnke et al. (2013b) found that incurring a workplace injury was not predicted by any demographic (including rank and years of service), body composition, or fitness variable. A 9-month follow-up of this sample, however, showed that obesity at baseline predicted musculoskeletal injury at follow up compared with normal weight (Jahnke et al., 2013a). In Katsavouni et al.'s (2015) Greek sample, reporting an injury was associated with some demographic variables, including younger age and greater years of service. These effects were small, however.

Physical injuries can also confer risk of poor mental health. Reporting an injury or injuries has been associated with depressive (Jahnke et al., 2013a) and PTSD symptoms (Katsavouni et al., 2015). In general, individuals with PTSD are prone to greater distress and impairment in relation to their physical injuries (Gupta, 2013; Pietrzak et al., 2013; Pietrzak et al., 2012). Likewise PTSD can impede recovery from injury, due to the mutual maintenance of PTSD and pain symptoms (Liedl et al., 2010). The risk of somatisation can also increase with further trauma exposures, which is an important issue during a prolonged career in the emergency services (Killgore et al., 2006).

1.4 Risk and protective factors

1.4.1 Demographic and occupational factors

A number of risk factors for mental disorder in emergency service populations have been identified in the literature but not consistently so. For example, poorer social support is generally predictive of PTSD and depression (Alghamd et al., 2013; Corneil et al., 1999; Meyer et al., 2012; Ogińska-Bulik, 2015; Razik et al., 2013). Greater years of service predicted higher PTSD symptoms in Canadian (Corneil et al., 1999) and Korean (Chung & Park, 2011) firefighter samples, but not in a sample of German paramedics (Streb et al., 2014). Older age predicted PTSD symptoms in some studies (Chung & Park, 2011; Katsavouni et al., 2015) but not others (Razik et al., 2013).

Of note, in currently serving samples, the risk of demographic variables associated with the passage of time (e.g., age, years of service) is likely to be moderated by the 'healthy worker' effect, whereby those who become unwell over the course of their career are more likely to leave the workforce. In general, demographic risk factors seem to show modest and inconsistent associations with disorder. Even within studies there are inconsistencies. Corneil et al. (1999) for example found that being married and higher rank was protective for PTSD in their US sample but there was no association in their Canadian sample. Likewise, previous serious work injury and work-related strain predicted PTSD in the Canadian group but not the US group. Demographic variables are not typically predictive of depressive symptoms (Meyer et al., 2012; Razik et al., 2013) although being married was found to be mildly protective by Razik et al. (2013). By employing a sample representative of an entire metropolitan firefighter population, including retired personnel, the current study is able to provide unique insight into demographic, occupational and trauma-related risk factors for disorder in urban firefighters.

1.4.2 Workplace and lifetime trauma exposure

Owing to occupational demands, firefighters are exposed to work-related traumatic stressors (critical incidents (CI)) that confer significant physical and psychological risk to their wellbeing. These *workplace exposures* are an occupational hazard of being an emergency service provider. Depending on one's role within the organization, these exposures can

occur regularly and sometimes repeatedly on a daily basis. Additionally, the very real threat of injury and death to the firefighter represents enduring psychological stress in the occupation.

There is significant psychological risk associated with the experiences of attempted rescues and witnessing of severe injury and death, with a higher number of lifetime critical incidents involving fatalities predicting PTSD, depression and probable heavy drinking in current and retired Australian fire-fighters (Harvey et al., 2016).

Even in the absence of a fatality, however, traumatic exposures, both in terms of civilian trauma and workplace stressors, represent an inherent risk of PTSD in firefighters (Armstrong et al., 2016; Harvey et al., 2016; Pinto et al., 2015; Razik et al., 2013; Wagner et al., 1998) and are also associated with depressive symptoms (Harvey et al., 2016; Kaufmann et al., 2013; Wagner et al., 1998) and alcohol misuse (Bacharach et al., 2008; Harvey et al., 2016; Kaufmann et al., 2013). Likewise, physical injuries, a number of which occur on the job, can be psychologically harmful (Chung & Park, 2011; Corneil et al., 1999).

Currently, there is little Australian research into the number and/or type of critical incidents experienced in the career of a firefighter, and how these factors affect mental health. In relation to type of critical incident, the most traumatic event reported by large sample Greek firefighters was death/rescue of a child (Katsavouni et al., 2015). This has important implications in relation to the expected mental health outcomes of this type of event.

Regehr et al. (2000), in an Australian study of combined metropolitan and county (volunteer) firefighters, found that 78% reported experiencing at least 1 CI in their time as a firefighter. Of those, 40% reported significant emotional distress as a result of a CI, but time since most recent CI was not associated with PTSD or depression symptoms. Higher rank and greater years of service showed weak, independent positive associations with distress from a CI (Regehr et al., 2000). In a small trauma-exposed sample of US metropolitan firefighters, the mean number of CIs in the past year was 2, which equated to a lifetime rate of 17.2 (Meyer et al., 2012), however the mean number of CIs in the past year did not predict psychological symptoms. In contrast, the number of CIs in the previous 4 months was related to drinking to cope in metropolitan US firefighters from New York City (Bacharach et al., 2008).

The cumulative burden of stress exposure leads to a substantial predicted risk of emerging psychiatric disorders, including major depressive disorder, PTSD and alcohol abuse in both firefighters (Bacharach et al., 2008; Harvey et al., 2016; Pinto et al., 2015), as well as the general community (Del Gaizo et al., 2011). Pinto et al. (2015) found frequency of the traumas experienced and the perceived threat involved in the trauma was associated with PTSD symptoms in Portuguese firefighters. Other studies have highlighted the importance of examining lifetime trauma exposure including childhood traumas in emergency service workers, due to their known association with psychopathology in adulthood (Komarovskaya et al., 2014; Razik et al., 2013).

In contrast, other studies of occupational groups have found no association with prevalence of traumatic exposure and symptomology (Meyer et al., 2012) which likely reflects the healthy worker effect. For example, Kaufmann et al. (2013) conducted a longitudinal study of a composite sample of US protective service workers, including firefighters and police officers. They found trauma number predicted mood and alcohol disorder, and new-onset PTSD for those who were protective service workers at 3-year follow-up but who weren't serving in these roles at baseline. There was no association for those who were protective

service workers both at baseline and 3-year follow-up, suggesting retention of healthy workers. Furthermore, those who were protective service workers at baseline but had left these roles by the 3-year follow-up had higher new-onset anxiety disorder than retained workers. There was no difference for mood and alcohol disorders, however.

1.4.3 Occupational stressors

Finally, in addition to demographic/occupational factors, and workplace and lifetime trauma exposure, *occupational stress*, defined as the negative environmental factors or stressors (e.g. job demand, job insecurity, organisational injustice, work overload, role ambiguity, poor working conditions, shiftwork) associated with a particular job, is a recognized problem in firefighters (Armstrong et al., 2016; Chung & Park, 2011). Not only are firefighters expected to cope with exposure to potentially traumatic events, they are also required to function effectively in an environment characterized by recurrent sleep disturbances, fatigue, the need to remain on high alert, and long shift schedules. These can also be important contributing factors to poor mental health.

Consequently, it is critical to map the cumulative burden as well as the individual impacts of each these three factors on both the mental and physical health of firefighter's over the course of their career.

1.5 Outline of this report

The current report aims to establish an accurate profile of the mental and physical health of the South Australian Metropolitan Fire Service (MFS) in the context of relevant demographic, occupational, environmental and organisational risk factors. Specifically, it will provide prevalence estimates of 12-month ICD-10 mental disorder, suicidal ideation and behaviour, psychological distress, doctor diagnosed physical health conditions, and injuries sustained during their career, in all currently serving MFS personnel in 2014.

The report begins with an overview of the methodology and demographic characteristics of the MFS and is then divided into three key sections: mental health, physical health, and occupational factors.

- The mental health section provides an overview of the mental health of the MFS, including weighted prevalence estimates of lifetime and 12-month ICD-10 mental disorder, lifetime trauma exposure and posttraumatic stress disorder, mental disorder comorbidity and associated functional impairment and quality of life impacts, current psychological distress, and 12-month self-reported suicidality.
- The physical health section details lifetime self-reported doctor diagnosed physical health conditions, including their comorbidity with mental disorder and psychological distress, then summarises types and rates of injuries sustained while on duty among the entire MFS.
- The occupational exposures section summarises key workplace exposures experienced by MFS members, sources of occupational stress, and models the relative impact of these occupational specific exposures and stressors, along with lifetime traumatic events, on 12-month mental disorder, current posttraumatic stress symptoms, and psychological distress.

Each section of the report concludes with a discussion and a series of recommendations.

2 Methodology

2.1 Study design

In order to ensure that the full spectrum of mental disorder was investigated within the MFS, prevalence estimates were obtained using a two-phase design. This approach to epidemiological research is well-accepted in the investigation of the prevalence of mental health disorders (Salim & Welsh, 2009). In the first phase, participants completed a screening questionnaire which provided a clear picture of psychological symptoms from a dimensional perspective. In the second phase, survey completers were invited to participate in a telephone interview using the Composite International Diagnostic Interview (CIDI). Data was then statistically weighted to be representative of the entire MFS in 2014.

2.2 Aims of the report

1. Provide prevalence estimates of 12-month and lifetime ICD-10 mental disorder, self-reported psychological distress and suicidality in all currently serving MFS personnel in 2014.
2. Provide prevalence estimates of lifetime exposure to traumatic events in the MFS and their association with 12-month PTSD in the MFS in 2014
3. Examine the functional impacts of 12-month ICD-10 mental disorder and mental disorder comorbidity, on self-reported work, social and family disruption, quality of life, and workplace productivity.
4. Provide prevalence estimates of physical complaints, injuries and chronic physical conditions such as cardiovascular disease and obesity in the MFS in 2014.
5. Examine the co-morbidity between 12month ICD-10 disorder and physical conditions.
6. Examine the relative impact of workplace and lifetime trauma exposure and occupational stressors on 12month rates of Diagnosable disorder and current levels of self-reported PTSD and Depression.

2.3 Sample

Eligible participants were drawn from two nominal rolls and comprised of all currently serving full-time MFS personnel, and all currently serving retained MFS personnel (N = 1061). Firefighters who had not yet completed MFS firefighting recruitment training were excluded from the study. Additionally, 10 MFS members were excluded from the sample due to an absence of demographic data for these individuals.

2.4 Recruitment methods and contact with participants

An advisory group was established to provide guidance to the research team on matters related to the study, including marketing and communication strategy. This group, consisting of MFS Senior Management, Station Officers, Union members, Employee Assistance Program (EAP) representatives, and members of the CTSS research team, met regularly to discuss issues pertaining to the study.

2.4.1 Promotion of the study

Prior to initial direct contact by the research team, the following strategies were utilised to promote the study to participants:

2.4.1.1 Advertising using print media.

A promotional poster was developed by the study team and placed in MFS newsletters, fire stations, and EAP provider rooms to promote the study and generate interest amongst personnel. A marketing brochure was also developed to further promote the study. These brochures were distributed to stations, placed in EAP provider rooms, and were distributed to personnel at information sessions and other scheduled study activities.

2.4.1.2 Media release.

A media release to targeted outlets was developed by the MFS in consultation with the research team as a means of launching the study to the wider community, disseminating information, and generating interest amongst personnel. Enquiries that resulted from the release were responded to promptly and effectively by the research team at the CTSS following a strict protocol.

2.4.1.3 Targeted briefs to MFS leadership, union officials and EAP peer support members.

A series of information sessions were held to brief MFS leadership, Union officials and EAP peer support members about the study and its importance. Leadership support played a paramount role in achieving a successful study outcome.

2.4.1.4 Study helpline and email address.

All written and verbal correspondence with personnel included a study free-call number and email address. Personnel who wished to communicate with the research team were able to do so via these two means. All queries were dealt with in a timely and efficient manner by the research team.

2.4.2 Participant recruitment

The survey was rolled out to participants in waves. Stations clustered in the same broader metropolitan location received their study materials at the same time. Prior to the distribution of the self-report survey, participants were sent a warm-up letter via email. This letter served as a brief introduction to the study, and contained a toll-free number and email address for personnel who wished to contact the research team to obtain more information regarding participation. Hard-copy versions of this letter were also forwarded to each fire station throughout South Australia, and distributed internally to personnel by the MFS.

One week after this initial correspondence, participants were sent an email containing a secure link to an online invitation package. This pack contained the self-report survey and all associated study materials including information sheets and consent forms. A hardcopy version of this invitation pack was distributed to participants who called or emailed the study team to request one.

Survey completers who consented to be contacted for phase 2 of the study were also invited to participate in a CIDI. Recruitment calls were made by trained interviewers from the Hunter Research Foundation who were blind to the scores of each participant on the self-report measures. Telephone calls were made at a variety of times during the day and evening, taking into account each participant's shift roster, so as to maximise contact opportunities.

2.4.3 Methods to maximise participation

A multi-faceted approach to following up survey non-respondents was undertaken in order to maximise participation:

2.4.3.1 Targeted briefs to MFS personnel.

A co-ordinated series of information sessions were held at the vast majority of metropolitan fire stations around South Australia as a means of generating interest surrounding the research, briefing personnel about the individual study components, distributing hardcopy invitation packs and highlighting the importance of being involved. Stations and shift groups with the lowest response rates were targeted as the highest priority. Other stations and shift groups were approached subsequently. Briefings were organised with stations a week in advance, taking into account rosters and scheduled training/activities.

2.4.3.2 Targeted briefs at retired personnel events.

Representatives from the research team were invited to attend a series of MFS retiree events as means of promoting the study to members who had recently transitioned out of the service. Due to the 'opt in' nature of recruitment for this sub group, these briefings were pivotal in gaining support and increasing numbers for the study.

2.4.3.3 Letters of support from the Union Representative and MFS Chief Officer.

During the course of the study, participants were sent separate letters of support from the Chief of the MFS and the United Firefighters Union Representative, endorsing the research and encouraging individuals to be involved.

2.4.3.4 Reminder letters/follow up phone calls.

One week after the survey was distributed to participants, all non-responders were followed up with a reminder email and/or letter. A week later, non-responders were contacted again via telephone and encouraged to complete the survey. Two weeks following the final follow-up phone call, a second reminder email/letter was sent out to all non-responders.

2.5 Measures

2.5.1 Phase 1: Self-report survey

In phase 1, MFS personnel were screened for mental health symptoms, psychological distress, physical health symptoms, workplace exposures and occupational stressors via a 60-minute self-report questionnaire, which was developed at the beginning of the study period in close consultation with the MFS Senior Management Group. Anonymity was preserved via the allocation of a unique study number to each participant for both phases of the research.

Participants were able to complete the survey in one of two ways:

- Online: personnel were sent an email which contained a secure link to an online invitation package containing the web-based survey. Participants were able to access the survey using their unique study ID and password; or
- Hardcopy: participants could opt to complete a hard copy version of the questionnaire. Hard copy questionnaires were either mailed to participants or provided to them during station briefings.

The report utilises data from the following sections of the survey (for detail regarding all other sections of the survey, refer to Annex B):

2.5.1.1 Demographic information

Participants were asked to provide demographic information in relation to gender, date of birth and highest educational qualification.

2.5.1.2 MFS service details

Participants were asked a series of questions specific to their employment with the MFS including the number of years served, age at commencement, experience working with the Australian Defence Force and/or other emergency services, rank, and the station and shift group they belonged to. In this section, participants were also asked questions about any workers compensation or sick leave they had taken whilst an employee with the MFS.

2.5.1.3 Workplace exposures

Participants were presented with a list of duty related incident stressors adapted from Beaton et al. (1998) and asked to indicate whether or not they had ever experienced any of the events on the list during their career as an MFS firefighter, and how many times they had experienced each of the applicable events.

2.5.1.4 Post-traumatic stress disorder (PTSD) Checklist- 5 (PCL-5)

In order to ascertain the psychological impact of these work place exposures, participants were then asked to complete the PTSD Checklist for DSM-5 (PCL-5) (Weathers, 2013) in relation to these experiences. The PCL-5 is a 20 item self-report measure that assesses the DSM-5 symptoms of PTSD. The 20 questions of the PCL-5 are scored from 0-4 and are summed to give a total symptom severity score.

2.5.1.5 Physical injuries

Participants were asked to indicate how many times in the last 12 months and across their entire career they had been treated or hospitalized for a range of injuries sustained either at the scene of an emergency or at other times whilst on duty. The list of injuries was adapted from the 2012 National Fire Protection Association (NFPA) Fire Experience Survey (Haynes & Stein, 2014) and National Fire Incident Reporting System (NFIRS) 5.0.

2.5.1.6 Occupational stressors

Participants were asked to complete the Sources of Occupational Stress Scale (SOOS) (Beaton, 1993), a 57-item measure designed to assess the different sources of on-the-job stress inherent and/or related to employment as a firefighter. Respondents were asked to indicate whether or not they had experienced a particular type of occupational stressor within their past 10 shifts, and if so, to indicate how bothered they were by that stressor on a scale of 1 to 10.

2.5.1.7 Quality of life

This section of the survey was comprised of 3 items that assessed general health, satisfaction with health, and quality of life. The final item in this section assessed global happiness via the Delighted-Terrible scale (Andrews, 1976), one of the more common approaches to collecting subjective quality of life data.

2.5.1.8 General psychological distress –Kessler Psychological Distress Scale (K10)

The K10 (Kessler et al., 2002) is a short 10-item screening questionnaire that yields a global measure of psychological distress based on questions about anxiety and depressive symptoms that an individual has experienced in the most recent 4-week period. Items are scored from 1 to 5 and are summed to give a total score between 10 and 50. Various

methods have been used to stratify the scores of the K10. The categories of low (10–15), moderate (16–21), high (22–29) and very high (30–50) that are used in this report are derived from the cut-offs of the K10 that were used in the 2007 ABS Australian National Mental Health and Wellbeing Survey (Slade et al., 2009).

2.5.1.9 Suicidal ideation

12-month suicidal ideation and behavior was assessed via four items that looked specifically at suicidal thoughts, plans and attempts. Items in this section were adapted from the National Survey of Mental Health and Wellbeing (Australian Bureau of Statistics, 2008).

2.5.1.10 Alcohol use

In this section of the survey, participants were asked a series of questions about their experience with drugs and alcohol. Alcohol consumption and problem drinking was examined using the Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al., 1993), a brief self-report screening instrument developed by the World Health Organization. This instrument consists of 10 questions to examine the quantity and frequency of alcohol consumption, possible symptoms of dependence, and reactions or problems related to alcohol. The AUDIT is an instrument that is widely used in epidemiological and clinical practice for defining at-risk patterns of drinking. Babor et al. (2001), in describing the significance of the different zones of risk, suggested that 0–7 (Zone I) represents those who would benefit from alcohol education, 8–15 (Zone II) represents those who are likely to require simple advice, 16–19 (Zone III) represents those for whom counselling and continued monitoring are required, and 20–40 (Zone IV) represents those who require diagnostic evaluation and treatment. Two additional supplementary items of the AUDIT were also included in the questionnaire.

2.5.1.11 Physical health

In this section of the survey participants were presented series of items that examined pain and doctor diagnosed medical problems/ conditions. These questions were taken directly from the 2011 Australian Gulf War Veterans Health Study follow-up (<http://www.coeh.monash.org/gwfollowup.html>; Sim et al., 2003).

2.5.1.12 Functioning

The Sheehan Disability Scale (Leon et al., 1997) was included in the questionnaire to assess functional impairment in three inter-related domains; work, social and family life.

For all other sections of the survey not referred to in the current report, please refer to Annex B

2.5.2 Phase 2: Diagnostic interview

All phase 1 completers (prioritising career personnel) were invited to participate in a telephone interview using the Composite International Diagnostic Interview (CIDI) Version 3 (World Health Organization Computer Assisted Psychiatric Interview CIDI Version 3) (Kessler & Ustun, 2004). The CIDI provided an assessment of mental disorders based on the definitions and criteria of two classification systems: the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) (American Psychiatric Association, 1994) and the World Health Organization International Classification of Diseases, 10th revision (ICD-10) (World Health Organization, 1994). The CIDI was selected because of its highly structured nature and its vast usage in epidemiological studies worldwide, in particular, the 2007 Australian National Survey of Mental Health and Wellbeing conducted by the Australian Bureau of Statistics (Slade et al., 2009).

The CIDI was administered to consenting participants by a team of trained interviewers from the Hunter Research Foundation in Newcastle, NSW. Their diagnostic inter-rater reliability was closely monitored by supervisors based at the research centre throughout the study period.

2.5.2.1 12-month and lifetime ICD-10 mental disorders

Past year and lifetime ICD-10 rates of the following mental disorders were assessed using the CIDI 3.0: depressive episode, dysthymia, bipolar affective disorder, panic attack, panic disorder, agoraphobia, social phobia, specific phobia, generalised anxiety disorder, obsessive-compulsive disorder, posttraumatic stress disorder, and alcohol use. Clinical calibration studies report that the WMH-CIDI 3.0 has good validity (Haro et al., 2006). Throughout this report, the ICD-10 prevalence rates are presented with hierarchy rules applied in order to be consistent with how Australian national rates are derived (Slade et al., 2009). For all ICD-10 disorders, the standard CIDI algorithms were applied, which means that in order for a 12-month diagnosis to be given, an individual would be required to meet lifetime criteria initially and then have reported symptoms in the 12 months prior to the interview. Data on lifetime trauma were obtained from the post-traumatic stress disorder module of the CIDI.

2.5.2.2 Lifetime trauma exposure

Lifetime exposure to trauma was examined as part of the PTSD module of the CIDI 3.0. Participants were asked to indicate whether or not they had experienced the following traumatic events: combat (military or organised non-military group); being a peacekeeper in a war zone or a place of ongoing terror; being an unarmed civilian in a place of war, revolution, military coup or invasion; living as a civilian in a place of ongoing terror for political, ethnic, religious or other reasons; being a refugee; being kidnapped or held captive; being exposed to a toxic chemical that could cause serious harm; being in a life-threatening automobile accident; being in any other life-threatening accident; being in a major natural disaster; being in a man-made disaster; having a life-threatening illness; being beaten by a parent or guardian as a child; being beaten by a spouse or romantic partner; being badly beaten by anyone else; being mugged, held up, or threatened with a weapon; being raped; being sexually assaulted; being stalked; having someone close to you die; having a child with a life-threatening illness or injury; witnessing serious physical fights at home as a child; having someone close experience a traumatic event; witnessing someone badly injured or killed or unexpectedly seeing a dead body; accidentally injuring or killing someone; purposefully injuring, torturing or killing someone; seeing atrocities or carnage such as mutilated bodies or mass killings; experiencing any other traumatic event; and experiencing any other event that the participant did not want to talk about.

2.6 Ethical considerations

In order to combat potential risks and ensure that participation in the study was completely free from coercion, participants were made explicitly aware that their involvement in the study was voluntary and that they could decline to participate and/or were free to withdraw from the project at any time. This was emphasized in all study materials. Secondly, whether or not an individual chose to participate in the study was not communicated to senior staff in the MFS, nor were members directly asked to participate in the study by MFS senior leadership. This also ensured that recruitment was free from coercion. In order to manage potential risks to participants in relation to both phase 1 and phase 2 of the research, a duty of care protocol was established and strictly adhered to by the research team. The study protocol was approved by The University of Adelaide Human Research Ethics Committee prior to any participant contact (H-2014-071).

2.7 Response rates

The following section describes the entire current serving MFS population, presenting basic demographic characteristics for individuals who completed the survey (responders) as compared to those who did not (non-responders), followed by weighted estimates of population characteristics.

2.7.1 Phase 1 survey respondents

A total of 578 MFS personnel completed a self-report survey. The breakdown of individuals with sufficient data to be included in the survey is summarised in Table 2.1. As the population characteristics were known (eg. sex, age, rank), it was possible to compare personnel who responded to the survey with personnel who did not, allowing weighting of the data to provide estimates of prevalence that are representative of the entire MFS. Table 2.1 shows the age and rank, by sex and service status (career or retained) of current serving MFS personnel who responded to the survey, compared with those who did not.

The MFS population comprised 97.7% (n = 1035) males, with the majority of these being career members 80% (n = 830). The total survey response rate was 54.5% (n = 578), with this comprising 85% career males, 13% retained males, and 2% females. Responders tended to be older and of higher ranks than non-responders, and response rates were greater for career compared to retained members, with relatively equal response vs non-response rates for females.

2.7.2 Phase 2 CIDI interview respondents

All Phase 1 completers, were invited to participate in a CIDI interview (N= 578). Of those invited, 369 completed the interview. Participants were prioritised by questionnaire completion date and then randomly allocated to interviewers at the Hunter Research Foundation (HRF). Participants were only invited to participate in a CIDI interview if their interview could be scheduled and completed within 4 weeks of completing their self-report questionnaire.

Table 2.1 presents the unweighted demographic characteristics of responders versus non-responders.

Table 2.1. Survey response rates by age, rank, sex and service status of current serving MFS personnel

Characteristics	Entire MFS					Responders				Non-Responders			
	N	All N (%)	Male career N (%)	Male retained N (%)	Female N (%)	All N (%)	Male career N (%)	Male retained N (%)	Female N (%)				
Age Group													
19-34	168	63 (37.5%)	37 (45.1%)	20 (27.0%)	6 (50.0%)	105 (62.5%)	45 (54.9%)	54 (73.0%)	6 (50.0%)				
35-44	304	178 (58.6%)	147 (63.4%)	27 (42.9%)	4 (44.4%)	126 (41.4%)	85 (36.6%)	36 (57.1%)	5 (55.6%)				
45-54	337	198 (58.8%)	176 (61.3%)	21 (44.7%)	1 (33.3%)	139 (41.2%)	111 (38.7%)	26 (55.3%)	2 (66.7%)				
55-64	236	131 (55.5%)	125 (57.3%)	5 (31.2%)	1 (50.0%)	105 (44.5%)	93 (42.7%)	11 (68.8%)	1 (50.0%)				
65+	16	8 (50.0%)	6 (54.6%)	2 (40.0%)	0	8 (50.0%)	5 (45.5%)	3 (60.0%)	0				
Rank													
Senior Management	8	8 (100.0%)	8 (100.0%)	-	-	0 (0.0%)	0 (0.0%)	-	-				
Commander	28	23 (82.1%)	23 (82.1%)	-	-	5 (17.9%)	5 (17.9%)	-	-				
Station Officer	262	170 (64.9%)	163 (66.5%)	5 (35.7%)	2 (66.7%)	92 (35.1%)	82 (33.5%)	9 (64.3%)	1 (33.3%)				
Senior Firefighter	469	253 (53.9%)	221 (54.3%)	25 (51.0%)	7 (53.8%)	216 (46.1%)	186 (45.7%)	24 (49.0%)	6 (46.2%)				
Firefighter	239	122 (51.0%)	75 (64.1%)	44 (38.6%)	3 (37.5%)	117 (49.0%)	42 (35.9%)	70 (61.4%)	5 (62.5%)				
Missing	55	2 (3.6%)	1 (4.0%)	1 (3.6%)	0 (0%)	53 (96.4%)	24 (96%)	27 (96.4%)	2 (100%)				
N	1061	578 (54.5%)	491 (59.2%)	75 (36.6%)	12 (46.2%)	483 (45.5%)	339 (40.8%)	130 (63.4%)	14 (53.8)				

Table 2.1 shows the demographic characteristics of the entire MFS, and compares them for study responders and non-responders. The entire MFS comprised 97.5% males, with 80.2% career firefighters, and 19.8% retained. Across age bands, the largest proportion of the population were aged between 35 and 54 years (60.5%). Approximately one in five (22.2%) MFS members were aged between 55 and 64 years at the time of completing the study, with lower numbers of personnel in the youngest age bracket (19-34 years: 15.8%). A very small number of MFS personnel were aged over 65. The distribution of rank within the MFS population shows that the majority of the MFS were firefighters (24.7%) or senior firefighters (44.2%), just under one quarter (24.7%) were station officers and approximately three percent in senior command or management positions.

The lowest response rate for the study was among those aged 19 to 34 years (37.5%), with similar rates across the remaining age bands. Higher ranks had better response rates in general, although across all ranks the response rate was greater than 50%.

2.8 Service and Demographic characteristics of the population (weighted estimates)

The following section describes the characteristics of the MFS population used in the analyses in this report. These characteristics are weighted estimates, and as such reflect the entire MFS population. These have been presented for the population as a whole, and separately for 3 subgroups: male career members, male retained members and females. The subpopulation data are for descriptive purposes only, and should be interpreted with caution where the sample size is small and confidence intervals wide. For this reason, sub-population tables for the remainder of this report are presented in the Annex only.

2.8.1 Demographic characteristics of MFS personnel

Table 2.2 Weighted demographic characteristics of the MFS

Characteristics	All (n=1061)		Male career (n=830)		Male retained (n=205)		Female all (n=26)	
	Weighted n	% (95% CI)	Weighted n	% (95% CI)	Weighted n	% (95% CI)	Weighted n	% (95% CI)
Household structure								
Living alone	65	6.1 (4.8, 7.7)	44	5.3 (4.2, 6.7)	18	9.0 (5.0, 15.6)	3	10.3 (2.0, 39.1)
Couple, no children	179*	16.8 (14.8, 19.1)	137	16.5 (14.5, 18.7)	34	17.0 (11.0, 25.3)	7	25.4 (11.1, 48.1)
Couple with children	720*	67.9 (65.2, 70.4)	590*	71.2 (68.6, 73.7)	116	56.7 (48.3, 64.7)	13	49.5 (26.8, 72.4)
Single parent	38*	3.6 (2.5, 5.0)	21	2.6 (1.8, 3.6)	16	8.1 (4.2, 15.1)	0	0.0 (., .)
Other	30	2.8 (1.8, 4.2)	16	1.9 (1.2, 2.8)	10	4.9 (1.9, 11.9)	4	14.9 (4.6, 38.8)
Missing	30	2.8 (2.0, 4.0)	21	2.5 (1.8, 3.5)	9	4.3 (1.6, 10.7)	0	0.0 (., .)
Highest education								
Primary school	2	0.2 (0.0, 1.0)	0	0.00 (., .)	2	1.1 (0.3, 4.9)	0	0.0 (., .)
Secondary school < grade 11	38	3.6 (2.6, 5.0)	15.2	1.8 (1.2, 2.8)	23	11.04 (6.7, 17.6)	0	0.0 (., .)
Secondary school grade 11-12	259*	24.4 (22.0, 27.0)	200*	24.1 (21.8, 26.6)	55	26.9 (19.4, 36.0)	4	14.9 (4.6, 38.8)
Certificate	465*	43.9 (41.1, 46.9)	354*	42.8 (40.0, 45.6)	104	50.9 (41.9, 59.9)	7	26.4 (9.2, 56.1)
Diploma	121	11.4 (9.8, 13.3)	104	12.5 (10.8, 14.5)	10	4.9 (2.3, 10.2)	7	26.4 (9.2, 56.1)
Bachelor	107	10.1 (8.6, 11.9)	94	11.4 (9.7, 13.3)	9	3.8 (1.6, 9.07)	5	20.8 (7.6, 45.4)
Post-graduate	66	6.3 (5.1, 7.7)	61	7.3 (6.0, 9.0)	3	1.2 (0.3, 5.6)	3	11.5 (2.1, 44.3)
Missing	1.9	0.2 (0.0, 0.7)	1.9	0.2 (0.1, 0.9)	0	0.0 (., .)	0	0.0 (., .)
Significant intimate relationship								
Yes	955	92.5 (90.6, 94.0)	768.5	92.6 (91.0, 93.9)	165.8	80.9 (72.4, 87.2)	20.7	79.5 (59.4, 91.1)
Missing	28.3	2.7 (1.8, 3.9)	19.5	2.4 (1.7, 3.3)	8.8	4.3 (1.6, 10.7)	0	0.0 (., .)
Total	1061		830		205		26	

All totals have a margin of error < 20

Table 2.2 describes the demographic characteristics of male career personnel, male retained personnel and female personnel. The most common household structure among the MFS, accounting for nearly seventy percent of MFS members, was being in a couple relationship with dependent children. This was higher among career males (71.2%) compared to retained males (56.7%) and females (49.5%). Most MFS members reported completing secondary education, with three quarters having a post-high school or tertiary qualification. The vast majority of MFS members reported being in a significant intimate relationship (92.5%), with slightly fewer retained males (84.5%) and females (79.5%) reporting this compared to career males (94.8%).

2.8.2 Service characteristics of MFS personnel

Table 2.3 Weighted service characteristics of the MFS

Characteristics	All (n=1061)		Male career (n=830)		Male retained (n=205)		Female all (n=26)	
	Weighted d n	% (95% CI)	Weighted d n	% (95% CI)	Weighted d n	% (95% CI)	Weighted d n	% (95% CI)
Shift group								
Day shift only	89.30	8.4 (7.2, 9.8)	88.10	10.6 (9.1, 12.4)	0	0.0 (., .)	1.20	4.6 (2.0, 10.1)
Rotating day/night shift	762.66 *	71.9 (69.8, 73.9)	711.00	85.7 (83.6, 87.5)	29.53	14.4 (8.8, 22.7)	22.13	85.1 (61.2, 95.4)
Regional Command	152.17	14.3 (12.5, 16.4)	25.76	3.1 (2.2, 4.3)	123.74	60.4 (51.4, 68.7)	2.67	10.3 (2.0, 39.1)
Missing	56.87	5.4 (4.0, 7.2)	5.13	0.6 (0.3, 1.3)	51.74	25.2 (17.9, 34.3)	0	0.0 (., .)
Years served with MFS								
<5 years	142	13.4 (11.4, 15.6)	59	7.1 (5.7, 8.7)	76	37.3 (29.2, 46.1)	7	26.4 (9.2, 56.0)
5-14	422	39.8 (37.3, 42.4)	326	39.3 (37.2, 41.5)	83	40.2 (31.5, 49.6)	13	51.8 (26.8, 75.9)
15-24	132	21.4 (10.8, 14.3)	104	12.6 (10.9, 14.4)	25	12.2 (7.7, 18.6)	3	10.3 (2.0, 39.1)
25+	361	34.0 (32.5, 35.6)	339	40.8 (39.2, 42.5)	19	9.2 (6.0, 13.8)	3	11.5 (2.1, 44.3)
Missing	4	0.4 (0.1, 1.0)	2	0.2 (0.1, 0.6)	2	1.1 (0.3, 5.0)	0	0
Other emergency service experience								
Any	677*	63.8 (61.0, 66.5)	518*	62.4 (59.7, 65.1)	139	67.6 (58.5, 75.5)	20	76.9 (50.1, 91.7)
CFS	154*	14.5 (12.5, 16.7)	118	14.2 (12.3, 16.3)	30	14.7 (9.2, 22.7)	6	23.08 (8.3, 49.9)
Police	62	5.9 (4.7, 7.4)	51	6.1 (4.9, 7.7)	12	5.6 (2.5, 12.2)	0	0.00
Ambulance	23	2.2 (1.4, 3.3)	15	1.8 (1.2, 2.7)	8	4.0 (1.6, 9.4)	0	0.00
ADF	106	10.0 (8.5, 11.8)	93	11.3 (9.6, 13.2)	13	6.3 (3.1, 12.1)	0	0.00
Mine emergency service	9	0.9 (0.5, 1.6)	7	0.8 (0.4, 1.4)	3	1.2 (0.3, 5.6)	0	0.00
Other emergency service	120	11.3 (9.7, 13.2)	105	12.6 (10.9, 14.6)	15	7.5 (4.0, 13.6)	0	0.00
None selected	677*	63.8 (61.0, 66.5)	518*	62.4 (59.7, 65.1)	139	67.6 (58.5, 75.5)	20	76.9 (50.1, 91.7)
Ever worked as fire cause investigator								
Yes	26	2.5 (1.8, 3.4)	23	2.8 (2.0, 3.9)	2	1.2 (0.3, 5.2)	0	0.0 (-)
missing	21.3	2.0 (1.3, 3.1)	15.3	1.8 (1.2, 2.8)	6.0	2.9 (0.9, 9.1)	0	0.0 (-)
Currently on sick leave								
Yes	14	1.4 (0.8, 2.4)	7	0.8 (0.4, 1.5)	8	3.7 (1.5, 8.9)	0	0.0 (-)
Missing	0	0	0	0	0	0	0	0
Currently on workers' compensation								
Yes	26	2.5 (1.8, 3.5)	23	2.8 (2.0, 3.9)	2	1.1 (0.3, 5.0)	0	0.0 (-)
missing	41.0	3.9 (2.9, 5.1)	37	4.5 (3.5, 5.9)	4	1.8 (0.3, 9.0)	0	0.0 (-)

Table 2.3 describes the service characteristics of male career personnel, male retained personnel and female personnel. The majority of MFS personnel have served for five or more years, with the greatest proportions being those who have served for 5 to 14 years (39.8%) and more than 25 years (34.1%). Just over thirteen percent of the population have served for under 5 years, and just over 12 percent for between 15 and 24 years. This distribution of length of service is largely explained by the male career members. For females, the pattern of distribution was more similar to the career males, with the exception of the 25+ years category. This is likely to reflect the relatively recent increases in the number of females joining the MFS. For retained members, average length of service tended to be shorter, with equally large numbers of personnel in the less than 5 and 5 to 14 year categories, and small numbers with greater than 15 years of service.

Nearly 40% of the MFS workforce reported other emergency service experience with CFS and ADF service the most common, followed by other unspecified services, police and ambulance. This pattern was similar for career and retained males with the exception of ambulance service: Twice as many retained members reported experience with ambulance service. Approximately one quarter of female MFS personnel reported experience with the CFS, with the remainder reporting no other emergency service experience.

The majority of the MFS workforce work rotating day and night shifts (71.9%), however the retained males were most likely to work in regional command and be on call, with a smaller proportion on rotating shifts. Only 8% of the population reported working day shift only.

At the time of completing the survey only an extremely small proportion of the workforce reported being on sick leave (1.4%), with this primarily being retained males. Approximately three percent of the workforce reported currently being on workers compensation. This was mainly career males.

2.9 Statistical analysis

2.9.1 Responders

Survey responders were defined as having completed any of the following scales: Sources of Occupational Stress, K10, PHQ-depression, AUDIT, PCL-5; or had answered any questions relating to workplace exposures, recent life exposures, and workplace injury. There were no partial CIDI responders. Ten individuals were removed from the population due to an absence of demographic data for these individuals, which was required for statistical weighting.

2.9.2 Weighting

Inverse probability weights were created separately for survey (stage 1) and CIDI (stage 2) responders. This was done to make the survey results representative of the entire population, and to allow estimates of numbers of MFS personnel within various categories. As key mental health indicators and response rates all varied with age, it was decided a-priori to include age as a stratum (where possible) when developing weights.

Stage 1: To create survey weights, both the population and responders were stratified by employee status (career versus retained), and by gender. Males were additionally stratified by age categories (19-29, 30-39, 40-49, 50+). Due to small numbers of female responders, female career personnel were stratified by age (<35 versus ≥35), and female retained were not further stratified by age. This approach represents a trade-off between producing reliable estimates by age categories, without producing large weights, therefore no analyses for females can be presented by age bands.

Stage 2: To create weights for CIDI responses, responders and the population were stratified by sex and employee status. Males were further stratified by age (19-34, 35-44, 45-54 and 55+). Females could not be stratified by age. This approach aimed to maximise our ability to analyse results by age bands, while still maintaining at least 2 responders within each strata. No analysis of CIDI data for females can be presented by age band or employment status.

2.9.3 Analysis

All analyses were conducted using Stata version 13.1 (StataCorp, 2013). Unless specified otherwise, all results presented use weights and incorporate stratification information. Standard errors were calculated using Taylor series linearization, using population totals within each strata for finite population correction. Confidence intervals for proportions were calculated using the logit transformation.

2.9.4 Results

The following chapters describe the MFS workforce in South Australia, outlining the overall mental and physical health of the MFS, according to ICD-10 diagnostic criteria and self-reported outcomes, an examination of functional impairment associated with various mental and physical health symptoms and provides an overview of relevant occupational risk factors for mental and physical health in this population.

3 Estimated Prevalence of Mental Disorder

- ❖ Approximately 50% of the entire MFS met ICD-10 criteria for any mental disorder in their lifetime (30% ICD-10 alcohol disorder; 21.9% affective disorder, 15.2% anxiety disorder).
- ❖ ICD-10 anxiety disorder was the most common 12-month disorder group (12.7%) followed by ICD-10 affective Disorder (5.7%) and ICD-10 alcohol disorder (3.0%).
- ❖ The most common 12-month disorder type in the MFS was PTSD (5.8%) followed by panic attacks (5.6%), and depressive episodes (5%).
- ❖ Lifetime trauma exposure was high, particularly in relation to event types likely to be experienced in the workplace such as seeing someone badly injured or killed (76.7%), Man-made disaster (58.7%).
- ❖ The risk of PTSD was significantly elevated among those MFS members who reported experiencing traumas that they would commonly be exposed to in the course of their duties such as dealing with a deceased person and mass casualties. These events are of particular importance in terms of their cumulative impact on MFS members. There was also a group of rare and unusual traumatic events where the estimated risk for PTSD was generally greatest.
- ❖ The 12-month prevalence of alcohol disorders was extremely low in the entire MFS.
- ❖ Impairment in work functioning was greatest in those with alcohol dependence, followed by social phobia and specific phobia.
- ❖ Impairment in social functioning was greatest in those with panic disorder, followed by those with alcohol dependence.
- ❖ Family functioning was most impaired in those with panic disorder, alcohol dependence and specific phobia.
- ❖ Affective disorders had the greatest impact on work functioning, while comorbid affective and anxiety disorders, and anxiety disorder specifically had the greatest impact on functioning in the social and family domains.
- ❖ Anxiety disorders carried the greatest impacts on quality of life in this population.
- ❖ The majority of the MFS, about two thirds of the population, recorded low levels of psychological distress on the K10.
- ❖ 10% of the MFS reported some form of suicidal ideation but this did not necessarily translate into attempts, with very low population level prevalence of plans and attempts (under 1 %).

The following chapter examines the mental health of the South Australian MFS, including ICD-10 mental disorder, impacts of mental disorder and mental disorder comorbidity on functioning and quality of life outcomes, current self-reported psychological distress and 12-month suicidality.

3.1 Lifetime and 12-month prevalence of ICD-10 mental disorder in the MFS

The following section provides weighted population based estimates of lifetime and 12-month ICD-10 mental disorder in the entire MFS. Results for the subgroups of career male, retained male, and female are presented in Annex A. Subsequent sections will present mental disorder prevalence by these same groupings. When considering prevalence estimates, those for the entire population represent the most reliable estimates, and close attention should be paid to the confidence intervals for the estimates within the descriptive subgroups. No statistical comparisons are performed for estimates between subgroups due to the small available samples of retained males and females.

The tables below describe weighted population based estimates of lifetime and 12-month ICD-10 mental disorder in the entire MFS. The subsequent sections in this chapter will focus on each mental disorder category in turn, with results pertaining to 12-month disorder discussed in detail, and includes an examination of rates of 12-month mental disorder among different ranks. Further stratification by length of service was not possible due to the small overall population, and general low prevalence of mental disorder.

3.1.1 Lifetime ICD-10 mental disorders

Table 3.1 Estimated prevalence of lifetime ICD-10 Affective, Anxiety, Alcohol and any disorders

Lifetime ICD-10 Disorder	All MFS (N =1061)	
	Weighted n	% (95% CI)
Any affective disorder	232	21.9 (18.2, 26.0)
Any anxiety disorder	161	15.2 (12.5, 18.3)
Any alcohol disorder	311	29.3 (25.4, 33.5)
PTSD	138	13.1 (10.4, 16.2)
Any mental disorder	527	49.7 (45.0, 54.3)

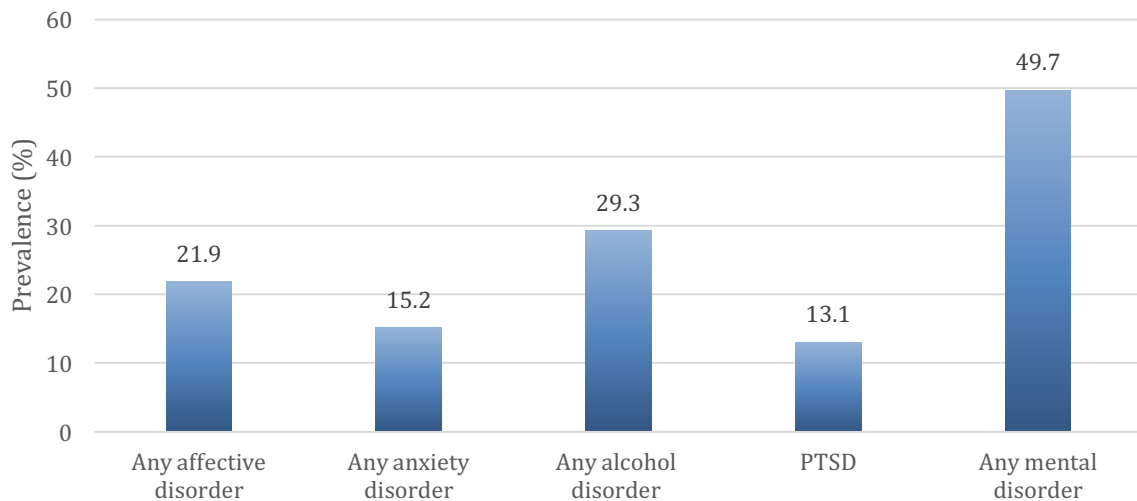


Figure 3.1 *Estimated prevalence of lifetime ICD-10 Affective, Anxiety, Alcohol and any disorders*

Table 3.1 and Figure 3.1 present the estimated prevalence of lifetime ICD-10 mental disorder for the MFS. For the entire population, just under 50% were estimated to meet ICD-10 criteria for any mental disorder in their lifetime. The most common disorder category was alcohol disorders, with an estimated lifetime prevalence of just under 30% in the entire MFS. This was followed by affective disorders (21.9%, CI 18.2, 26.0) then anxiety disorders (15.2%, CI 12.5, 18.3). The estimated prevalence of posttraumatic stress disorder across the lifetime for the MFS was 13.1% (CI 10.4, 16.2). PTSD is discussed further below, under anxiety disorders. Further details of lifetime ICD-10 mental disorder for the three MFS subgroups of male career, male retained and females are provided in Table A.1 (Annex A).

3.1.2 Prevalence of 12 month ICD-10 disorders

Table 3.2 *Estimated prevalence of 12 month ICD-10 Affective, Anxiety, Alcohol and any disorders*

12-month ICD-10 Disorder	All MFS (N =1061)	
	Weighted n	% (95% CI)
Any affective disorder	61	5.7 (4.1, 8.0)
Any anxiety disorder	134	12.7 (9.7, 16.4)
Any alcohol disorder	32	3.0 (1.9, 4.6)
PTSD	61	5.8 (4.1, 8.1)
Any mental disorder	182	17.1 (13.8, 21.1)

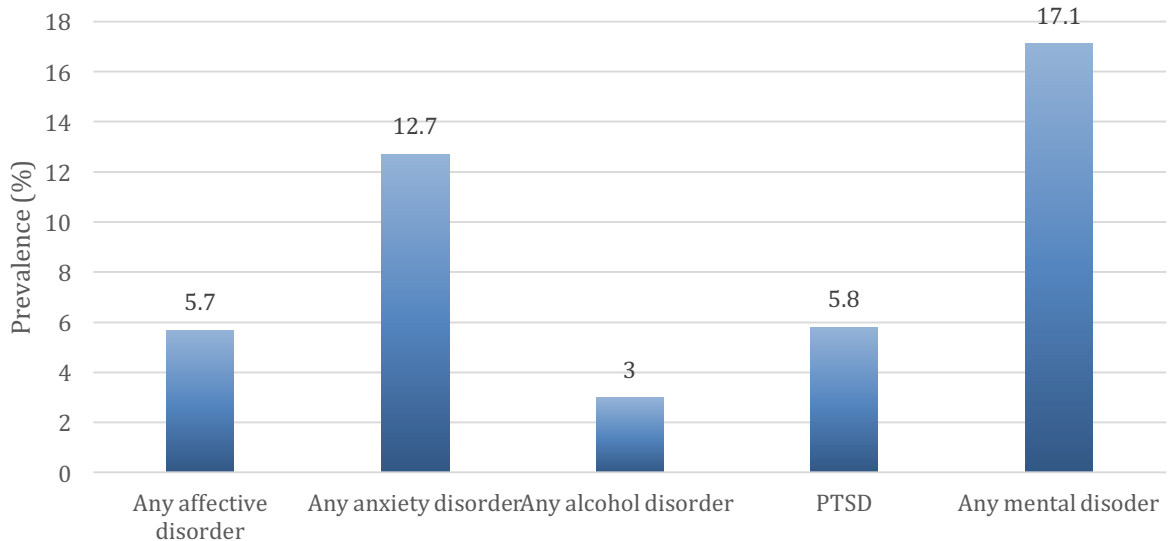


Figure 3.2 Estimated prevalence of 12 month ICD-10 Affective, Anxiety, Alcohol and any disorders

Table 3.2 and Figure 3.2 present the estimated prevalence of 12 month ICD-10 disorder among the MFS, and the subgroups of male career, male retained and females. The estimated 12-month prevalence of any mental disorder among the entire MFS was 17.1% (CI 13.8, 21.1), with anxiety disorders being more prevalent (12.7%, CI 9.7, 16.4) than affective (5.7%, CI 4.1, 8.0) or alcohol disorders (3.0%, CI 1.9, 4.6). The estimated 12-month prevalence of posttraumatic stress disorder was just under 6 percent. Further details of 12-month ICD-10 mental disorder for the three MFS subgroups of male career, male retained and females are provided in Table A.2 (Annex A).

3.1.3 Prevalence of 12 month ICD-10 Affective Disorders

The following section provides a summary of the prevalence of 12-month ICD-10 affective disorders among MFS personnel. For descriptive purposes, results are also provided for the subgroups of male career, male retained, and females in Annex A.

Three types of affective disorder were examined, and are described below:

- **Depressive episodes** are a characteristic of a major depressive disorder and require that an individual has suffered from depressed mood lasting a minimum of two weeks, with associated symptoms or feelings of worthlessness, lack of appetite, difficulty with memory, reduction in energy, low self-esteem, concentration problems, and suicidal thoughts. Depressive episodes can be mild, moderate or severe, with all three included under the same heading. Hierarchy rules were applied to depressive episodes such that a person could not have met criteria for either a hypomanic or manic episode.
- **Dysthymia** is characterised as a chronic or pervasive disturbance of mood lasting several years that is not sufficiently severe or in which the depressive episodes are not sufficiently prolonged to warrant a diagnosis of a recurrent depressive disorder. Hierarchy rules were applied to dysthymia such that in order to have this disorder, a person could not have met criteria for either a hypomanic or manic episode and could not have reported episodes of severe or moderate depression within the first two years of dysthymia.
- **Bipolar affective disorder** is associated with fluctuations of mood that are significantly disturbed. These fluctuations of mood are markedly elevated on some occasions (hypomania or mania) and can be markedly lowered on other occasions (depressive

episodes). A diagnosis of bipolar affective disorder was applied in this study if the individuals met criteria for mania or hypomania in the previous 12-months, as follows.

- **Hypomanic episodes** last at least four consecutive days and are considered abnormal to the individual. These episodes are characterised by increased activity, talkativeness, elevated mood, disrupted concentration, decreased need for sleep and disrupted judgment manifesting as risk taking (for example, mild spending sprees). In a subgroup of people, these disorders are particularly characterised by irritability. To meet criteria for the ‘with hierarchy’ version, the person cannot have met criteria for an episode of mania.
- **Mania** is similar to hypomania but is more severe in nature. Lasting slightly longer (a minimum of a week), these episodes often lead to severe interference with personal functioning. In addition to the symptoms outlined under hypomania, mania is often associated with feelings of grandiosity, marked sexual indiscretions and racing thoughts.

This range of disorders is the same as that presented by the 2007 National Survey on Mental Health and Wellbeing, and those included in the 2010 Australian Defence Force Mental Health and Wellbeing Prevalence Study (McFarlane et al., 2011).

Table 3.3 Estimated prevalence of 12-month ICD-10 affective disorders in the entire MFS

All MFS (N =1061)		
12-month ICD-10 Affective Disorders	Weighted n	(95% CI)
Depressive episodes	53	5.0 (3.6, 7.1)
Dysthymia	2	0.2 (0.1, 1.0)
Bipolar affective disorder	7	0.7 (0.2, 2.4)
Any affective disorder	61*	5.7 (4.1, 8.0)

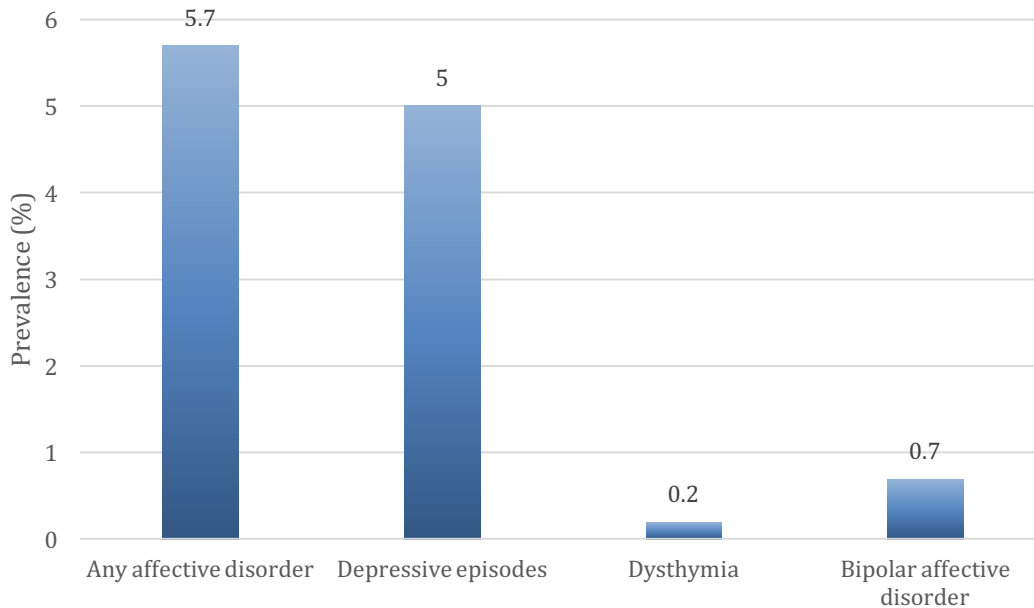


Figure 3.3 Estimated prevalence of 12-month ICD-10 affective disorders in the entire MFS

As can be seen in Table 3.3 and Figure 3.3, the estimated 12-month prevalence of any affective disorder was just under six percent in the entire MFS. This is comparable to prevalence rates in the Australian community in 2010 (5.9%) and significantly lower than the rates observed in the Australian Defence Force in 2010 (9.5%) (McFarlane et al., 2011). The majority of affective disorders in the MFS represent depressive episodes (5.0%, CI 3.6, 7.1), with less than one percent of the total MFS population reporting dysthymia or bipolar affective disorder. Further details of 12-month ICD-10 affective disorder for the three MFS subgroups of male career, male retained and females are provided in Table A.3 (Annex A).

3.1.4 Prevalence of 12 month ICD-10 anxiety disorders

The following section provides a summary of the prevalence of 12-month ICD-10 anxiety disorders among MFS personnel. For descriptive purposes, results are also provided for the subgroups of male career, male retained and females. In addition to examining posttraumatic stress disorder, this section also describes the prevalence of exposure to lifetime traumatic events among the MFS, and the estimated prevalence of PTSD in relation to exposure to each event.

Eight types of Anxiety Disorders were examined, and are outlined below:

- **Panic attack:** Sudden onset of extreme fear or anxiety, often accompanied by palpitations, chest pain, choking sensations, dizziness, and sometimes feelings of unreality, fear of dying, losing control, or going mad.
- **Panic disorder:** Recurrent panic attacks that are unpredictable in nature.
- **Agoraphobia:** Marked fear or avoidance of situations such as crowds, public places, travelling alone, or travelling away from home, which is accompanied by palpitations, sweating, shaking, or dry mouth as well as other anxiety symptoms such as chest pain, choking sensations, dizziness, and sometimes feelings of unreality, fear of dying, losing control, or going mad.
- **Social phobia:** Marked fear or avoidance of being the centre of attention or being in situations where it is possible to behave in a humiliating or embarrassing way, accompanied

by anxiety symptoms, as well as either blushing, fear of vomiting, or fear of defecation or micturition.

- **Specific phobia:** Marked fear or avoidance of a specific object or situation such as animals, birds, insects, heights, thunder, flying, small enclosed spaces, sight of blood or injury, injections, dentists, or hospitals, accompanied by anxiety symptoms as described in 'Agoraphobia'.
- **Generalised anxiety disorder:** Generalised and persistent worry, anxiety or apprehension about everyday events and activities lasting a minimum of six months that is accompanied by anxiety symptoms as described in 'agoraphobia'. Other symptoms may include symptoms of tension, such as inability to relax and muscle tension, and other non-specific symptoms, such as irritability and difficulty in concentrating.
- **Obsessive-compulsive disorder:** A disorder characterised by obsessional thoughts (ideas, images, impulses) or compulsive acts (ritualised behaviour). These thoughts and acts are often distressing and typically cannot be avoided, despite the sufferer recognising their ineffectiveness.
- **Post-traumatic stress disorder:** A stress reaction to an exceptionally threatening or traumatic event that would cause pervasive distress in almost anyone. Symptoms are categorised into three groups: re-experiencing symptoms such as memories or flashbacks, avoidance symptoms, and either hyperarousal symptoms (increased arousal and sensitivity to cues) or inability to recall important parts of the experience.

Table 3.4 Estimated prevalence of 12-month ICD-10 anxiety disorders in the MFS

All MFS (n=1061)		
12-month ICD-10 Anxiety Disorders	Weighted n	% (95% CI)
Panic attack	60*	5.6 (3.6, 8.7)
Panic disorder	19	1.8 (1.0, 3.3)
Agoraphobia	14	1.4 (0.7, 2.8)
Social phobia	33	3.1 (1.5, 6.3)
Specific phobia	33	3.1 (1.9, 5.2)
Generalised anxiety disorder	14	1.3 (0.6, 2.7)
Obsessive-compulsive disorder	15	1.4 (0.7, 3.1)
Posttraumatic stress disorder	61*	5.8 (4.1, 8.1)
Any anxiety disorder	134*	12.7 (9.7, 16.4)

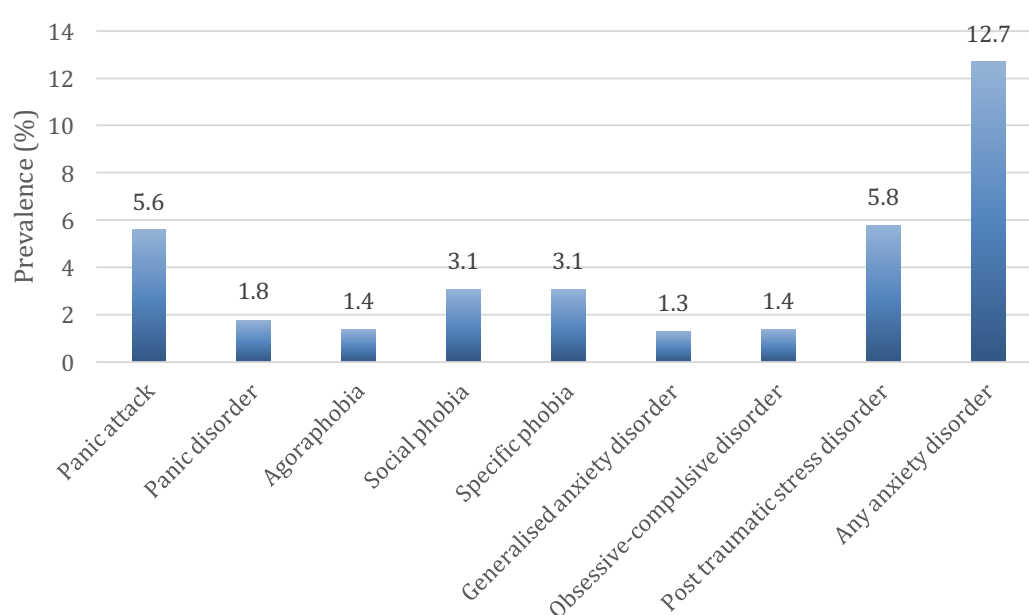


Figure 3.4 Estimated prevalence of 12-month ICD-10 anxiety disorders in the MFS

Table 3.4 and Figure 3.4 present the estimated 12-month prevalence of ICD-10 anxiety disorders in the entire MFS population. The estimated prevalence of any 12-month anxiety disorder was 12.7% (CI 9.7, 16.4), which again is comparable to the Australian community in 2010 (12.6%), and slightly lower than the ADF in 2010 (14.8%)(McFarlane et al., 2011). The most prevalent anxiety disorder in the MFS was PTSD (5.8%, CI 4.1, 8.1) followed by panic attacks (5.6%, CI 3.6, 8.7), social phobia (3.1%, 1.5, 6.3) and specific phobia (3.1%, 1.9, 5.2). Rates of PTSD were similar to the Australian community in 2010, and lower than the ADF in 2010 (8.3%) (McFarlane et al., 2011). Rates of panic attack, despite being one of the most prevalent disorders in the MFS were lower than in both the ADF and the Australian community in 2010. Further details of 12-month ICD-10 anxiety disorder for the three MFS subgroups of male career, male retained and females are provided in Table A.4 (Annex A).

3.1.4.1 PTSD and trauma exposure

Rates of lifetime exposure to potentially traumatic events among the entire MFS are summarised below. This is followed by the estimated prevalence of posttraumatic stress disorder from each event type. The purpose of this is to provide details of background trauma morbidity in the MFS in

order to provide valuable insight into lifetime trauma as a potential protective and risk factor for mental and physical health problems in this population.

Self-reported lifetime trauma exposure questions used in this section were drawn from the PTSD module of the CIDI 3.0 (Haro et al., 2006). Participants were asked to indicate whether or not they had experienced a list of 28 traumatic events (as described in Chapter 2). For each applicable event, participants were required to provide further information regarding the following: their age the first and last time the event took place, and the number of times each event took place. Participants were also asked to indicate which traumatic event was their ‘worst’ event.

Table 3.5 Estimated prevalence of lifetime trauma in the entire MFS

Lifetime trauma	All MFS (N=1061)	
	Weighted n	% (95% CI)
Combat	20	1.9 (0.9, 3.7)
Peacekeeper	17	1.6 (0.7, 3.4)
Witnessed mass carnage/mutilated bodies	453**	43.00 (38.7, 47.3)
Purposely injured or killed someone	10	1.0 (0.5, 2.1)
Life threatening automobile accident	244*	23.0 (19.8, 26.6)
Other life-threatening accident	242**	22.9 (19.3, 27.00)
Exposed toxic chemicals	436**	42.0 (37.8, 46.3)
Man-made disaster	622**	58.7 (54.1, 63.2)
Natural disaster	363*	34.3 (30.6, 38.1)
Someone close died unexpectedly	502**	47.5 (42.8, 52.1)
Child had life threatening illness/injury	140*	13.2 (10.3, 16.8)
Life threatening illness	197*	18.6 (15.8, 21.8)
Saw someone badly injured/ killed	810**	76.7 (72.2, 80.6)
Accidentally injured/ killed someone	39	3.7 (2.4, 5.6)
Raped	19	1.8 (0.9, 3.5)
Sexual assault	93*	8.8 (6.8, 11.2)
Beaten by parent	56*	5.3 (3.7, 7.7)
Beaten by spouse	9	0.9 (0.3, 2.2)
Beaten by other	123*	11.6 (9.3, 14.5)
Witness domestic violence	90*	8.5 (6.5, 11.1)
Stalked	67*	6.3 (4.5, 8.9)
Mugged	239*	22.6 (19.3, 26.2)
Kidnapped	17	1.7 (0.8, 3.3)
Unarmed civilian	41	3.9 (2.6, 5.6)
Civilian in place of ongoing terror	24	2.3 (1.3, 3.8)
Someone close had traumatic experience	169**	16.1 (12.5, 20.2)
Other traumatic event	219*	20.7 (17.6, 24.1)
Experience didn't want to talk about	90*	8.5 (6.4, 11.1)

Note: Margin of error for totals < 20, unless * MoE 20-39, ** MoE > 40

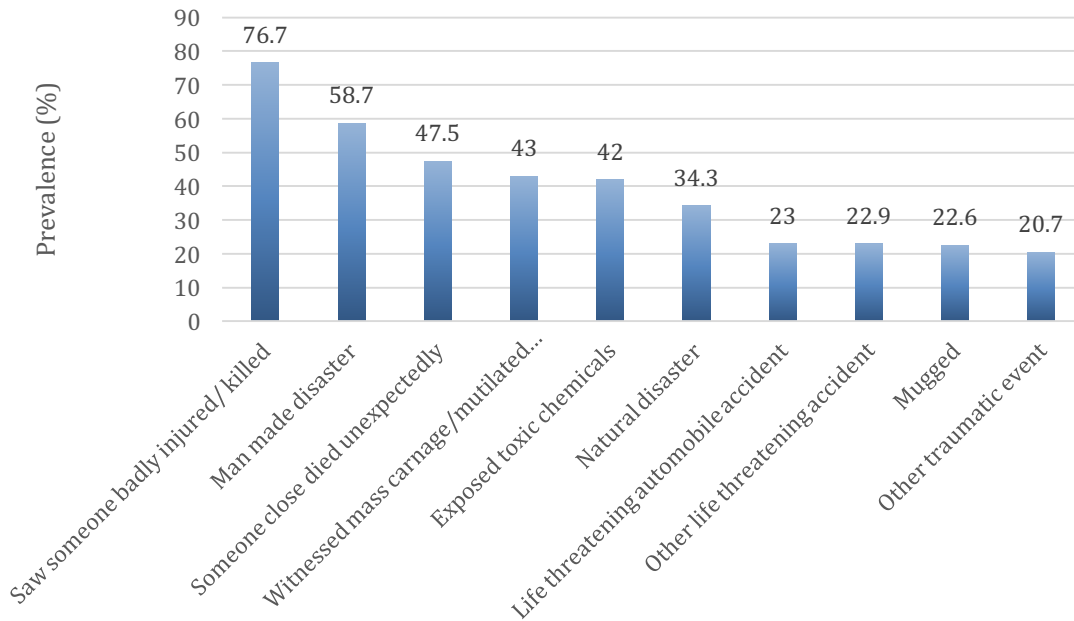


Figure 3.5 Ten most reported lifetime traumas in the entire MFS

Table 3.5 presents the estimated prevalence of lifetime traumatic events reported by the entire MFS. Figure 3.5 presents the ten most commonly endorsed events in this population. These were witnessing a bad injury or death (76.7%, CI 72.2, 80.6), experiencing a man-made disaster (58.7%, CI 54.1, 63.2), having someone close to them die unexpectedly (47.5%, CI 42.8, 52.1), being exposed to toxins (42.0%, CI 37.8, 46.3), and witnessing mass carnage/mutilated bodies (43%, CI 38.7, 47.3). Further details of lifetime trauma exposures for the three MFS subgroups of male career, male retained and females are provided in Table A.5 (Annex A).

Table 3.6: Estimated prevalence of post-traumatic stress disorder from specific event types

Trauma	%	95% CI	RR	(95% CI)	p
Combat	12.4	(2.5, 43.8)	3.26	(0.60, 17.72)	0.170
Peacekeeper	0.0	(., .)	0.00	(0.00, 0.00)	<0.001
Unarmed civilian	6.0	(1.3, 23.3)	1.08	(0.23, 5.18)	0.920
Civilian in place of ongoing terror	10.2	(2.2, 36.3)	1.82	(0.37, 8.89)	0.457
Kidnapped	14.0	(2.9, 47.2)	3.19	(0.59, 17.25)	0.177
Exposed toxic chemicals	5.8	(3.4, 9.8)	1.23	(0.59, 2.55)	0.574
Life threatening automobile accident	4.3	(2.0, 9.1)	0.70	(0.30, 1.64)	0.411
Other life threatening accident	5.8	(2.8, 11.7)	1.04	(0.48, 2.23)	0.925
Natural disaster	4.5	(2.3, 8.5)	0.74	(0.33, 1.63)	0.447
Man-made disaster	7.8	(5.3, 11.3)	2.76	(1.14, 6.67)	0.024
Life threatening illness	6.5	(3.3, 12.5)	1.27	(0.56, 2.88)	0.559
Beaten by parent	15.7	(6.2, 34.3)	2.80	(1.16, 6.80)	0.023
Beaten by spouse	41.1	(8.5, 84.0)	2.75	(1.07, 7.06)	0.035
Beaten by other	12.5	(6.8, 22.0)	3.16	(1.41, 7.10)	0.005
Mugged	8.2	(4.2, 15.5)	1.99	(0.91, 4.36)	0.085
Raped	13.0	(2.7, 45.1)	1.24	(0.14, 11.31)	0.847
Sexual assault	10.6	(4.3, 24.0)	1.31	(0.61, 2.81)	0.490
Stalked	9.2	(2.8, 26.1)	1.35	(0.45, 4.04)	0.593
Someone close died unexpectedly	10.1	(6.9, 14.5)	5.93	(2.18, 16.11)	0.001
Child had life threatening illness/injury	5.7	(2.3, 13.3)	1.22	(0.46, 3.29)	0.687
Someone close had traumatic experience	4.5	(1.8, 10.5)	0.60	(0.20, 1.83)	0.369
Witness domestic violence as child	13.9	(7.1, 25.6)	2.42	(1.02, 5.75)	0.045
Saw someone badly injured/ killed	7.2	(5.0, 10.2)	5.64	(1.05, 30.39)	0.044
Accidentally injured/ killed someone	19.4	(8.0, 39.9)	4.77	(1.99, 11.46)	0.001
Purposely injured or killed someone	49.8	(17.6, 82.2)	9.59	(4.13, 22.27)	<0.001
Witnessed mass carnage/mutilated bodies	9.2	(6.2, 13.6)	3.00	(1.36, 6.65)	0.007
Other traumatic event	8.3	(4.3, 15.7)	1.83	(0.81, 4.10)	0.143
Experience didn't want to talk about	24.0	(13.7, 38.6)	5.37	(2.88, 10.03)	<0.001

Table 3.6 presents the estimated proportion of individuals who reported each lifetime traumatic event type, who met criteria for 12-month ICD-10 PTSD, and the corresponding relative risk for PTSD associated with exposure to each trauma type, adjusted for employee status (career vs retained), sex, age, rank, and number of years served in the MFS.

Importantly, in the context of a workforce perspective, estimated risk for PTSD was elevated among those MFS members who reported experiencing a range of traumas that they might commonly be expected to be exposed to in the course of their duties, such as seeing someone badly injured or killed (RR 5.64, CI 1.05, 30.39), witnessing mass carnage or mutilated bodies (RR 3.00, CI 1.36, 6.65), and experiencing a man-made disaster (RR 2.76, CI 1.14, 6.67). Risk for PTSD was also elevated among those reporting a range of intimate interpersonal traumas including having someone close die unexpectedly (RR 5.93, CI 2.18, 16.11), witnessing domestic violence as a child (RR 2.42, 1.02, 5.75), being beaten by parent (RR 2.80, CI 1.16, 6.80), being beaten by spouse (RR 2.75, CI 1.07, 7.06), and being beaten by another (RR 3.16, CI 1.41, 7.10). In general, while the risk for PTSD was greatest for the least prevalent traumatic events (e.g., purposely or accidentally injuring or killing someone), from a workforce perspective, these extremely low frequency traumas are of less relevance.

3.1.5 Prevalence of 12 month ICD-10 alcohol disorder

The following section provides a summary of the estimated prevalence of 12-month ICD-10 Alcohol Disorders among the entire MFS.

The study examined two types of alcohol disorders, described below:

- **Alcohol harmful use:** Diagnosis not only requires high levels of alcohol consumption, but that the alcohol use is damaging to the person’s physical or mental health. Each participant was initially asked if they consumed 12 or more standard alcoholic drinks in a 12-month period. If so, they were then asked a series of questions about their level of consumption. A diagnosis of Alcohol Harmful Use was applied if the alcohol interfered with either work or other responsibilities; caused arguments with their family or friends; was consumed in a situation where the person could get hurt; resulted in being stopped or arrested by police; or if the participant continued to consume alcohol despite experiencing social or interpersonal problems as a consequence of their drinking during the previous 12-months. A person could not meet criteria for Alcohol Harmful Use if they met criteria for Alcohol Dependence.
- **Alcohol dependence:** Is characterised by an increased prioritisation of alcohol in a person’s life. The defining feature of Alcohol Dependence is a strong, overwhelming desire to use alcohol despite experiencing a number of associated problems. A diagnosis was given if the person reported three or more of the following symptoms in the previous 12-months:
 - strong and irresistible urge to consume alcohol
 - a tolerance to the effects of alcohol
 - inability to stop or reduce alcohol consumption
 - withdrawal symptoms upon cessation or reduction of alcohol intake
 - continuing to drink despite it causing emotional or physical problems
 - reduction in important activities because of or in order to drink.

Table 3.7: Estimated prevalence of 12-month ICD-10 alcohol disorders

12-month ICD-10 Alcohol Disorders	Weighted n	All MFS (n=1061) % (95% CI)
Alcohol harmful use	17	1.6 (0.8, 3.0)
Alcohol dependence	15	1.4 (0.8, 2.6)
Any alcohol disorder	32	3.0 (1.9, 4.6)

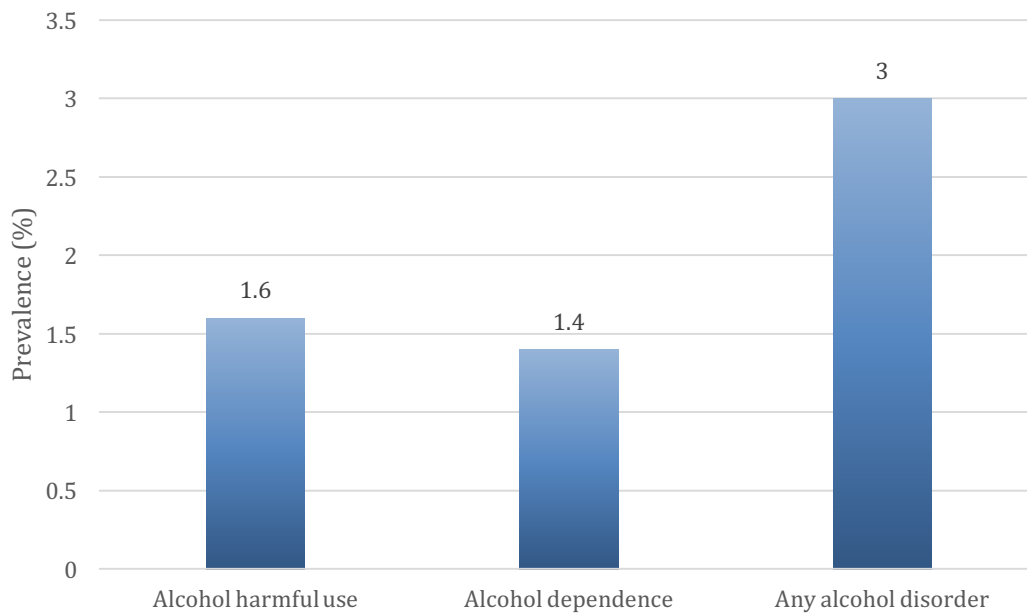


Figure 3.6 *Estimated prevalence of 12-month ICD-10 anxiety disorders in the MFS*

Table 3.7 and figure 3.6 present the estimated 12-month prevalence of ICD-10 alcohol disorder in the MFS. The 12-month prevalence of alcohol disorders was extremely low in the entire MFS, with 3 percent of members reporting any alcohol disorder. This comprised an estimated prevalence of 1.6% (CI 0.8, 3.0) for harmful use of alcohol, and 1.4% (CI 0.8, 2.6) for alcohol dependence. Further details of 12-month ICD-10 alcohol disorder for the three MFS subgroups of male career, male retained and females are provided in Table A.6 (Annex A).

3.2 12-month ICD-10 disorder by rank

The following section describes rates of ICD-10 mental disorder according to MFS rank. Due to the relatively small population, and low levels of mental disorder, rank categories were dichotomised according to personnel role: Station Officer and Senior Management were combined and compared to firefighters.

Table 3.8 Estimated prevalence of 12-month ICD-10 disorder by Rank

12-month ICD-10 Disorder	Rank Categories			
	Station Officer/Senior Management		Senior Firefighter/Firefighter	
	Weighted n	% (95% CI)	Weighted n	% (95% CI)
Depressive Episodes	22	6.4 (3.9, 10.4)	31	4.4 (2.7, 7.0)
Dysthymia	0	0.0 (., .)	2	0.3 (0.1, 1.5)
Bipolar Affective Disorder	0	0.0 (., .)	7	1.1 (0.3, 3.7)
Any Affective Disorder	22	6.4 (3.9, 10.4)	38	5.5 (3.5, 8.5)
Panic Attack	14	3.9 (1.9, 7.7)	46	6.5 (3.8, 11.2)
Panic Disorder	3	0.8 (0.2, 3.5)	17	2.4 (1.2, 4.6)
Agoraphobia	5	1.5 (0.5, 4.4)	9	1.3 (0.5, 3.4)
Social phobia	2	0.7 (0.2, 3.0)	31	4.4 (2.0, 9.2)
Specific Phobia	10	2.9 (1.3, 6.1)	23	3.3 (1.7, 6.2)
Generalised Anxiety Disorder	3	0.8 (0.2, 3.5)	11	1.6 (0.7, 3.6)
Obsessive Compulsive Disorder	2	0.7 (0.2, 3.1)	13	1.8 (0.8, 4.3)
PTSD	14	3.9 (1.9, 7.8)	47	6.7 (4.5, 9.9)
Any Anxiety Disorder	37	10.4 (6.9, 15.2)	98	13.9 (10.0, 19.1)
Alcohol Harmful Use	3	0.8 (0.2, 3.5)	14	2.0 (1.0, 4.0)
Alcohol Dependence	8	2.1 (0.9, 5.0)	7	1.1 (0.4, 2.5)
Any Alcohol Disorder	10	2.9 (1.3, 6.1)	21	3.0 (1.7, 5.3)
Any 12-month Disorder	59	16.7 (12.3, 22.3)	123	17.5 (13.1, 22.9)

Table 3.8 presents the estimated prevalence of 12-month ICD-10 disorder by MFS rank categories. The estimated prevalence of any 12-month disorder was similar for those in a station officer/senior management position (16.7%, CI 12.3, 22.3) compared to those in a firefighter position (17.5%, CI 13.1, 22.9). When examining disorder types, affective disorders and alcohol disorders did not differ between ranks, and anxiety disorders were slightly higher among firefighters (13.9%, CI 10.0, 19.1) compared to station officers and senior management. In particular this difference reflected higher rates of panic attack and PTSD among firefighters (6.5%, CI 3.8, 11.2 and 6.7%, CI 4.5, 9.9 respectively) compared to Station Officer/Senior Management (3.9%, CI 1.9, 7.7 and 3.9%, CI 1.9, 7.8, respectively), though the overlapping confidence intervals suggest that these differences should be interpreted with caution.

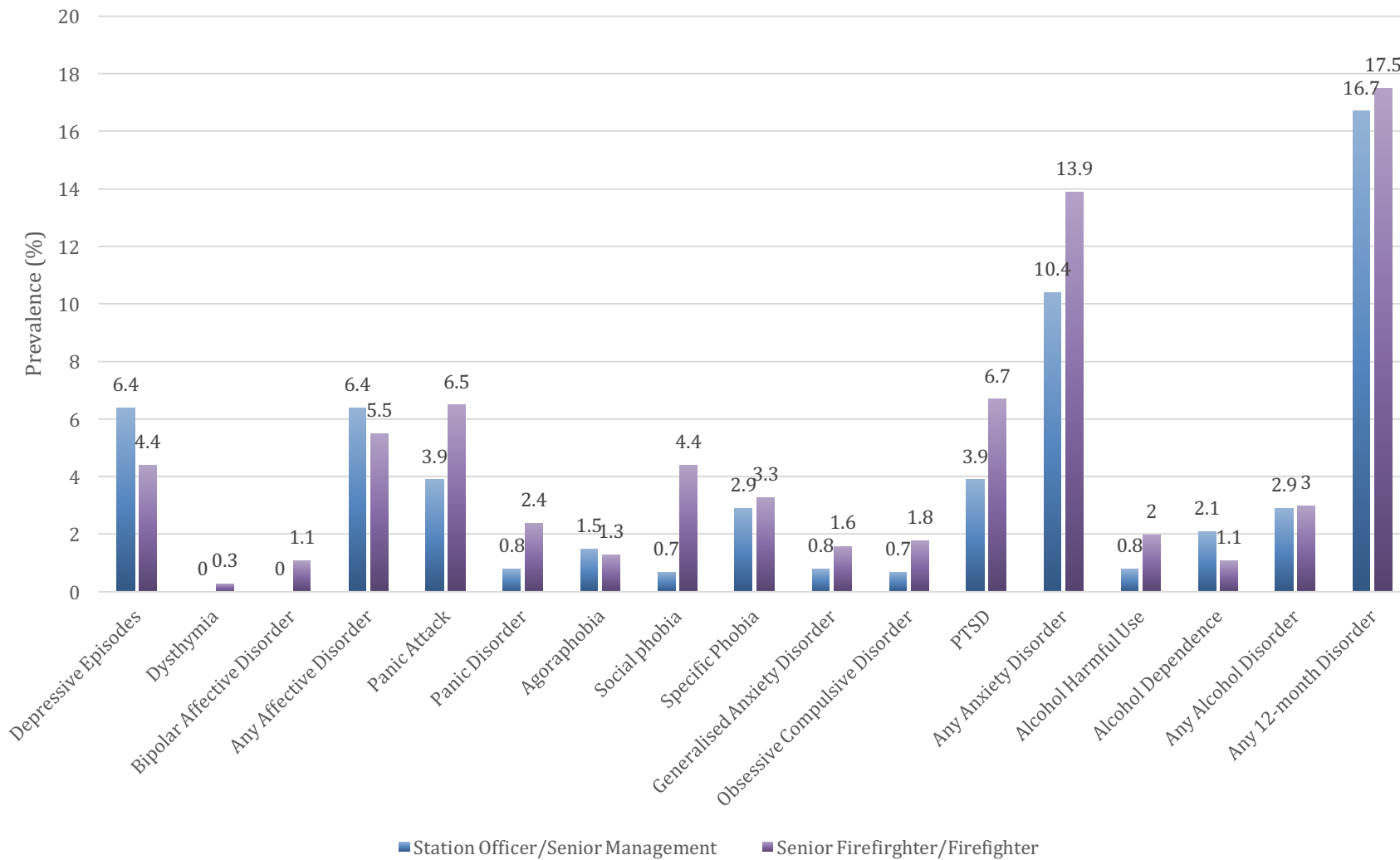


Figure 3.7 Estimated prevalence of 12-month ICD-10 disorder by Rank

3.3 Prevalence of ICD-10 Mental disorder: comparison between the MFS, the 2010 ADF and the Australian community

The following section describes and compares the rates of ICD-10 mental disorder between the MFS, the Australian Defence Force (ADF) and a matched sample from the Australian community as reported in the 2010 Australian Defence Force Mental Health Prevalence and Wellbeing Study (MHPWS) (McFarlane et. Al, 2011). This comparison is for illustrative purposes only. A statistical comparison of the MFS and ABS populations was not possible in this study as this required matching the ABS and the ADF with the demographic characteristics of the MFS population. Figures 3.8 and 3.9 provide a descriptive comparison of estimated prevalence rates of lifetime and 12-month ICD-10 mental disorder in the SA MFS compared to the 2010 ADF and the Australian community in 2010. Figures 3.10 to 3.11 provide a descriptive comparison of estimated prevalence rates of individual 12-month ICD-10 affective, anxiety and alcohol disorders between the MFS and the 2010 ADF.

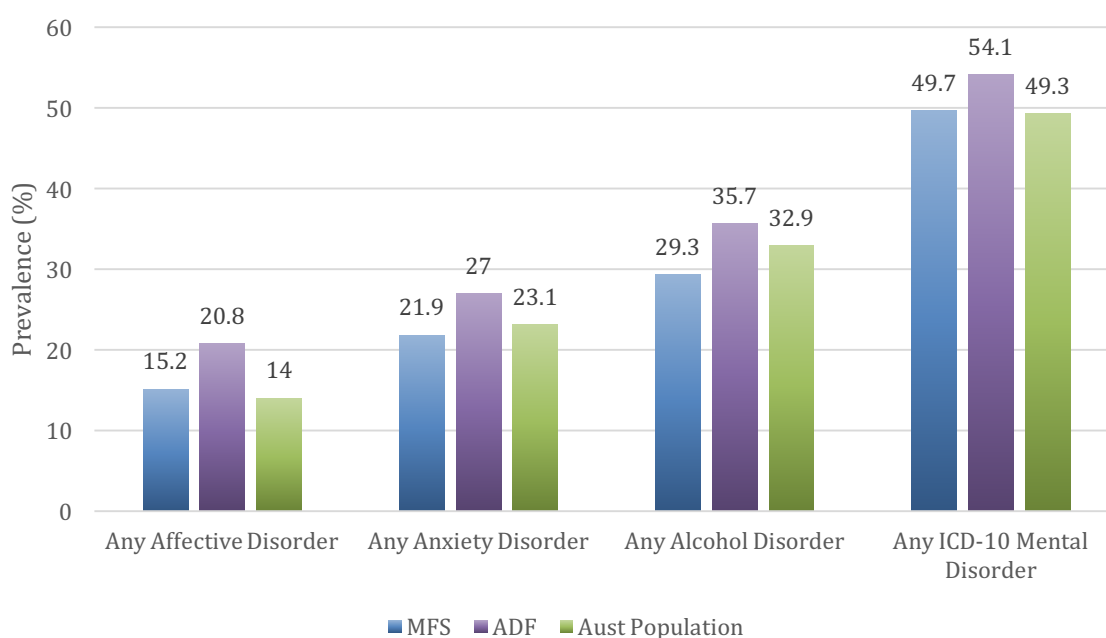


Figure 3.8 Estimated prevalence of Lifetime ICD-10 mental disorder among MFS, 2010 ADF and 2010 Australian community

Figure 3.8 presents the estimated prevalence of lifetime ICD-10 mental disorder for the entire MFS alongside the MHPWS rates for the 2010 Australian Defence Force (ADF) and the 2010 Australian community. Rates of any lifetime mental disorder are similar in the MFS compared to the Australian community, and slightly lower than for the 2010 ADF. This pattern is repeated for the affective and anxiety disorder categories. Any alcohol disorder was lower in the MFS compared to both the 2010 ADF and the Australian community.

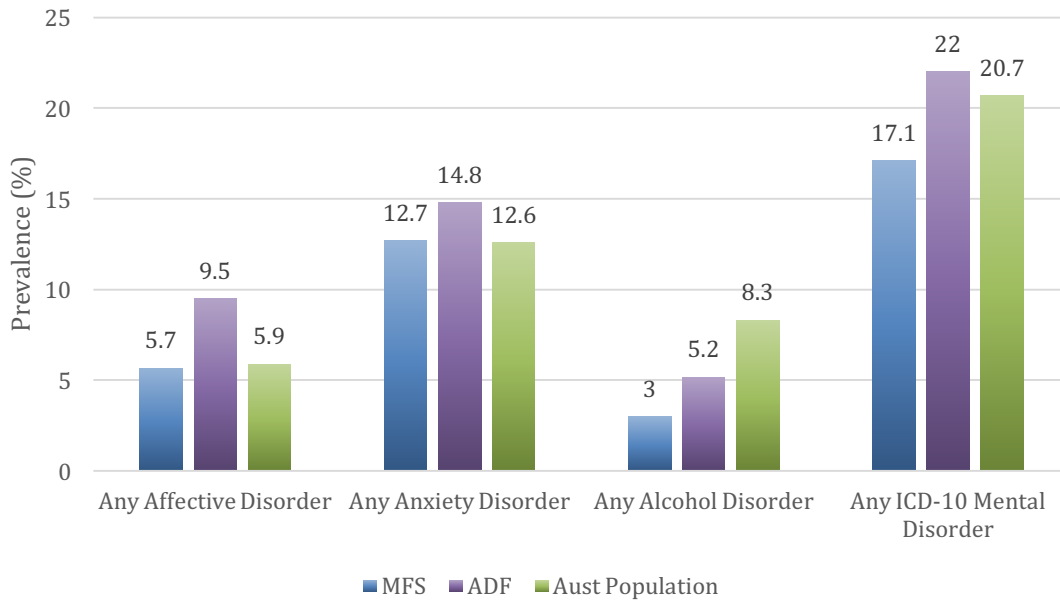


Figure 3.9 Estimated prevalence of 12 month ICD-10 mental disorder among MFS, 2010 ADF and 2010 Australian community

Figure 3.9 presents the estimated prevalence of 12-month ICD-10 mental disorder for the entire MFS, alongside the MHPWS results for the 2010 ADF and the 2010 Australian community. Rates of any 12-month mental disorder were lower in the MFS compared to both the 2010 ADF and the 2010 Australian community. For affective and anxiety disorder categories, rates in the MFS were similar to the Australian community, and lower than the 2010 ADF. Rates of alcohol disorders were higher in the 2010 Australian community than both the MFS and 2010 ADF. Alcohol disorders were lowest amongst the MFS.

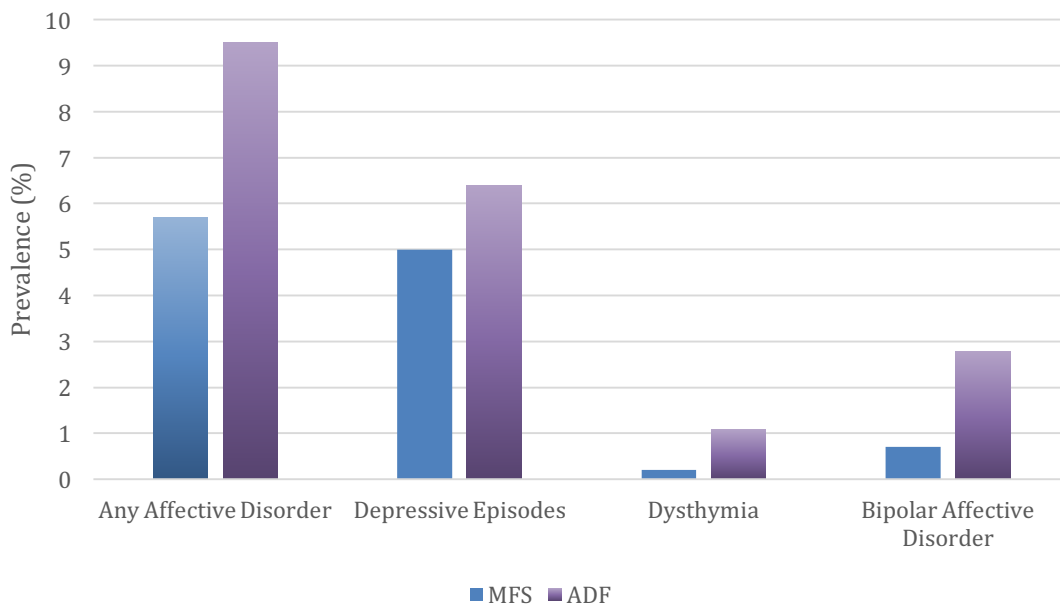


Figure 3.10 Estimated prevalence of 12 month ICD-10 affective disorders among the MFS and 2010 ADF

Figure 3.10 compares estimated prevalence rates of 12-month ICD-10 affective disorders for the MFS and the 2010 ADF. While rates of any 12-month affective disorder were lower among the MFS than the 2010 ADF, rates of depressive episodes were similar (5.0% vs 6.4%). In contrast, rates of dysthymia and bipolar affective disorder were 5 times higher among the 2010 ADF compared to the MFS.

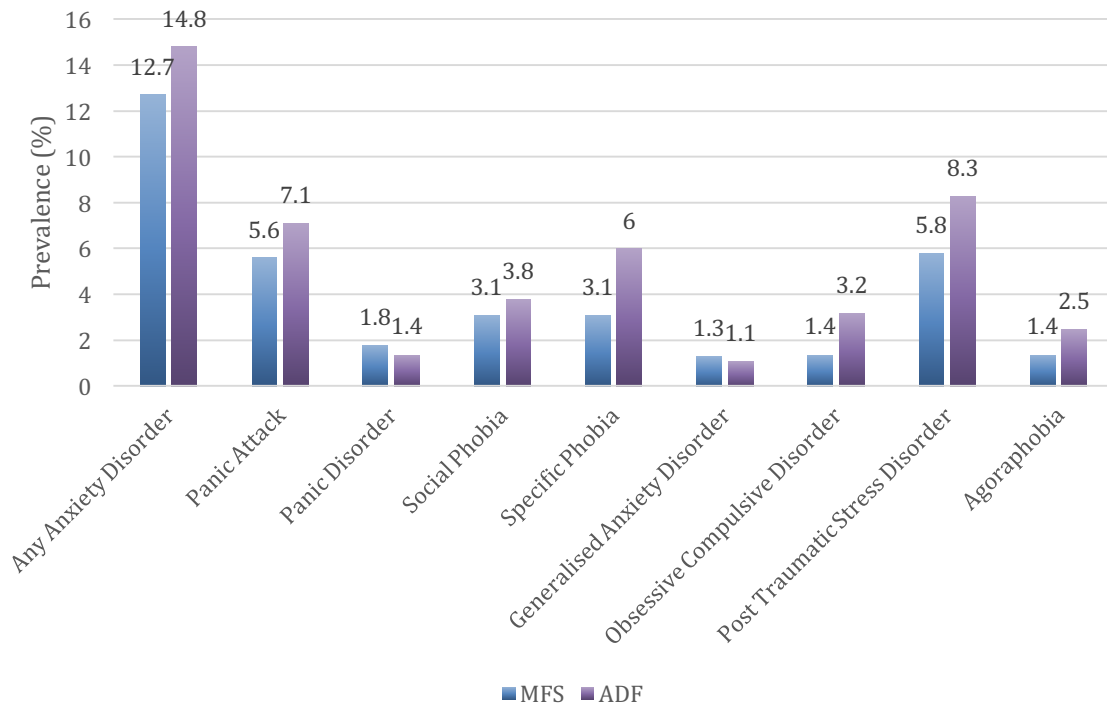


Figure 3.11 Estimated prevalence of 12 month ICD-10 anxiety disorders among the MFS and 2010 ADF

Figure 3.11 compares the estimated prevalence rates of 12-month ICD-10 anxiety disorders for the MFS and 2010 ADF. Rates of any 12-month anxiety disorder were relatively similar between the MFS and the 2010 ADF, with some specific disorders having slightly higher rates among the ADF. In particular, rates of specific phobia, obsessive compulsive disorder and agoraphobia were almost twice as high among the 2010 ADF, and rates of 12-month PTSD were approximately 30% higher among the 2010 ADF compared to the MFS.

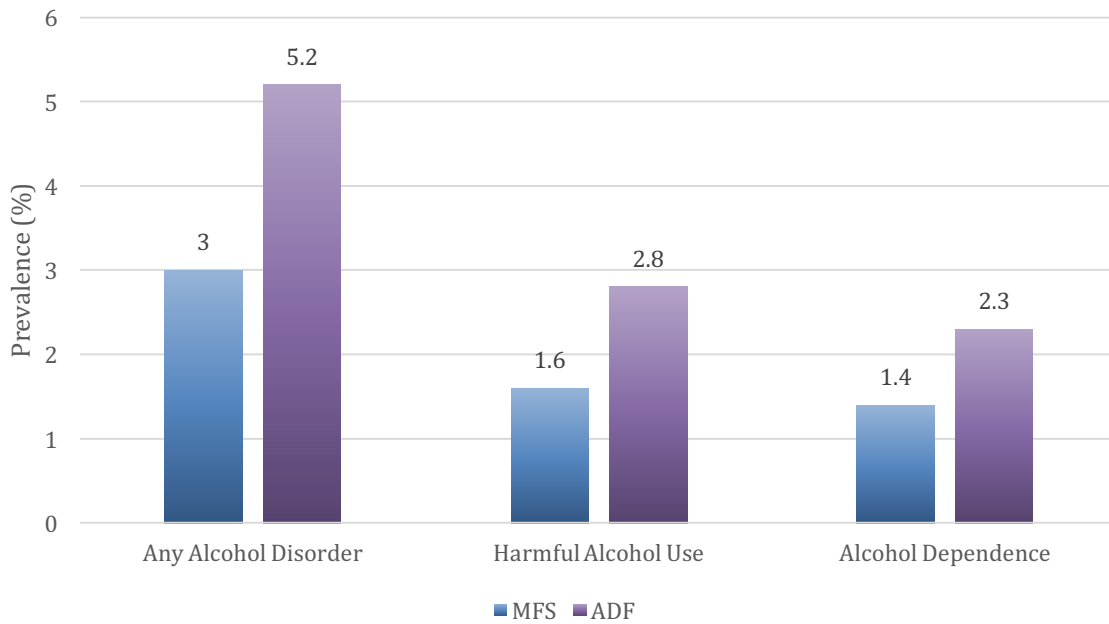


Figure 3.12 Estimated prevalence of 12 month ICD-10 alcohol disorders among the MFS and 2010 ADF

Figure 3.12 compares the estimated prevalence rates of 12-month ICD-10 alcohol disorders among the MFS and the 2010 ADF. Overall, any alcohol disorder, harmful alcohol use, and dependence were approximately 40% higher among the 2010 ADF compared to the MFS.

3.4 Functional impacts of mental disorder and mental disorder comorbidity

The following section describes the impacts of mental disorder and mental disorder comorbidity, by examining the functional impairment in self-reported work, social and family domains, as well as the impact on quality of life and workplace productivity.

3.4.1 12-month mental disorder and work, social, family disruption

The following section examines the impacts of 12-month ICD-10 mental disorder on functional impairment in work, social and family domains. Functional impairment was assessed via the Sheehan Disability Scale (Leon et al., 1997), a 5-item self-report measure of disability due to mental health symptoms in three inter-related domains of work/school, social life and family life. The 3 items assessing impairment in the 3 domains are scored from 0 to 10 and can yield a total global functional impairment score of between 0 and 30. For the purpose of the following analyses, the separate domain specific impairments were examined, first in relation to broad disorder categories, then in relation to individual disorders.

3.4.1.1 Work impairment

Table 3.9 Work disruption and 12-month ICD-10 mental disorder

	Any mental disorder		Any affective disorder		Any anxiety disorder		Any alcohol disorder	
	M	(95% CI)	M	(95% CI)	M	(95% CI)	M	(95% CI)
Disrupt work	2.74	(2.03, 3.46)	3.59	(2.47, 4.70)	2.68	(1.81, 3.55)	3.05	(1.45, 4.64)

Table 3.9 presents the mean self-reported work disruption among the MFS who met ICD-10 criteria for a 12-month mental disorder. Overall, self-reported disruption was lowest for anxiety disorders, and highest for affective disorders. Further details of work disruption and 12-month ICD-10 mental disorder for the three MFS subgroups of male career, male retained and females are provided in Table A.7 (Annex A).

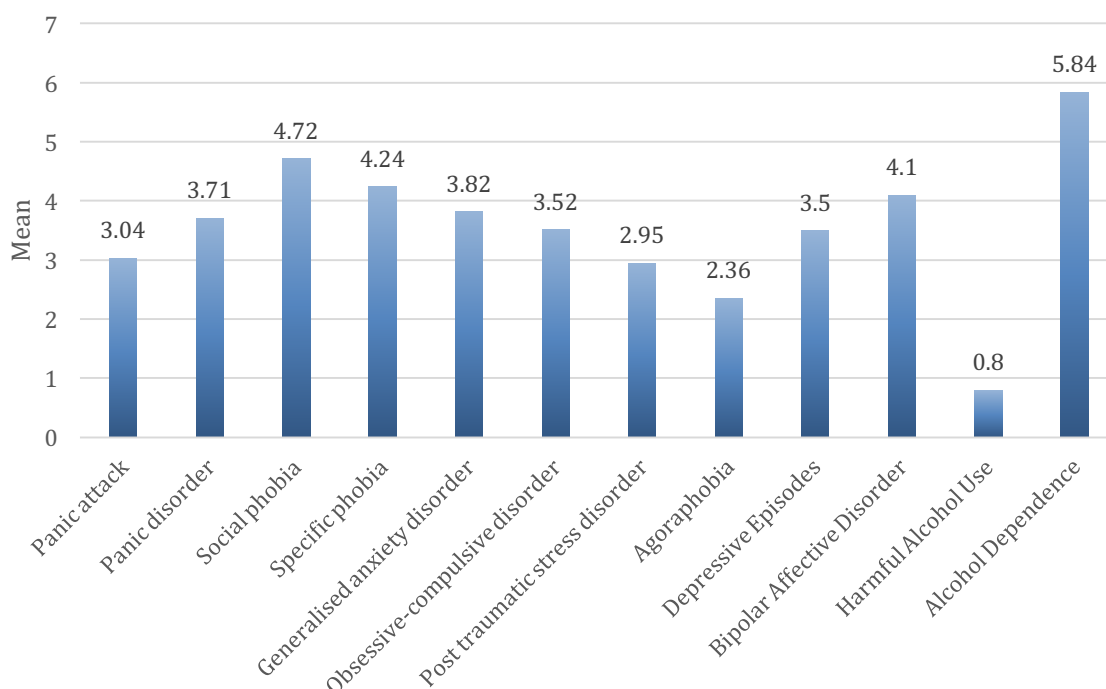


Figure 3.13 Mean self-reported disruption to work functioning for each 12-month ICD-10 mental disorder

Figure 3.13 presents the mean self-reported work dysfunction for each 12-month mental disorder. Impairment in work functioning was greatest among those with alcohol dependence, followed by social phobia and specific phobia.

3.4.1.2 Social impairment

Table 3.10 Social disruption and 12 month ICD-10 mental disorder

	Any mental disorder		Any affective disorder		Any Anxiety Disorder		Any Alcohol Disorder	
	M	(95% CI)	M	(95% CI)	M	(95% CI)	M	(95% CI)
Disrupt social	3.21	(2.49, 3.93)	4.17	(3.23, 5.11)	3.41	(2.48, 4.33)	3.41	(1.81, 5.00)

Table 3.10 presents mean self-reported social disruption among MFS members for each mental disorder category. Disruption in the social domain was somewhat higher than disruption to work functioning, and was greatest for those with a 12-month affective disorder. Further details of social disruption and 12-month ICD-10 mental disorder for the three MFS subgroups of Male Career, Male Retained and Females are provided in Table A.8 (Annex A).

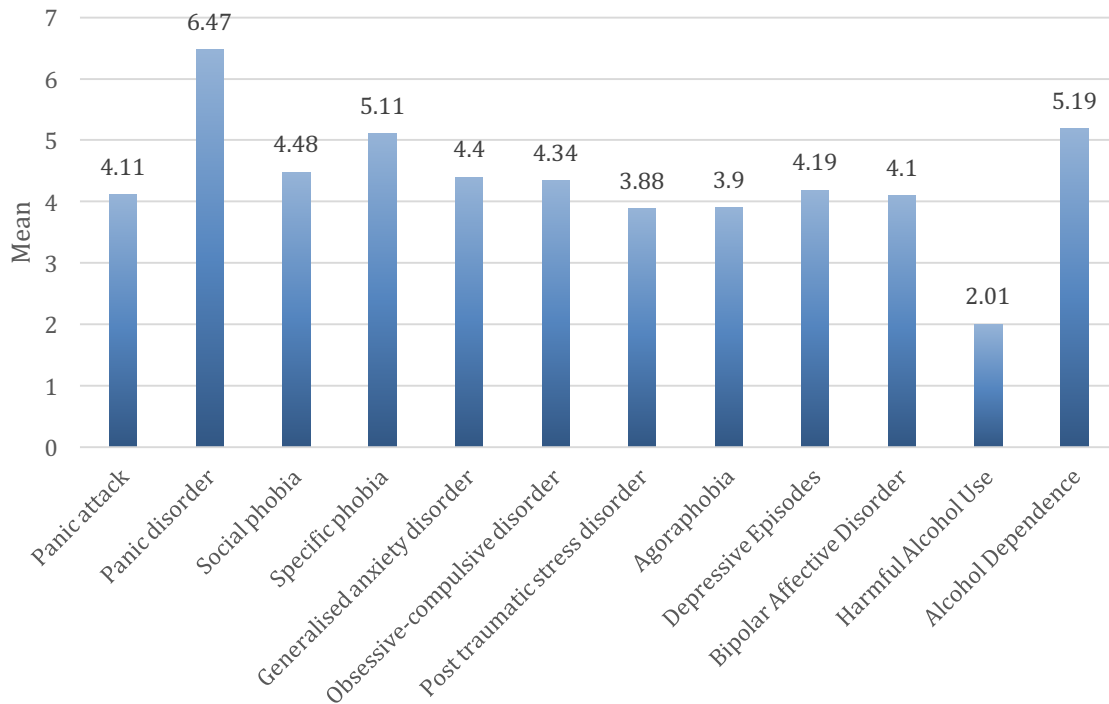


Figure 3.14 Mean self-reported disruption to social functioning for each 12-month ICD-10 mental disorder

Figure 3.14 presents mean self-reported social impairment among the MFS for each specific 12-month mental disorder. In contrast to work functioning, impairment in social functioning was greatest in those with panic disorder, followed again by those with alcohol dependence.

3.4.1.3 Family impairment

Table 3.11 Family disruption and 12-month ICD-10 mental disorder

	Any Mental Disorder		Any Affective Disorder		Any Anxiety Disorder		Any Alcohol Disorder	
	M	(95% CI)	M	(95% CI)	M	(95% CI)	M	(95% CI)
Disrupt family	3.3	(2.65, 4.07)	4.35	(3.45, 5.26)	3.47	(2.57, 4.37)	3.68	(2.01, 5.34)
	6							

Table 3.11 shows the self-reported family disruption associated with 12-month ICD 10 disorders among the MFS. Again, family disruption was highest amongst those with a 12-month affective disorder. Further details of family disruption and 12-month ICD-10 mental disorder for the three MFS subgroups of Male Career, Male Retained and Females are provided in Table A.9 (Annex A).

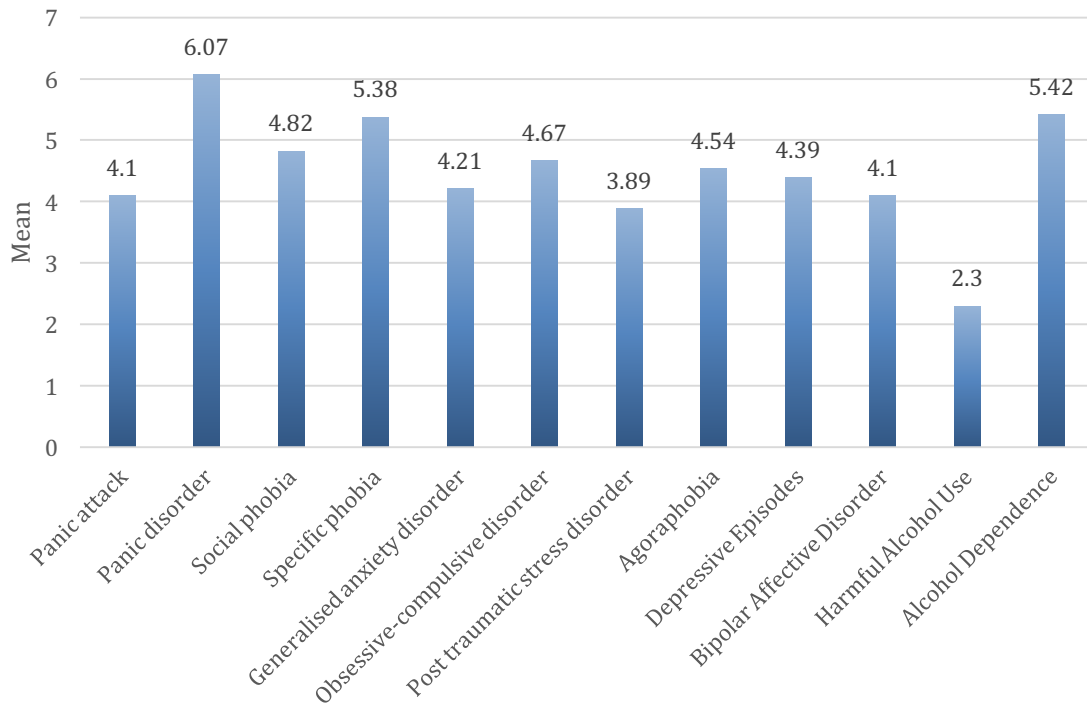


Figure 3.15 Mean self-reported disruption to family functioning for each 12-month ICD-10 mental disorder

Figure 3.15 shows the mean family disruption associated with each 12-month mental disorder. Similar to the social domain, family functioning was most impaired in those with panic disorder, alcohol dependence and specific phobia.

Together, results show that having a 12-month ICD-10 mental disorder was associated with low to moderate levels of disruption across all domains, with disruption most apparent in the family domain and least apparent in the work domain.

3.5 Mental disorder comorbidity in the MFS

The following sub-section focusses on the impacts of 12-month mental disorder comorbidity, on work, social and family functioning, quality of life, and workplace productivity. Comorbidity categories include anxiety and affective disorders, but not alcohol disorders due to their extremely low prevalence. Comorbidity categories were those with no 12-month ICD-10 mental disorder, those with any 12-month affective disorder, but no anxiety disorder, those with any 12-month anxiety disorder, but no affective disorder, and those with both any 12-month affective disorder, and any 12-month anxiety disorder.

3.5.1 Work, social, and family disruption

Table 3.12 Functional impact on MFS personnel with no 12-month mental disorder, 12-month affective disorder only, 12-month anxiety disorder only, both an affective and anxiety disorder

Comorbidity categories*	No affective or anxiety disorder (N = 887)		Affective disorder only (N = 21)		Anxiety disorder only (N = 99)		Both affective and anxiety disorder (N = 31)	
	Weighted n	% (95% CI)	Weighted n	% (95% CI)	Weighted n	% (95% CI)	Weighted n	% (95% CI)
Disrupt work								
Not at all	530	58.8 (53.8, 63.7)	2	9.4 (2.0, 34.2)	39	39.1 (23.7, 57.0)	6	18.1 (5.8, 44.2)
Mildly	292	32.4 (27.8, 37.4)	15	57.5 (30.8, 80.4)	34	34.3 (21.3, 50.0)	10	28.8 (13.7, 50.8)
Moderately	45	4.9 (3.4, 7.1)	.	0.0 (., .)	19	19.4 (10.5, 33.1)	9	24.5 (10.0, 48.4)
Markedly	20	2.2 (1.3, 3.8)	2	9.4 (2.0, 34.2)	.	0.0 (., .)	3	7.4 (1.6, 28.6)
Extremely	.	0.0 (., .)	2	9.4 (2.0, 34.2)	7	7.3 (2.1, 22.8)	3	7.6 (1.6, 29.2)
Disrupt social								
Not at all	488	54.2 (49.2, 59.1)	2	9.4 (2.0, 34.2)	35	34.9 (20.0, 53.5)	.	0.0 (., .)
Mildly	296	32.9 (28.3, 37.8)	15	57.5 (30.8, 80.4)	38	38.2 (24.4, 54.2)	14	40.0 (21.1, 62.5)
Moderately	78	8.7 (6.5, 11.5)	6	23.8 (7.6, 54.3)	13	12.7 (6.3, 23.9)	6	17.5 (5.6, 43.0)
Markedly	24	2.7 (1.6, 4.5)	.	0.0 (., .)	12	11.8 (4.4, 28.2)	7	21.2 (8.9, 42.7)
Extremely	3	0.3 (0.1, 1.4)	.	0.0 (., .)	2	2.4 (0.5, 10.4)	5	14.4 (4.9, 35.6)
Disrupt family								
Not at all	447	49.6 (44.6, 54.6)	.	0.0 (., .)	36	36.2 (21.3, 54.4)	.	0.0 (., .)
Mildly	329	36.5 (32.0, 41.2)	17	66.9 (38.5, 86.7)	32	31.8 (19.1, 47.9)	14	40.0 (21.1, 62.5)
Moderately	86	9.6 (6.8, 13.4)	6	23.8 (7.6, 54.3)	15	15.1 (8.0, 26.9)	6	17.5 (5.6, 43.0)
Markedly	23	2.5 (1.5, 4.2)	.	0.0 (., .)	14	14.5 (6.2, 30.4)	7	21.2 (8.9, 42.7)
Extremely	6	0.7 (0.2, 2.3)	2	9.4 (2.0, 34.2)	2	2.4 (0.5, 10.4)	5	14.4 (4.9, 35.6)

*includes n=23 missing population information, and could not be categorised into a mental disorder comorbidity group

Table 3.12 presents self-reported disruption to work, social and family domains for those with no mental disorder, an affective disorder only, an anxiety disorder only, and those with both an affective and anxiety disorder. In the work domain, affective disorders had the greatest impact, while in the social

and family domains, comorbid affective and anxiety disorders, and anxiety disorder specifically had the greatest impact. Further details of functional impairment and 12-month ICD-10 mental disorder comorbidity for the three MFS subgroups of male career, male retained and females are provided in Table A.10 (Annex A).

3.5.2 Quality of life

Quality of life was measured via a single item taken from the Australian Gulf War Veterans' Health Study 2011 follow-up (Sim et al., 2015). Participants were asked to rate their quality of life on a 5-point Likert scale ranging from 'very poor' to 'very good'.

Table 3.13 Quality of life for MFS personnel with no 12-month mental disorder, 12-month affective disorder only, 12-month anxiety disorder only, both an affective and anxiety disorder

Quality of life	No affective or anxiety disorder		Affective disorder only		Anxiety disorder only		Both affective and anxiety disorder	
	Weighted n	% (95% CI)	Weighted n	% (95% CI)	Weighted n	% (95% CI)	Weighted n	% (95% CI)
Very poor/ poor	5	0.5 (0.1, 3.0)	.	0.0 (., .)	13	12.7 (5.3, 27.1)	5	14.3 (4.9, 35.2)
Neither poor nor good	58	6.4 (3.8, 10.5)	2	9.4 (2.0, 34.2)	.	0.0 (., .)	6	18.1 (5.9, 43.9)
Good/very good	828	92.0 (87.7, 94.9)	23	90.6 (65.8, 98.0)	82	82.2 (67.7, 91.1)	21	60.8 (38.4, 79.4)

Table 3.13 presents self-reported quality of life among the MFS with no affective or anxiety disorder, anxiety or affective disorder only or both an anxiety and affective disorder. A lower proportion of those with both an affective and anxiety disorder endorsed good or very good quality of life, compared to those with no disorder or an anxiety or affective disorder alone. Interestingly, those endorsing an affective disorder only had similar quality of life to those with no disorder. Taken together, it appears that anxiety disorders carried the greatest impacts on quality of life in this population. Further details of quality of life and 12-month ICD-10 mental disorder comorbidity for the three MFS subgroups of male career, male retained and females are provided in Table A.11 (Annex A).

3.6 Current Psychological Distress

The following section provides a summary of the patterns of psychological distress (as measured by the K10) reported by the entire MFS. Descriptive data for psychological distress is also presented for the male career, male retained and female subgroups in Table A13 Annex A.

The K10 is a ten-item screening tool for psychological distress. It is typically used to complement clinical interviews to quantify levels of distress in those who are in particular need of treatment (Kessler et al., 2002). Participants rate how often they had experienced one of ten emotional states during the last 4 weeks (e.g. tired for no good reason, nervous, hopeless, depressed) from one of the following response options: 'all of the time, most of the time' some of the time', 'a little of the time' or 'none of the time'.

Scores for the 10 questions are summed to give a total score from 10-50, with higher scores indicating higher levels of psychological distress. The K10 scoring categories of low (10-15), moderate (16-21), high (22-29) and very high (30-50) levels of psychological distress used in this report are derived from the K10 cut-offs that were used in the Australian National Mental Health and Wellbeing Survey (Australian Bureau of Statistics, 2008; Slade et al., 2009) in the 2010 ADF Mental Health Prevalence and Wellbeing Study (McFarlane et al., 2011).

Table 3.15 K10 risk categories in the MFS

All MFS (N =1061)		
K10 Category	Weighted n	% (95% CI)
Low (10-15)	665	66.8 (63.8, 69.6)
Moderate (16-21)	231	23.2 (20.7, 25.9)
High (22-29)	69	7.0 (5.5, 8.7)
Very high (30-50)	30	3.0 (2.1, 4.3)

Margin of error for totals is < 20 unless: * 20-39, ** 40+

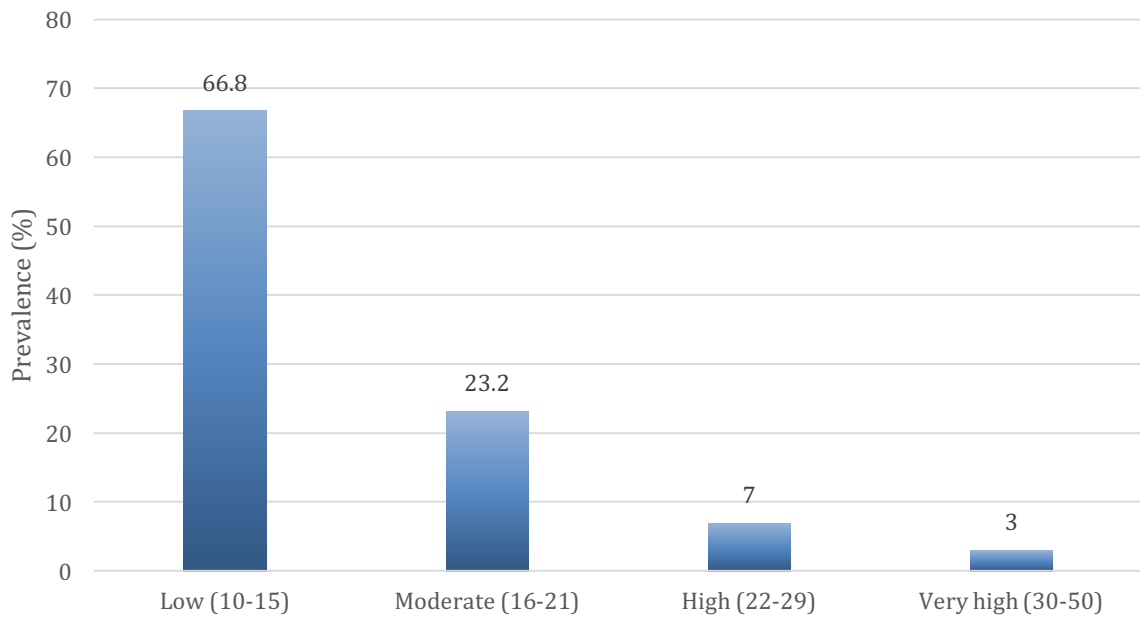


Figure 3.16 K10 risk categories in the MFS

Table 3.15 and Figure 3.16 present self-reported psychological distress for the entire MFS. The majority of the MFS, about two thirds of the population (66.8%, CI 63.8, 69.6), recorded low levels of psychological distress. Approximately 10 percent of the MFS however, reported high or very high levels of psychological distress, with a further 23 percent reporting moderate distress. Further details of self-reported psychological distress for the three MFS subgroups of male career, male retained and females are provided in Table A.13 (Annex A). Psychological distress symptoms are further discussed in Chapter 5 of this report.

3.7 Current Self-Reported Suicidal Ideation and Attempts

The following section summarises suicidality reported by the MFS. This includes suicidal ideation, and suicide plans and attempts, with descriptive data for the male career, male retained and female subgroups provided in Table A14 Annex A.

Twelve-month self-reported suicidality in the MFS was examined in this study with the following four survey questions:

- (1) *Suicidal ideation*: In the last 12 months, have you ever felt that your life was not worth living?
- (2) *Suicidal ideation*: In the last 12 months, have you ever felt so low that you thought about committing suicide?
- (3) *Suicide plan*: In the last 12 months, have you made a suicide plan?
- (4) *Suicide attempt*: In the last 12 months, have you attempted suicide?

The responses for each of these four questions were limited to either yes or no.

Table 3.16 Estimated suicidality in the entire MFS

	All MFS (N=1061)	
	Weighted n	% (95% CI)
Suicidal ideation	108	10.1 (8.5, 12.1)
Felt life not worth living	97	9.8 (8.1, 11.8)
Felt so low thought about committing suicide	48	4.9 (3.7, 6.4)
Suicide plan or attempt	7	0.7 (0.4, 1.5)
Suicide plan	6	0.6 (0.3, 1.3)
Suicide attempt	2	0.2 (0.0, 0.6)
No ideation, Plan or attempt	887	89.0 (86.9, 90.9)

Table 3.16 presents self-reported suicidal ideation and attempts over the last 12 months for the entire MFS. As estimated ten percent of the entire MFS reported some form of suicidal ideation in the previous 12 months, with 10 percent reporting feeling that life was not worth living, and five percent reporting having thought about committing suicide. Despite the high rates of ideation, this did not necessarily translate into attempts, with very low population level estimated prevalence of plans and attempts (under 1 percent). Further details of 12-month self-reported suicidality for the three MFS subgroups of male career, male retained and females are provided in Table A.14 (Annex A).

Table 3.17 Estimated suicidality among MFS, 2010 ADF and 2010 Australian community

	All MFS % (95% CI)	2010 ADF %	Australian Community %
Ideation (single item)	4.9 (3.7, 6.4)	3.9	1.7
Plan	0.6 (0.3, 1.3)	1.1	0.4
Attempt	0.2 (0.0, 0.6)	0.4	0.3

Table 3.17 presents a descriptive comparison of suicidality rates for the MFS compared to the 2010 ADF and the 2010 Australian community, using the single item measure “in the last 12 months have you ever felt so low that you thought about committing suicide”, and suicide plan and attempt items.

Suicidal ideation on this single item measure was slightly higher for the MFS compared to the 2010 ADF, and more the three times higher than the Australian community. Suicide plans and attempts were similarly low across the three groups.

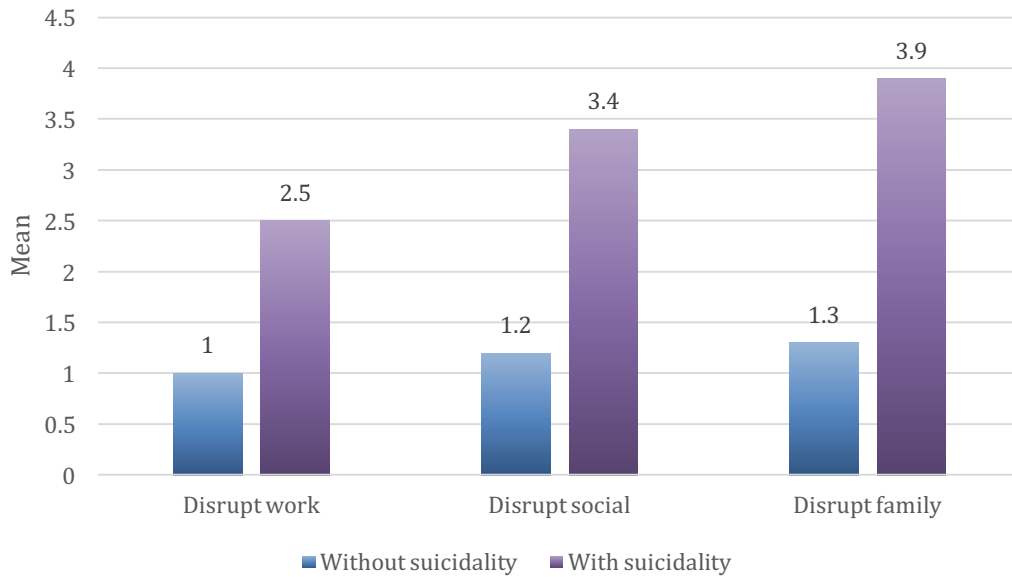


Figure 3.17: Mean self-reported work, social and family disruption among the MFS with and without any 12-month suicidal ideation

Figure 3.17 describes the self-reported functional impact of suicidal ideation in the work, social and family domains. Those MFS members reporting 12-month suicidal ideation had significantly greater functional impairment across all domains, compared to those without ideation, with the greatest impacts in the family and social domains.

3.7.1 Years served with the MFS

Table 3.18 Suicidality by years served with the MFS

	Years Served with the MFS							
	0-4 Years		5-14 Years		15-24 Years		25+ Years	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any suicidality	15	10.7 (5.5, 19.7)	45	10.6 (8.0, 13.8)	21	16.1 (10.7, 23.3)	27	7.4 (5.4, 9.9)
Felt life not worth living	10	7.2 (3.0, 16.2)	41	10.6 (7.9, 14.2)	21	16.7 (11.0, 24.4)	25	7.3 (5.3, 10.0)
Felt so low thought about committing suicide	3	2.3 (0.5, 10.4)	20	5.2 (3.2, 8.2)	14	10.7 (6.7, 16.7)	12	3.4 (2.1, 5.5)
Suicide plan or attempt	0	0.0 (., .)	6	1.5 (0.6, 3.4)	0	0.0 (., .)	2	0.5 (0.1, 1.7)
Suicide plan	0	0.0 (., .)	4	1.1 (0.4, 3.0)	0	0.0 (., .)	2	0.5 (0.1, 1.8)
Suicide attempt	0	0.0 (., .)	2	0.4 (0.1, 1.5)	0	0.0 (., .)	0	0.0 (., .)

Table 3.18 describes the estimated prevalence of suicidality among MFS by duration of service in the MFS. In general, suicidality increased with years of service, with the highest prevalence among those with 15-24 years of service (16.1%, CI 10.7, 23.3). Rates of suicide plans and attempts were extremely low, and clustered among those with 5-14 years of service (1.5%, CI 0.6, 3.4) and 25+ years of service (0.5%, CI, 0.1, 1.7).

3.8 Discussion

The mental health of the MFS was considered across a series of domains, including diagnosable mental disorder and current symptomatology. This is the first study to examine the mental health of an entire fire service using a comprehensive methodology that allows comparisons to the general population in terms of the rates of lifetime and 12-month mental disorder as well as along an axis of distress continuum, including suicidality.

3.8.1 Mental Disorders in the Metropolitan Fire Service:

This study found anxiety disorders to be the most prevalent 12-month mental disorder in the MFS, with an estimated rate of 12.7%, which was similar to the lifetime rate of 15.2%. 12-month affective disorders were present in 5.7% of the current workforce, whereas the lifetime prevalence was significantly higher at 21.9%. With regard to PTSD, a condition which is of particular interest in emergency service personnel, the 12-month prevalence in the MFS using ICD-10 criteria was 5.8%, which was significantly lower than the lifetime prevalence of 13.1%.

In general, the rates of 12-month mental disorder in the Australian community are substantially lower than lifetime rates, with approximately 40% of those who have a lifetime disorder recording a 12-month disorder. In the MFS, a slightly lower 34.4% of those with a lifetime disorder met criteria for a 12-month disorder. Overall, 17.1% of the MFS were estimated to have any 12-month mental disorder, with 49.7% meeting criteria for a lifetime mental disorder. This is particularly the case with alcohol disorders, which have a 12-month prevalence of only 3% in contrast to a lifetime prevalence of 29.3%. In contrast, the concordance between 12-month and lifetime anxiety disorder rates suggest that there are lower rates of remission of anxiety disorders in this workforce.

The MFS rates of mental disorder look very similar to the Australian community population rates, where there is a lifetime history of disorder of 49.3%. The estimated 12-month prevalence of affective disorders in the Australian community is 5.9%, (MFS 5.7%) and any anxiety disorder 12.6% (MFS 12.7%). The 12-month rates of any alcohol disorder were substantially lower in the MFS (3%) compared to 8.3% of the Australian community. A finding that was also observed when comparing the ADF to the Australian community. Interestingly, the rates of PTSD were similar for the MFS and the Australian community, with 5.8% of the MFS meeting ICD-10 criteria for 12-month PTSD compared to 5.2% in the Australian community (McFarlane, 2010a).

The findings for the rates of mental disorder in the MFS also need to be considered in context of the member's duration of service. This is because the length of service is likely to reflect both their cumulative trauma exposure and the age of the individual. The two largest groups in the Fire Service are those who have had 5 to 14 years of service (39.8%) and those with more than 25 years of service (34%). As Harvey et al. (2016) have shown, there is an increasing burden of risk to the mental health of firefighters with increasing duration of service and this of particular relevance to these groups into the future. A strategy of managing and monitoring this risk is important.

In general, the overall concordance of mental disorder rates between the MFS and the Australian community is reflective of the community from which fire fighters are drawn. However, what this does not address is the issue of the 'healthy worker effect'. Mental disorder rates within an organisation such as the MFS need to take into account the healthy worker effect (Arrighi & Hertz-Picciotto, 1994; Haley, 1998). The 'healthy worker effect' phenomenon suggests that the selection and recruitment process aims to exclude vulnerable and unwell individuals, meaning that this population should be *healthier* than the Australian community from whom they are drawn. Equally, members who become unwell or are not capable of continuing to work as a firefighter because of emerging psychological distress or physical injury are also likely to retire, thus leaving a 'healthy' workforce which remains. Any consideration of mental disorder prevalence needs to take into account this potential effect.

The findings also highlight the need to consider that the MFS is not a closed community, with those experiencing mental disorders being at substantially greater probability of transition from the workforce (hence not being captured in the rates presented here). It is difficult to compare mental disorder rates generally with other emergency service personnel because of the lack of research documenting disorder other than PTSD, and the use of self-report methodology, which provides estimates of probable rather than diagnosable disorder. For example, Harvey et al. (2016) identified that the rate of probable PTSD in the NSW Fire Service, using a self-report measure, was 7.7%, while the rate amongst retired fire fighters was 17.9%: a finding consistent with the healthy worker effect. However, other research, such as Berger et al. (2012's) meta-analysis showed that the rate of PTSD documented among the MFS in this study is slightly lower than rates found in other international studies.

3.8.1.1 Anxiety Disorders

In addition to overall rates of any anxiety disorder, the prevalence of specific anxiety disorders in the MFS were also examined. Posttraumatic stress disorder (PTSD) was the most prevalent anxiety disorder (5.8%), closely followed by panic attacks (5.6%). These rates are similar to those found in the Australian Defence Force (ADF), where the most prevalent anxiety disorder diagnosis was panic attacks, with these being experienced by an estimated 5.8% of the ADF. Panic attacks represent a pattern of reactivity to environmental triggers that can increase in frequency and severity over time via the process of sensitisation (McFarlane, 2010a). While a panic attack diagnosis does not represent full-blown panic disorder, (which was experienced by a smaller percentage of the MFS (1.8%)), they are important antecedents, and occur in a significant percentage of people with subsyndromal PTSD (Goodwin et al., 2004; Marshall-Berenz et al., 2011).

3.8.1.2 PTSD and Trauma Exposure

The traumatic exposures experienced by the MFS workforce were documented using the lifetime self-report measures from the CIDI diagnostic interview. It was anticipated that several types of traumatic exposures would be particularly high in the MFS. These included seeing somebody badly injured or killed (76.7%) and dealing with a man-made disaster (58.7%). Other important traumatic exposure types reported by the MFS however, were those which may not have occurred in the context of the work environment. These included life-threatening motor vehicle accidents (23%), other threatening accidents (22.9%) and being mugged (22.6%). These findings overall highlight that the traumatic exposures

experienced by firefighters which may occur both in the work environment and in their private lives, should be considered together, because collectively they have a cumulative impact.

The impact of cumulative trauma exposures is an important consideration, as there is emerging evidence from a variety of research fields which suggests that cumulative trauma exposures increases the risk of PTSD (Karam et al., 2014). Population studies show that the overall number of trauma exposures experienced by an individual is a significant risk factor for PTSD and other adverse health outcomes (Del Gaizo et al., 2011). Similarly, the impact of cumulative traumatic stress exposure has also been clearly demonstrated in veteran studies, which have found that lifetime trauma exposure is an important predictor of both PTSD and depression in military populations (Dedert et al., 2009; Iversen et al., 2008), over and above the effects of combat experiences. It is not simply exposure to a single traumatic event that leads to PTSD or other disorder, but rather repeated trauma exposures that ultimately result in further sensitisation and neurobiological dysregulation, which eventually leads to the onset of clinical disorders. Thus, it is important to consider the lifetime trauma history accumulated over the course of a fire fighter's career, when considering any potential health impacts.

It is also important to consider that different lifetime traumatic events carry with them differential risks of disorder. In this study, it is of note that the lifetime traumatic events that were particularly associated with PTSD and occurred with sufficient prevalence within the MFS were accidentally injuring or killing somebody (RR = 4.77%), seeing somebody badly injured or killed (RR = 5.64%) and experiencing a man-made disaster (RR = 2.7%). Interestingly, a number of specific traumas that occurred in an individual's personal life also carried with them a significant risk. These were having someone close to them die unexpectedly (RR = 5.93%) and witnessing domestic violence as a child (RR = 2.42%). These findings emphasise again that the traumatic exposures that firefighters experience in the course of their occupational service are important. However, the background traumas experienced in an individual's personal life should also be considered. Firefighters are not immune to the general posttraumatic morbidity that impacts the broader Australian community.

3.8.1.3 Alcohol Disorders

Alcohol disorders are of particular importance amongst emergency service populations because they can impact significantly on performance. Also, in some cases alcohol disorders are an indicator of self-medication for an underlying psychiatric condition. This study found that the estimated 12-month prevalence of any alcohol disorder in the MFS was 3.0% (with 1.6% harmful alcohol use, and 1.4% alcohol dependence). Harmful use represents levels of consumption that disrupt work and other responsibilities. In contrast, alcohol dependence is characterised by an irresistible urge to use alcohol and tolerance to its intoxicant effects. Such individuals often have an inability to reduce consumption.

The comorbidity of PTSD and alcohol abuse has long been recognized (McFarlane, 1998) and there is extensive literature highlighting this relationship (Jacobsen et al., 2001). Changing patterns of alcohol consumption is well documented in a number of settings as a marker of PTSD risk (Crum et al., 2013; Davis et al., 2013; Kline et al., 2014). Furthermore, PTSD symptoms have been shown to increase alcohol craving and a possibility of relapse (Gielen

et al., 2014; Killeen et al., 2015; Simpson et al., 2012). It is therefore important that the identification and treatment of PTSD is addressed in any treatment of alcohol use disorders.

Equally, trauma exposures are another important risk factor for increasing drinking behavior, where longitudinal studies have highlighted the role of alcohol consumption to manage PTSD symptoms (Boscarino et al., 2011). Other studies have examined the potential bi-directional relationship between psychological symptoms and alcohol consumption. For example, one study which examined this relationship generally supported a self-medication model where elevated PTSD symptoms were predictive of greater alcohol use (Haller & Chassin, 2014; Simpson et al., 2014), while other studies have shown alcohol use to predict recruitment of PTSD symptomatology (Tipps et al., 2014).

3.8.2 Comparisons of the MFS with the Australian Community and the ADF

In general, the health and wellbeing of the MFS is tracking comparatively better than that of the Australian Defence Force across the full range of mental disorders. However, as discussed previously, the impact of the healthy worker effect should not be underestimated; these figures do not represent the accumulated costs of working within a fire service as the data could not capture those individuals who have left the MFS, either due to problems related to physical injury, physical health complaints, or mental disorders.

What is important is that the findings of this study emphasise that appropriate and effective strategies within the MFS are applied to manage mental health conditions, as there remains a subgroup of employees who are experiencing symptoms that can potentially impact on their occupational capacity. This subgroup also represents a risk into the future in terms of the potential exacerbation of their mental health disorder through further trauma exposures in the workplace.

3.8.3 Functional impairment and quality of life in relation to 12 -month mental disorder

This study found that mental disorder and symptoms, in general least impacted on work functioning of MFS personnel in contrast to family and social domains. In the work domain, affective disorders had the greatest impact, while in the social and family domains, comorbid affective and anxiety disorders, and anxiety disorder specifically had the greatest impact. Mental disorder comorbidity was associated with poorer quality of life, and this appears to reflect the detrimental effects of anxiety disorders in particular. Taken together, a clear implication of these findings is that in cases of undiagnosed disorder, this may not exert negative impacts on the MFS member's work, however will likely have impacts at home. This means it's critical to have an open dialogue between the MFS as an organisation, and families, particularly as the family environment may be the first place that symptoms manifest and are identified.

Importantly, the impact of mental disorders is likely to be manifest in interpersonal settings and may impact of the reporting of occupational stressors such as satisfaction and conflict with colleagues.

3.8.4 Psychological distress

The use of a dimensional examination of self-reported mental health symptoms has gained increasing consideration in mapping the emerging risks of mental disorder at a population level (Judd et al., 1996; Karsten et al., 2013; O'Donnell, 2013; Pietrzak, 2013). While diagnosis has a considerable utility for categorising and treating patients, the sometimes arbitrary cut-offs between disorder and no disorder disguises the significance of subthreshold symptomatology. Subthreshold symptoms, across the spectrum of anxiety and depression, are associated with significant levels of impairment and distress (Judd et al., 1996; Karsten et al., 2011). Equally, they represent a significant risk of emerging disorder or partially treated disorder (Kennedy et al., 2004; Pine et al., 1999). These sub threshold categories therefore have significant relevance from a public health perspective. In particular, some threshold symptoms are potentially less entrenched and more susceptible to brief interventions than are fully established disorders (Haller & Chassin, 2014; Scott et al., 2013).

There has been an increasing emphasis in psychiatry to examine the early symptoms of mental disorder because of the substantial benefits of early intervention (McGorry & Nelson 2016). This perspective emphasises the importance of a longitudinal model of psychiatric morbidity which is fluid and reactive to environmental stressors and interventions (Fichter et al., 2008)

Just over one in three MFS members reported at least moderate or high levels of current psychological distress, with approximately one in ten reporting high or very high levels. A moderate or higher level of psychological distress symptomatology not only indicates the current mental health of the individual, but can be reflective of subthreshold anxiety or depressive disorders, thus can be a flag for early intervention or further follow-up. Recognition of these symptoms among MFS members is particularly important in terms of preservation of mental fitness and wellbeing. In any on-going monitoring of the mental health for the MFS workforce, the Kessler 10 is a useful instrument because it can be used to compare the MFS with the Australian community.

3.8.5 Suicidality

Ambulance officers and police (Stuart, 2008) are occupational groups who evoke special concern about rates of suicide, but this issue has received remarkably little attention in firefighters. The finding that approximately one in ten MFS members were estimated to have experienced some form of suicidal ideation in the previous 12 months indicates that this also a significant issue in firefighters. In particular, the finding that these rates among the MFS are high when compared against Australian community estimates is of importance. In Australian males, the 12 month population based estimate of suicidality is 1.6% (Slade et al., 2009). A significant body of evidence supports a continuum of suicidal expression, where non-fatal suicidality, (i.e., suicidal ideation, suicidal plans and attempts) predominantly precede future completed suicide (De Leo et al., 2005; Joiner Jr et al., 2005). Thus, focusing on suicidal thoughts and behaviours provides effective opportunities to prevent suicide deaths.

Suicidality is a well- documented symptom or correlate of mental disorder, most notably PTSD, depression and alcohol dependence/abuse (Arsenault-Lapierre et al., 2004; Kang & Biullman, 2008; Marshall et al., 2001; Oquendo et al., 2005; Rihmer, 2007). However, the

rates of suicidal ideation observed in MFS members is greater than would be expected, given the rates of diagnosed disorder in this population. This finding highlights the importance of the emerging evidence that suicidality is a further consequence of cumulative stress and trauma exposure, and the particularly distressing nature of some of the more common exposures experienced by emergency services workers. The impact of cumulative exposure and the confrontation to death is reflected in the finding that there is increasing rates of suicidal ideation with years of service (table 3.18). A key reason to consider the phenomenon of suicidal ideation is that it is a very good predictor of future suicidal behaviour and represents a critical flag for intervention (De Leo et al., 2005; Joiner Jr et al., 2005). However, importantly, most people who think about suicide *do not* go on to take their own life (Klonsky et al., 2016). Suicidal ideation alone may more generally be a manifestation or symptom of distress, thus is important to target for this reason. The finding that suicidal ideation was associated with functional impairment across the domains of social, family and work functioning further highlights its relevance as a marker of substantial distress. The fact that the impact of suicidality on MFS members was most marked in the family domain, highlights the importance of family engagement in identifying individuals at risk, and in terms of interventions.

As already discussed, there is a strong relationship between suicidality and a range of common mental disorders, this highlights the need to identify and treat these conditions given the increased risk of suicidality in the MFS. The issue of suicidal ideation should be monitored in the context of the cumulative burden of exposure to distressing and traumatic events. Furthermore, the structure of fire service workforces, with a predominance of younger males, is an issue to consider as they carry a population risk of increased suicidal ideation (Slade et al., 2009).

In summary, the level of suicidal ideation found in this study was not anticipated in the context of the observed rates of mental disorder. It suggests general adverse impacts of exposures to events that confront MFS members with death, horror and grievous injury, and underscores the importance of the cumulative monitoring of these exposures.

3.9 Implications and recommendations

3.9.1 Mental health literacy and training

- Access should be provided to high quality sources of information online to assist mental health literacy to improve access to care.
- Mental health training should be an integral aspect of the MFS work environment so as to allow both firefighters and officers to self-appraise their mental fitness and capacity and that of their colleagues.
- Specific mental health training should be an integral part of leadership and promotion courses.
- The focus on the development of subsyndromal symptoms as a risk for full disorder should be addressed in health promotion strategies. This should be focused on language that focuses on concepts such as mental fitness. Similarly, a skill based

approach can be integrated in the training firefighters how to deal with the distress of accident victims.

- Training in how to deal with mass casualty events and how to deal with deceased persons in such a manner that minimises the psychological impact should be investigated. These include minimising exposure to the personal details of the victims and strategies for providing positive meaning in these extremely difficult circumstances.

3.9.2 Trauma and stress exposure

- The cumulative nature of the burden of traumatic stress exposure and the impact of aging on physical and psychological health should be considered in the recruitment of firefighters as the MFS carries the risk not only for the exposures during service as an MFS firefighter but also from previous occupational exposures and personal life time traumatic stresses. The implementation of a screening process that monitors and documents this cumulative burden should be considered. In those who appear at risk, the opportunity for a period of rotating out of front line duties may need consideration.
- The current employee assistance program to review the findings with the MFS and consider possible strategies to address these. The incidents that are recognised as high risk for PTSD should be given particular consideration for the type of intervention required. These should include ways of minimising identification of firefighters with deceased persons.

3.9.3 Early intervention

- A key message is that PTSD is not the only disorder that can arise as a consequence of MFS service and early treatment is critical to preventing the disorder becoming more severe and chronic.
- An intervention should be established for suicide prevention to address suicidal ideation and be sustained during officers' service. Training should be instituted for those in command and management roles in the identification and management of suicidal ideation and related behaviours.

3.9.4 Treatment and Return to the Workforce

- The treatment guidelines for emergency services developed in NSW highlight how during treatment, officers should be optimally kept in a meaningful role in the work place while not being exposed to further traumatic events. On return to the workplace ongoing impacts of further exposures should be carefully monitored because of the risk of relapse, and subsequent increases to the severity and chronicity of disorder.
- The assessment and treatment of psychological disorders should be accompanied by a comprehensive assessment of the firefighter's physical health and risk factors, including history of physical injuries and related disabilities.

4 Physical Health

- ❖ **The most prevalent physical health conditions in the MFS were high cholesterol (13.3%), high blood pressure (10.4%), sinus problems (9.8%), skin cancers (8.9%), osteoarthritis (5.9%) and hearing loss (5.9%).**
- ❖ **Doctor diagnosed physical health conditions increased with age and length of service. Station Officers and Senior Management had higher numbers of conditions compared to firefighters, suggesting an overall accumulation of physical health complaints with age.**
- ❖ **The comorbidity between doctor diagnosed physical conditions and 12-month mental disorder tended to be greater for lower prevalence conditions. An estimated 70.9% of the MFS who reported a doctor diagnosed traumatic brain injury also met criteria for a 12-month mental disorder. Nearly 60% of those with rheumatoid arthritis (58.7%), 43.1% of those with carpal tunnel syndrome, 30.9% of those with impotence, 30.1% of those with hearing loss, 28.7% of those with kidney disease, and 28.5% of those with migraine met criteria for a 12-month ICD-10 mental disorder.**
- ❖ **The most prevalent form of injuries sustained while on duty and while attending emergencies were musculoskeletal injuries, with just over one third of the MFS estimated to have sustained a musculoskeletal injury while on duty or attending an emergency.**

Firefighters are at risk of physical injury due to the nature of their work, and in addition they may also be at risk of other physical medical conditions. As well as potential long term physiological effects of stress, in the context of an ageing workforce, diseases associated with ageing such as osteoarthritis, hypertension and hyperlipidaemia are likely to be relevant and require monitoring (Zimmerman, 2012).

Physical injuries can also confer a risk of poor mental health. For example, mental disorders including PTSD and major depressive disorder carry a risk for a range of physical conditions including cardiovascular disease (Edmondson & Cohen, 2013), hyperlipidaemia and hypertension (Levine et al., 2014). This emphasises the importance of simultaneously monitoring physical and mental disorders. PTSD and depression also have a significant association with somatic symptoms such as pain and fatigue which are important sources of disability in occupational environments (Gupta, 2013; Katsavouni et al., 2015).

The following chapter describes the physical health of the MFS, according to a range of self-reported outcomes. These include doctor diagnosed physical health conditions, physical and mental health comorbidity, and physical injuries sustained in relation to MFS service.

4.1 Physical health conditions

This section describes the estimated prevalence of doctor diagnosed physical health conditions among the entire MFS.

Table 4.1 Estimated Prevalence of doctor diagnosed physical health conditions among the MFS

Doctor diagnosed physical health conditions	All MFS (N=1061)	
	Weighted n	% (95% CI)
High blood pressure	110	10.4 (8.7, 12.3)
Heart attack	10	0.9 (0.6, 1.5)
High cholesterol	141	13.3 (11.6, 15.2)
Heart failure	8	0.7 (0.4, 1.5)
Migraines	36	3.4 (2.5, 4.6)
Pneumonia	35	3.3 (2.5, 4.4)
Stomach/duodenal ulcers	28	2.6 (1.8, 3.8)
Colitis/Crohn's disease	10	1.0 (0.6, 1.6)
Functional dyspepsia	2	0.2 (0.0, 0.5)
Hepatitis	5	0.5 (0.2, 1.0)
Bowel polyps	52	4.9 (3.9, 6.0)
Kidney disease	23	2.1 (1.5, 3.1)
Bladder disease	10	1.0 (0.6, 1.6)
Diabetes	13	1.2 (0.7, 2.1)
Temporomandibular joint dysfunction	4	0.4 (0.2, 0.8)
Traumatic brain injury	12	1.2 (0.7, 1.9)
Fibrositis or fibromyalgia	2	0.2 (0.0, 0.5)
Eye or vision problems	32	3.1 (2.3, 4.1)
Sinus problems	104	9.8 (8.4, 11.6)
Hearing loss	62	5.9 (4.8, 7.2)
Dermatitis	26	2.5 (1.7, 3.6)
Eczema	28	2.6 (1.8, 3.8)
Psoriasis	29	2.8 (1.9, 4.0)
Malignant melanoma	11	1.1 (0.7, 1.7)
Other skin cancer	94	8.9 (7.5, 10.4)
Other cancer	36	3.4 (2.5, 4.4)
Chronic fatigue syndrome	4	0.3 (0.1, 0.8)
Impotence	18	1.7 (1.1, 2.5)
Sleep apnoea	32	3.1 (2.3, 4.1)
Carpal tunnel syndrome	34	3.2 (2.3, 4.5)
Osteoporosis	7	0.6 (0.3, 1.5)
Osteoarthritis	63	5.9 (4.8, 7.3)

*No responders reported having angina, epilepsy, MND, MS, Cirrhosis, or multiple chemical sensitivity

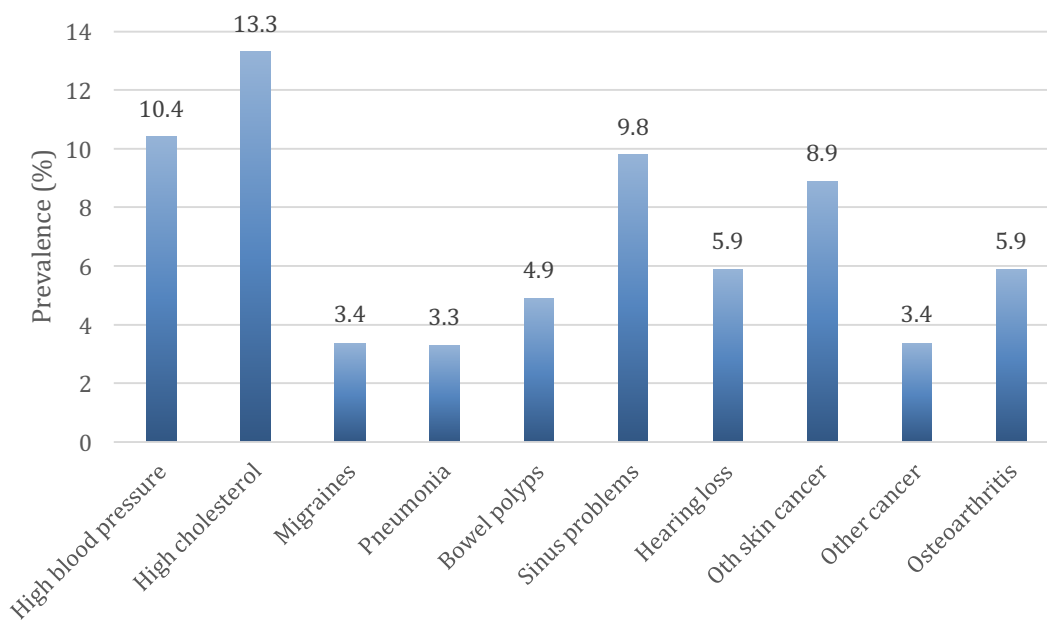


Figure 4.1 Estimated Prevalence of top 10 doctor diagnosed physical health conditions among the MFS

Table 4.1 and Figure 4.1 present the estimated prevalence of physical health conditions among the MFS. The most prevalent conditions in this population were high cholesterol (13.3%, CI 11.6, 15.2), high blood pressure (10.4%, CI 8.7, 12.3), sinus problems (9.8%, CI 8.4, 11.6), skin cancers (8.9%, CI 7.5, 10.4), osteoarthritis (5.9%, CI 4.8, 7.3) and hearing loss (5.9%, CI 4.8, 7.2). Importantly, these conditions are all also associated with normal aging, so may reflect the relative age of the MFS population. Further details of doctor diagnosed conditions for the three MFS subgroups of male career, male retained and females are provided in Table A.15 (Annex A).

Table 4.2 Mean number of doctor diagnosed conditions by age, rank and length of service.

Categories	All MFS (N=1061)
	Mean (95% CI)
Age	
19	0.3 (0.1, 0.5)
35	0.5 (0.4, 0.6)
45	1.2 (1.1, 1.4)
55+	1.9 (1.7, 2.1)
Rank	
Station officer/ senior management	1.4 (1.2, 1.5)
Senior firefighter/firefighter	0.9 (0.8, 0.9)
Length of service	
0-4	0.3 (0.2, 0.5)
5-14	0.6 (0.5, 0.7)
15-24	1.3 (1.0, 1.6)
25+	1.7 (1.5, 1.8)
All	1.0 (1.0, 1.1)

Table 4.2 presents the mean number of doctor diagnosed physical health conditions for the MFS by a range of relevant demographic characteristics including age, rank and length of

service. The mean number of conditions for the entire MFS was 1, and rates increased with age, with those MFS members aged over 55 years having double the population rate (M = 1.9, CI 1.7, 2.1). Station Officers and Senior Management had higher numbers of conditions (M = 1.4, CI 1.2, 1.5) compared to firefighters (M = 0.9, CI 0.8, 0.9), and number of conditions also increased with length of service. Together these findings suggest an overall accumulation of physical health complaints with age. Further details of the mean number of doctor diagnosed physical health conditions by a range of relevant demographic characteristics including age, rank and length of service for the three MFS subgroups of male career, male retained and females are provided in Table A.16 (Annex A).

4.2 Prevalence of Comorbid Physical and Mental Disorder

The following section describes mental and physical disorder comorbidity in the MFS. As well as individual conditions, a selection of doctor diagnosed physical conditions were grouped according to the categories of metabolic (hypertension, high cholesterol and diabetes), gastrointestinal (ulcer, colitis, dyspepsia), chronic conditions (TMJ dysfunction, fibrositis, chronic fatigue, and osteoarthritis), skin conditions (dermatitis, eczema, psoriasis), and cancers (melanoma, other cancer, other skin cancer). The weighted proportion of individuals with each condition category is presented, followed by the proportion of these with a co-morbid 12-month mental disorder. Mean self-reported psychological distress among those with each physical condition type is also presented.

Table 4.3 Estimated prevalence of mental and physical disorder comorbidity

	Physical condition		Physical condition AND any CIDI disorder		K10 score for those with physical condition
	Weighted n	% (95% CI)	Weighted n	% (95% CI)	% (95% CI)
Metabolic (hypertension, high cholesterol, diabetes)	220	20.9 (18.1, 24.0)	44	19.8 (13.4, 28.2)	16.6 (15.3, 17.9)
Heart attack	13	1.2 (0.6, 2.4)	0	0.0 (..)	16.9 (14.1, 19.6)
Stroke	7	0.7 (0.3, 1.6)	0	0.0 (..)	17.3 (15.0, 19.6)
Heart failure	12	1.1 (0.5, 2.7)	0	0.0 (..)	14.6 (13.0, 16.2)
Migraines	26	2.5 (1.5, 4.1)	7	28.5 (12.0, 53.8)	15.7 (13.1, 18.3)
Pneumonia	44	4.2 (2.8, 6.2)	3	6.0 (1.3, 24.2)	15.2 (13.6, 16.8)
Gastro (ulcer, colitis, dyspepsia)	85	8.1 (6.2, 10.4)	18	20.9 (12.1, 33.8)	15.4 (14.3, 16.5)
Hepatitis	2	0.2 (0.1, 1.0)		0.0 (..)	12.0 (12.0, 12.0)
Kidney disease	23	2.2 (1.2, 3.9)	7	28.7 (9.1, 61.6)	20.9 (13.9, 27.9)
Bladder disease	12	1.2 (0.6, 2.3)	2	19.5 (4.3, 56.9)	19.3 (14.1, 24.5)
Chronic (TMJ dysfunction, fibrositis, chronic fatigue, osteoarthritis)	86	8.2 (6.3, 10.4)	10	11.3 (5.4, 22.1)	14.6 (13.9, 15.4)
TBI	18	1.7 (1.0, 3.0)	13	70.9 (40.1, 89.9)	16.7 (14.6, 18.9)
Vision problems	45	4.3 (3.0, 6.1)	10	21.4 (10.4, 39.1)	16.7 (15.3, 18.1)
Sinus	117	11.1 (8.9, 13.9)	18	15.4 (8.8, 25.7)	15.7 (14.8, 16.6)
Hearing loss	71	6.8 (5.1, 8.9)	22	30.1 (18.1, 45.7)	18.5 (15.8, 21.2)

	Physical condition		Physical condition AND any CIDI disorder		K10 score for those with physical condition
	Weighted n	% (95% CI)	Weighted n	% (95% CI)	% (95% CI)
Skin condition (dermatitis, eczema, psoriasis)	60	5.7 (4.1, 7.7)	2	4.1 (0.9, 16.6)	14.2 (13.2, 15.1)
Cancers (melanoma, other cancer, other skin cancer)	151	14.4 (11.8, 17.4)	35	23.0 (15.1, 33.3)	16.6 (15.6, 17.6)
Impotence	23	2.2 (1.3, 3.7)	7	30.9 (13.1, 57.1)	20.1 (16.3, 23.9)
Sleep apnoea	34	3.3 (2.1, 5.1)	7	19.9 (6.0, 49.3)	18.8 (13.1, 24.5)
Carpal tunnel	27	2.6 (1.6, 4.2)	12	43.1 (21.0, 68.4)	18.5 (12.1, 24.8)
Osteoporosis	10	1.0 (0.3, 2.6)		0.0 (.,.)	15.6 (12.3, 18.8)
Rheumatoid arthritis	24	2.3 (1.3, 3.8)	14	58.7 (33.3, 80.2)	15.1 (13.9, 16.2)
Other inflammatory arthritis	23	2.2 (1.2, 3.9)	5	22.4 (7.3, 51.1)	16.9 (14.2, 19.5)
Gout	33	3.1 (2.1, 4.7)	7	22.6 (9.7, 44.5)	15.1 (13.4, 16.9)
Other musc	155	14.7 (12.2, 17.5)	37	24.2 (16.8, 33.5)	17.6 (16.5, 18.7)
No physical conditions selected	492	46.4 (42.7, 50.0)	76	15.5 (10.3, 22.5)	14.8 (14.0, 15.6)

** Note: prevalence estimates of doctor diagnosed physical conditions vary slightly in this table from the previous due to the statistical weighting used

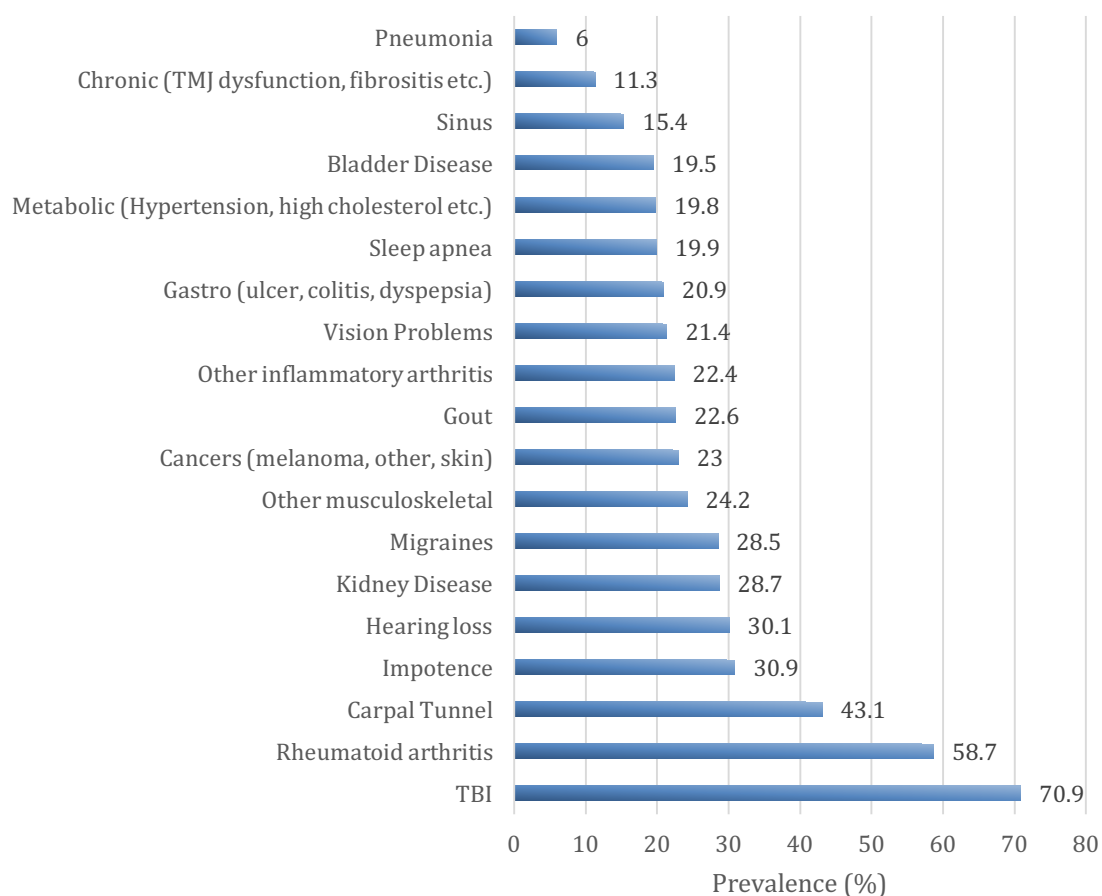


Figure 4.2 Rank ordered physical and mental disorder comorbidity

Table 4.3 shows the comorbidity between doctor diagnosed physical health conditions, diagnosable mental disorder, and psychological distress among the entire MFS. Figure 4.2 presents physical conditions and mental disorder co-morbidity rank ordered from lowest to highest proportions of co-morbidity. As shown in Table 4.3, the most prevalent physical condition type among the MFS was metabolic, with an estimated 20.9% of the MFS reporting this. Importantly, of these, just under one in five had a comorbid 12-month ICD-10 mental disorder. However, in general, the comorbidity of mental disorder with physical conditions was highest in those with low prevalence conditions. Among these lower prevalence conditions, an estimated 70.9% of the MFS with a self-reported doctor diagnosed traumatic brain injury also met criteria for a 12-month mental disorder. Furthermore, for other low prevalence conditions, nearly 60% of those with rheumatoid arthritis (58.7%), 43.1% of those with carpal tunnel syndrome, 30.9% of those with impotence, 30.1% of those with hearing loss, 28.7% of those with kidney disease, and 28.5% of those with migraine all met criteria for a 12-month ICD-10 mental disorder. While migraines had low prevalence in the MFS (2.5%), 28.5% of those with migraine were estimated to also have a comorbid mental condition. With some exceptions (bladder disease, sleep apnoea) the findings for current self-reported psychological distress levels followed a similar pattern to that of 12-month mental disorder comorbidity, being highest among those individuals with kidney disease, hearing loss, impotence and carpal tunnel. Further details of mental and physical disorder comorbidity for the three MFS subgroups of male career, male retained and females are provided in Table A.17 (Annex A).

4.3 Physical injuries

The following section describes estimated rates of physical injuries occurring while on duty, and occurring while attending an emergency, among the entire MFS

4.3.1 Injuries while on duty

Table 4.4 Estimated rates of injuries sustained while on duty

Injuries	All MFS (N=1061)	
	Weighted n	% (95% CI)
Burn (no smoke inhalation)	49	4.6 (3.7, 5.8)
Smoke/gas inhalation (no burn)	27	2.6 (1.8, 3.6)
Burn and smoke inhalation	10	0.9 (0.6, 1.5)
Other respiratory distress	18	1.7(1.1, 2.7)
Wound, cut, bleeding or bruise	129	12.2 (10.6, 14.1)
Dislocation or fracture	65	6.2 (4.9, 7.7)
Strain, sprain or muscular pain	359	33.8 (31.5, 36.3)
Thermal stress	55	5.2 (4.0, 6.7)
Other injury	55	5.2 (4.1, 6.5)

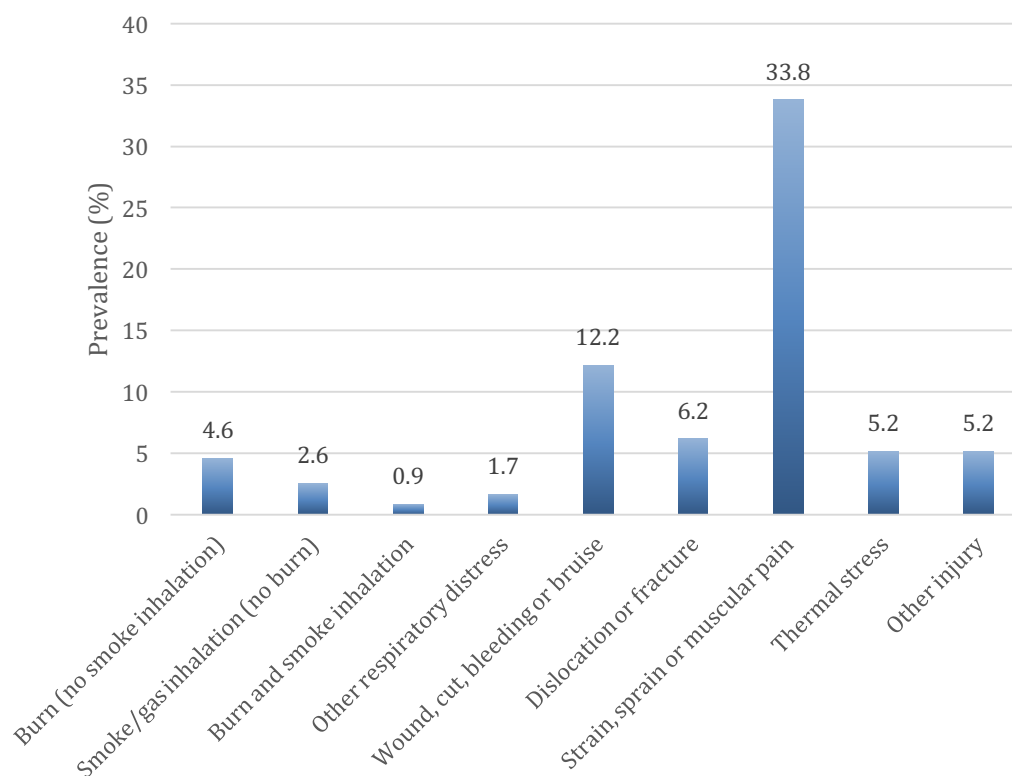


Figure 4.2 Estimated prevalence of physical injuries sustained while on duty

Table 4.4 and Figure 4.2 present the estimated prevalence of injuries sustained while on duty over the course of their career for the entire MFS. Musculoskeletal injuries were most prevalent (33.8%, CI 31.5, 36.3), followed by wounds (12.2%, CI 10.6, 14.1),

dislocations/fractures (6.2%, CI 4.9, 7.7) and thermal stress injuries (5.2%, CI 4.0, 6.7). Further details of estimated rates of injuries sustained while on duty for the three MFS subgroups of male career, male retained and females are provided in Table A.18 (Annex A).

4.3.2 Injuries while attending emergency

Table 4.5 Estimated rates of physical injuries while attending an emergency

Injuries	All MFS (N=1061)	
	Weighted n	% (95% CI)
Burn (no smoke inhalation)	112	10.6 (9.1, 12.3)
Smoke/gas inhalation (no burn)	139	13.1 (11.4, 15.0)
Burn and smoke inhalation	17	1.6 (1.1, 2.3)
Other respiratory distress	39	3.7 (2.8, 4.7)
Wound, cut, bleeding or bruise	212	20.0 (17.9, 22.2)
Dislocation or fracture	65	6.1 (4.9, 7.6)
Strain, sprain or muscular pain	337	31.7 (29.3, 34.2)
Thermal stress	144	13.6 (11.7, 15.8)
Other injury	58	5.5 (4.4, 6.8)

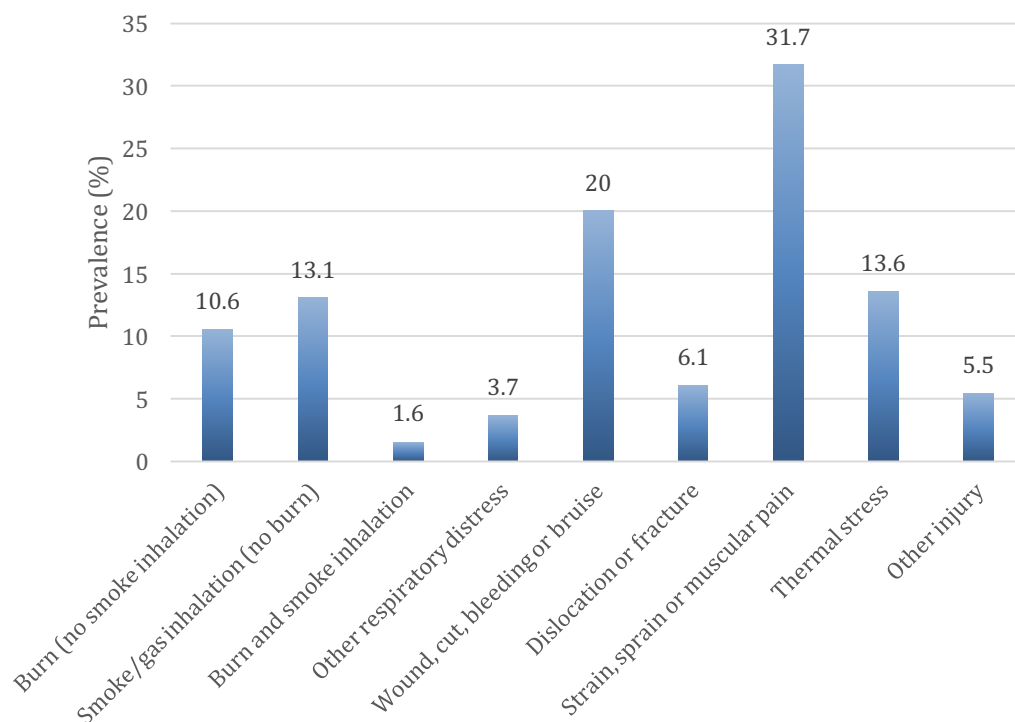


Figure 4.3 Estimated prevalence of physical injuries sustained while attending emergencies

Table 4.5 and Figure 4.3 describe the estimated rates of injuries sustained whilst attending emergencies across their career, for the entire MFS. In general, the pattern of injuries reported being sustained while attending an emergency was similar to those sustained while on duty, however rates of some injuries were higher. The most prevalent form of injuries sustained while attending emergencies were also musculoskeletal, with just under one third (31.7%, CI 29.3, 34.2) of the MFS estimated to have sustained one. In contrast to injuries

sustained while on duty, 20% (CI 17.9, 22.2) of the MFS were estimated to have sustained some kind of wound while attending an emergency. Approximately 13% of the MFS were estimated to have sustained a thermal stress injury (13.6%, CI 11.7, 15.8) or smoke or gas inhalation (13.1%, CI 11.4, 15.0), with approximately 10 percent sustaining a burn while attending an emergency (10.6%, CI 9.1, 12.3). An estimated 6.1% (CI 4.9, 7.6) of the MFS reported sustaining a dislocation or fracture whilst attending an emergency over the course of their career. Further details of estimated rates of injuries sustained while attending an emergency for the three MFS subgroups of male career, male retained and females are provided in Table A.19 (Annex A).

4.4 Discussion

In this study, the physical health of the MFS was found to be generally good, consistent with the requirement that firefighters are capable of performing their roles. Those with more severe injuries and illness would be medically discharged, thus rates reported here do not reflect the extent of accumulated physical health complaints and injuries in the MFS.

4.4.1 Doctor diagnosed physical conditions

On average, MFS members reported having 1 to 2 doctor diagnosed conditions, and there was an association between age, rank and length of service and the number of physical health conditions reported, where higher numbers of health conditions were reported among members who were older, of higher ranks, and with greater length of service. Together this suggests an overall accumulation of physical health complaints with age, combined with the impacts of occupational injuries and exposures. The 10 most prevalent conditions in the MFS were high cholesterol, high blood pressure, sinus problems, skin cancers, osteoarthritis, hearing loss, bowel polyps, migraines, other cancers and pneumonia. These most prevalent conditions are those found to be most commonly associated with normal aging (Casey & Ballantyne, 2017), again reflecting the relative age of the MFS population.

4.4.2 Physical and mental disorder comorbidity

This report also specifically examined the issue of physical and mental disorder comorbidity, finding that for most physical conditions there was significant comorbidity with diagnosable mental disorders. For the majority of physical conditions at least 20% of those endorsing the condition met criteria for at least one comorbid mental disorder. This significant comorbidity across all conditions highlights the needs to consider the physical and mental health of the MFS concurrently, particularly because of the increasing evidence of critical physiological and immunological dysregulation in PTSD (Gupta, 2013) as well as other mental disorders (Walker et al., 2014; Loftis et al., 2010). The concurrent management of the physical and mental health of the MFS will have generalised benefits in terms of occupational capacity and the wellbeing of individual officers.

Importantly, while the effects of aging are an important consideration when examining physical health, the more prevalent conditions observed in the MFS also have a significant relationship with PTSD (Qureshi et al., 2009) and some other mental disorders including depression (Loftis et al., 2010; Michopoulos et al., 2016a; Penninx, 2017; Walker et al., 2014). Among the MFS, approximately 20% of the workforce were estimated to have a self-reported metabolic syndrome related disorder (hypertension, high cholesterol, diabetes). These have important associated risks for long term cardiovascular health (Edmondson &

Cohen, 2013). Metabolic syndrome represents a combination of several of these conditions, and is also known as insulin resistance syndrome (Balkau et al., 2002). This is a complex disorder characterised by a cluster of cardiovascular risks, including abdominal obesity, high blood pressure, dyslipidaemia, and high levels of fasting blood glucose. Increasing evidence indicates that individuals with PTSD are at greater risk of having this syndrome, or elevated rates of one or more of the disorders it comprises (Bartoli et al., 2013; Wolf et al., 2016) though the direction of this relationship is unclear.

The breadth of physical comorbidities among individuals in midlife with PTSD has been highlighted in a meta-analysis by (Pacella et al., 2013), that reported a metabolic syndrome prevalence of 38.7%, abdominal obesity prevalence of 49.3%, hyperglycaemia prevalence of 36.1% and hypertension prevalence of 76.9%. The risk of metabolic syndrome was almost double that of the general population. Consistent with these findings, PTSD is also associated with increased risk of cardiovascular disease (Edmondson & Cohen, 2013) which is also contributed to by immune dysregulation (Gupta, 2013; O'Donovan et al., 2015). These metabolic shifts not only have significant immediate consequences in their own right, but also have longer term health impacts. For example, metabolic syndrome has been associated with various forms of neuropathology, in particular, reduced cortical thickness of the brain (Wolf et al., 2016).

Diagnosis of a major depressive disorder is similarly recognised as a significant risk factor for the onset and course of cardiac disease, informing development of clinical guidelines regarding screening for psychiatric disorders, particularly depression, in patients with coronary episodes (Lichtman et al., 2008). Thus, given the high rates of PTSD and depression comorbidity observed in community and other (including military) populations, physical health sequelae are particularly relevant. In addition, it is important to consider other familial risk factors in relation to the onset of these conditions, in conjunction with any environmental and occupational exposures.

That 8% of the MFS reported a pain related chronic condition (including TMJ dysfunction, fibrositis, chronic fatigue and osteoarthritis) also highlights the role of traumatic stress exposure in pain related conditions. There is a substantial body of epidemiological evidence about the relationship between issues such as musculoskeletal pain and posttraumatic stress disorder (Sareen et al., 2007). This relationship has been particularly identified in relation to spinal pain where one study found that in a community sample, 19% of people complained of chronic spinal pain, and of these, one in three had a comorbid psychiatric disorder (Von Korff et al., 2005). This highlights the importance of assessing the mental state of an individual who has a physical injury because of the probability that this will be impacting on their treatment and rehabilitation. It is also important to recognize the extent of somatic symptoms as a central aspect of the symptomatology of PTSD. This includes conditions such as TMJ dysfunction (Mottaghi & Zamani, 2014). Physical and mental fitness are intimately inter-related, particularly for firefighters, and will influence confidence and capacity to function in frontline roles.

Interestingly, those physical health conditions associated with the highest likelihood of mental disorder comorbidity were generally low prevalence disorders, including Traumatic Brain Injuries, rheumatoid arthritis, carpal tunnel syndrome and hearing loss. While the low prevalence of these conditions is important to note, their accompanying high rates of mental disorder comorbidity suggest that the presence of these conditions may serve as a flag for further screening and intervention. However, they require individual consideration. Firstly, carpal tunnel syndrome and the associated pain is likely to have complex relationship with mental disorder because of the impact of the nocturnal occurrence of the symptoms and their capacity to disrupt sleep which can exacerbate psychological distress (Tanik et al.,

2016). However, the accuracy of the diagnosis should be considered with caution as this may relate to other forms of arm pain such as sympathetic dystrophy and nerve root pain from cervical spine injuries.

The levels of psychological comorbidity observed with rheumatoid arthritis in this study are of particular note, as it has a recognised relationship with PTSD and traumatic stress exposure. For example, in a large study of veterans aged under 55, there was a two-fold risk of autoimmune disease such as inflammatory bowel disease, thyroiditis, multiple sclerosis and rheumatoid arthritis in individuals with PTSD (O'Donovan et al., 2015). This risk appears to be conferred as a consequence of changes in inflammatory mediators, immune-related genes and alterations of the hypothalamic-pituitary adrenal axis. A study of US Marines found that genes related PTSD risk are also associated with the risk of developing rheumatoid arthritis, and to a lesser degree psoriasis, with interrelated pathogenic mechanisms of these diseases, including the pro-inflammatory milieu in PTSD (Stein et al., 2016). This may suggest that individuals with rheumatoid arthritis could be at particular risk of reactivity to ongoing traumatic stress exposures.

Hearing loss is a recognised occupational hazard of noise intense environments. It also carries the risk of social isolation and withdrawal and increased symptoms of depression (Li et al., 2014), thus psychological distress should be assessed in those identified with occupational hearing loss. Another possibility that this study cannot address is where hearing loss may be more likely to present in assessment among those with psychiatric disorders due to associated deficits in attentional processing and difficulties in concentration (Stewart & White, 2008) and tinnitus (Fagelson, 2007). In this case, hearing loss may also serve as a flag for further psychological screening

The relationship between traumatic brain injury (TBI) and mental disorder is significant. The fact that this was reported as an injury by 12 individuals (1.2%) suggests that this is not referring to mild traumatic brain injury (mTBI) which has recently gained significant attention in veterans of the Iraq and Afghanistan conflict. The prevalence of mTBI in the ADF is approximately 45% (Van Hooff et al., 2012). Rather these are likely to reflect significant head injuries that carry a substantial neuropsychiatric consequence. This is an issue that requires ongoing surveillance of individuals who have a significant head injury in the MFS because of the potential broad ranging consequence.

In summary, these results highlight the importance of having a systematic method for monitoring the age of the MFS workforce due to the issue of age related declines in physical health, and known diseases of aging. The challenge is how to optimise the maintenance and testing of physical health standards for the workforce, considering the individual need for the security of employment. Given the standards required at recruitment which are deemed necessary for the capacity to perform the duties of a firefighter, these should be relevant to the ongoing assessment of the physical health of the workforce. The challenge is how to ensure the welfare and employment security of individuals who cannot maintain these health standards.

4.4.3 Physical injuries

While the physical health of the MFS might be expected to be better than the Australian population, among the active MFS population, physical injuries are expected to be of great importance given the potential for these to be sustained through the course of completing everyday work-related activities. The prevalence of self-reported physical injuries sustained while on duty across MFS members careers varied by injury type, with approximately one

third of the MFS estimated to have sustained a strain, sprain or muscular pain in the course of duty, while just over 10% reported sustaining a wound, cut, bleeding or bruise, and much lower proportions (6% or less) reported dislocations or fractures, thermal stress, other injuries, burns or smoke inhalation. The pattern of career injuries reported by MFS members mirrors those from international research, with the majority being musculoskeletal, and superficial wounds and injuries (Jahnke et al., 2013b; Katsavouni et al., 2015). Furthermore, consistent with international studies, rates of injuries were greater in relation to emergency callouts. When rates of injuries were examined in relation to attending emergency callouts specifically, while the proportion of MFS members reporting musculoskeletal injuries was similar (around 30%), there were substantially higher rates of wounds (20%), thermal stress (13%), smoke or gas inhalation (13%) and burns (10%). Thus, while a large part of the burden of injury for the MFS is clearly linked to emergency callouts, there is still a significant level of morbidity associated with general duty.

Strains, sprains and muscular aches and pains have an expected trajectory of fairly rapid recovery. However, the circumstances of an injury being sustained during an emergency, where the nature of the event is potentially threatening and distressing, also conveys further risk for psychological symptomatology. When managing work related injuries, this aspect of the event needs to also be assessed as this can impact on recovery, and the potential for a related psychological injury should be considered (Bryant R.A. et al., 2010). Importantly, some individual difference factors (such as age and length of service) and easily modifiable health factors such as weight and physical fitness may contribute to injury risk and recovery. Therefore, again, this points to the need for a general organisational focus on physical and psychological fitness and wellbeing as a preventative mechanism. While the relationship between specific injuries and mental health was not examined in this report, the substantial literature focussed on the comorbidity between injury and mental disorder symptoms highlights the need for considering their co-occurrence.

4.4.4 Summary

In summary, when firefighters join the MFS they are in excellent physical health as this is required by recruiting standards. Due to the effects of general aging, workplace exposures and injuries, these levels of physical capacity and health inevitably decline. The NSW Auditor General Report (Audit Office of New South Wales, 2014) highlighted that the employment standards at intake need to be met throughout a firefighter's career which poses a potential threat to the occupational security of the workforce. The maintenance of fitness standards, and occupational security, depends on a legitimately injured firefighter being provided with long-term compensation if he or she is unable to continue in the role. The recent changes in Workers' Compensation Legislation have introduced a 30% impairment level for compensation to be paid, and medical expenses to be paid for more than 2 years, which is a level of impairment that is markedly greater than that which makes a firefighter unfit for duty.

This situation is inadequate both for firefighters and the MFS, if adequate levels of occupational fitness and capacity are to be maintained, as there is a very strong disincentive for injuries and illnesses to be declared even if they mean that the firefighter does not meet the required employment standards. The public has an interest in protecting those who are injured in the course of carrying out their duty of protecting the community, to ensure that individuals will undertake these roles as well as having an emergency service made up of individuals who are fit and capable of carrying out those roles.

4.5 Implications and recommendations

4.5.1 Recruitment

- The cumulative burden of trauma exposure in the course of a firefighter's career and its impact on mental and psychological health highlights the importance of employing a fit workforce who carry few risk factors. Accepting the context of antidiscrimination legislation and age discrimination, it should be recognised that the employment of older age groups carries with it the probability of a greater risk of psychological injury and emerging problems with physical health. This emphasises the importance of appraising potential risk factors in the recruitment context.
- A workplace strategy should be developed to take an actuarial approach to the health of MFS fighters across the span of probable employment that takes account of the probable risk of psychological and physical injury. This requires a strategy that deals with the impacts of age and the risks of physical illness as well as the impact of cumulative exposure to traumatic stress.

4.5.2 Health maintenance – risk assessment

- Existing health maintenance strategies within the MFS need to be reviewed, particularly for those with physical injuries or medical conditions. A workforce strategy to address dietary and physical preventative strategies at workforce level should be considered, particularly in the older age groups.
- Presumptive legislation has been enacted in South Australia for firefighters with different time periods for acceptance of liability for different cancers. The importance of early diagnosis should ensure screening for cancer is part of any system of health assessment that is adopted by the MFS.

4.5.3 Annual assessments

- Ensuring the operational fitness of fire officers is potentially a contentious issue. Careful discussion between management and the union should address the importance of ensuring officers are protected from potential adverse consequences of further trauma exposures. Equally, a mechanism as recommended in the NSW Auditor General's examination of this question needs to ensure that all individuals in the fire service reach the necessary standards of operational fitness. The optimal frequency of these assessments should be discussed between management and the unions.
- The relationship between physical illness and injury and psychiatric distress is of central importance to comprehensive rehabilitation. A strategy should be developed to ensure the comprehensive assessment that combines the physical and psychological dimensions of injury and fitness for duty so as to ensure optimal interventions.

5 Occupational Factors

- ❖ Workplace trauma exposure is an inherent part of MFS service with 76% of the workforce reporting exposure to 10 or more critical incidents during their career, and 6.1% reporting more than 30 critical incidents.
- ❖ Almost all MFS personnel have witnessed death on the job (95.64%), with almost 76% reporting feeling threatened on the job.
- ❖ The workplace events most highly associated with current levels of psychological distress were events involving injury to MFS members themselves, and events requiring attendance at mental health incidents.
- ❖ Occupational Stressors were also commonly reported by MFS members, however the direction of the relationship between mental health symptoms and self-reported occupational stress remains undetermined.
- ❖ The three most common sources of occupational stress reported by MFS members were job skill concerns, co-worker conflict (80.7%), and sleep issues (79.7%).
- ❖ The relative impact of workplace exposures, occupational stressors and Lifetime trauma differs depending on whether the outcome is a diagnosable disorder or current symptoms of psychological distress or PTSD.
- ❖ When examining the relative impact of these three factors, lifetime trauma is the strongest predictor of 12-month ICD-10 disorder. Current psychological distress is most strongly predicted by occupational stressors, and workplace exposures are the strongest predictors of current self-reported symptoms of PTSD.

By the very nature of their work, firefighters are called to critical incidents (CI) that confer substantial physical and psychological risk to their wellbeing. There is significant psychological risk associated with the experiences of attempted rescues and witnessing severe injury and death. A recent study of current and retired Australian firefighters found a higher number of lifetime critical incidents involving fatalities predicted PTSD, depression and probable heavy drinking (Harvey et al., 2016). These critical incidents are *workplace exposures* which are an occupational hazard of being an emergency service provider. Depending on one's role within the organization, these exposures can occur regularly and sometimes repeatedly on a daily basis.

In addition to workplace exposures, lifetime non-work-related trauma exposure (for example childhood trauma or accidents) is a risk factor for poor mental health in emergency service personnel, as it is for members of the community (Kessler et al., 2014; Sareen, 2014). Furthermore, 65% of MFS personnel have work experience in other emergency services (police, ambulance, SES or ADF) either prior or concurrent with their employment in the MFS. This increases their lifetime exposure to work related traumatic events. As was

reported in Chapter 3, the most commonly endorsed lifetime traumatic events in the MFS were witnessing a bad injury or death (76.7%), experiencing a man-made disaster (58.7%), having someone close to them die unexpectedly (47.5%), being exposed to toxins (42.0%), and witnessing mass carnage/mutilated bodies (43%). This background of trauma experiences further places firefighters at increased risk of psychological morbidity.

Finally, in addition to workplace exposures and lifetime trauma exposure, *occupational stress*, defined as the negative environmental factors or stressors (e.g. work overload, role ambiguity, poor working conditions, shiftwork) associated with a particular job, is a recognized problem in firefighters (Carpenter et al., 2015). Not only are firefighters expected to cope with exposure to potentially traumatic events, they are also required to function effectively in an environment characterized by recurrent sleep disturbances, fatigue, the need to remain on high alert, and long shift schedules. These can also be important contributing factors to poor mental health (Carey et al., 2011).

Consequently, it is critical to map the cumulative burden and the individual impacts of each of these three factors (workplace exposures, lifetime non-work-related trauma exposure and occupational stress) on the mental health of firefighters over the course of their career.

The following chapter explores the impact of these occupational factors in the MFS, first describing the prevalence of self-reported workplace exposures and occupational stressors among the population, followed by an examination of the association between these factors, lifetime traumatic events, and diagnosable disorder, as well self-reported current psychological distress and posttraumatic stress symptoms.

5.1 Workplace exposures

To measure the degree of exposure to duty-related incident stressors (workplace exposures) participants were presented with a list of 44 events adapted from Beaton et al. (1998) and asked to indicate whether or not they had ever experienced any of the events on the list during their career as an MFS firefighter, and how many times they had experienced each event. Weighted prevalence estimates of each individual workplace exposure (as well the top 20 exposure types) for the entire MFS as well as career males, retained males and females is presented in Table A.22 (Annex A).

For the purpose of this chapter, the 44 workplace exposures were grouped into 8 exposure categories:

- **Witnessed death:** witnessed co-worker fire death; witnessed co-worker non-fire death; callout infant injury/death; callout child injury/death; fire with single death; fire with multiple deaths; MVA single death; MVA 2-4 deaths; MVA > 4 deaths callout known casualty; CPR/full arrest resulting in death; callout mutilated bodies; callout murder; callout completed suicide; adult DOA, natural cause; callout adolescent injury/death; removed body from MVA; body removal with other agencies
- **Operational problems:** inappropriate dispatch; bystanders distressed/interfering; callout prominent media; significant operational problems

- **Threat to self:** direct exposure to chemicals; threats or fear of violence; physically at risk; direct exposure bodily fluids
- **Attended injury:** fire with multiple burn victims; prolonged contact with casualty; aided sexual assault victim; callout attempted suicide
- **Disaster:** community natural disaster; callout industrial accident
- **Call out where mental health issues (of non-MFS personnel) were a concern:** mental health issues were a concern
- **Personally relevant event:** co-worker fire death (not witnessed); co-worker non-fire death (not witnessed); aided injured friend/relative; witnessed co-worker injury; co-worker injury (not witnessed); casualty resembled self/family)
- **Injury to self:** experienced career changing injury; received 3rd degree burn; received head injury; received fracture; received musculoskeletal strain

The number of workplace exposures was derived by summing the number of endorsed exposures. The total number of exposures was then grouped into the following four categories: Low (0-9), Moderate (10-19), High (20-29), Very High (30-44).

Table 5.1. Estimated number of workplace exposures across MFS career

Number of Workplace Exposures	Weighted n	%	95% CI
Low (0-9)	255	24.1	21.7, 26.6
Moderate (10-19)	424	40.0	37.2, 42.8
High (20-29)	317	29.8	27.6, 32.2
Very high (30-44)	64	6.1	5.0, 7.4

Table 5.1 presents the total estimated number of different workplace exposures reported by the MFS during their career. Three quarters of the MFS (75.9%) reported experiencing 10 or more exposures during their career, with 6.1% reporting extremely high rates of exposure (more than 30 exposures). Just under one quarter of the MFS reported having experienced 9 or fewer exposures in their career. Further details of the number of workplace exposures for the three MFS subgroups male career, male retained and females are provided in Table A.21 (Annex A).

Table 5.2 Estimated prevalence of lifetime workplace exposures in the MFS.

All MFS (N=1061)			
Workplace Exposures	Weighted n	%	95% CI
Witnessed death	1015	95.64	93.87, 96.92
Attended injury	803	75.70	73.08, 78.14
Personally relevant event	606	57.09	54.44, 59.69
Injury to self	535	50.42	47.91, 52.93
Operational problems (i.e inappropriate dispatch, media presence, distressed bystanders)	948	89.30	87.17, 91.12

Threat to self	806	75.96	73.31, 78.43
Disaster	749	70.60	67.92, 73.16
Call out where mental health issues (of non-MFS personnel) were a concern)	735	69.29	66.61, 71.84

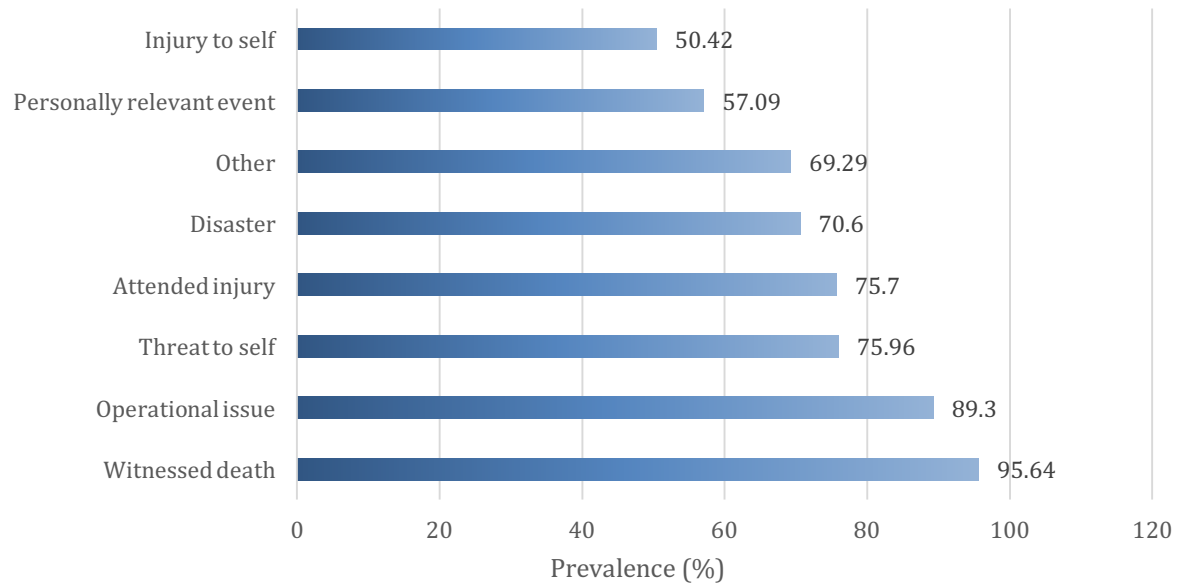


Figure 5.1: Estimated prevalence of lifetime workplace exposures in the MFS (rank ordered).

Table 5.2 shows the estimated prevalence of each exposure type among the entire MFS, while Figure 5.1 presents these in rank order. The most common workplace exposure type for the entire MFS was an exposure involving witnessing death (95.64%, CI 93.87, 96.92), followed by an event involving operational issues (89.30%, CI 87.17, 91.12), events involving threat to self (75.96%, CI 73.31, 78.43) and events where the MFS was required to attend an injury (75.70%, CI 73.08, 78.14).

Table 5.3: Individual and relative impacts of workplace exposures on self-reported psychological distress

Ever vs Never Workplace Exposures	Unadjusted			Adjusted		
	coef (95% CI)	t	p	coef (95% CI)	t	p
Witnessed death	1.89 (-0.58, 4.36)	1.5	0.133	0.72 (-0.78, 2.22)	0.95	0.344
Attended injury	1.66 (0.62, 2.71)	3.13	0.002	0.89 (0.15, 1.62)	2.37	0.018
Personally relevant event	1.34 (0.41, 2.26)	2.85	0.005	0.69 (0.01, 1.36)	2	0.046
Injury to self	1.77 (0.86, 2.67)	3.84	<0.001	1.19 (0.48, 1.89)	3.3	0.001
Operational problems (i.e inappropriate dispatch, media presence, distressed bystanders)	1.94 (0.35 , 3.53)	2.4	0.017	0.28 (-0.86, 1.42)	0.48	0.633
Threat to self	1.77 (0.68, 2.85)	3.19	0.001	0.96 (0.29, 1.64)	2.81	0.005
Disaster	0.70 (-0.30, 1.69)	1.37	0.171	-0.01 (-0.77, 0.75)	-0.03	0.977

Call out where mental health issues (of non-MFS personnel) were a concern)	1.75 (0.78, 2.72)	3.54	<0.001	1.18 (0.47, 1.89)	3.27	0.001
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Table 5.3 presents the results of a multivariate linear regression examining which workplace exposures were most highly associated with current psychological distress, as measured using the K10 total score. Interestingly the most prevalent events in this population (witnessed death, events involving operational issues) did not emerge as significant predictors of current psychological distress when all events were included in the same model. Instead, the events most highly associated with current psychological distress were exposures involving injury to the MFS member themselves, and exposures where the MFS members were required to attend an incident involving members of the public with mental health issues.

5.2 Occupational Stressors

In order to quantify the degree of occupational stressors experienced by the MFS, participants were asked to complete the Sources of Occupational Stress Scale (SOOS) (Beaton, 1993), a 57-item measure designed to assess the different sources of on-the-job stress inherent and/or related to one's employment as a fire-fighter. Respondents were asked to indicate whether or not they had experienced a particular type of occupational stressor within their past 10 shifts. Weighted prevalence estimates of each individual occupational stressors (as well the top 20 stressors) are presented in Table A.23 and Figure A.2 (Annex A).

For the purpose of this chapter, the 57 occupational stressors were grouped into 14 categories:

- **Conveying tragic news:** informing loved ones of injury/death; conveying tragic news to survivors
- **Discrimination:** discrimination; harassment
- **Tedium:** lack of novelty/boredom; dislike duties
- **Second job stress:** carry-over stress from second job; too much responsibility
- **Threats to personal safety:** threats to personal safety; increased personal risk; concerns re personal injury/death
- **Management/labour conflicts:** anxious/demanding colleague; conflict with senior ranks; management/labour conflicts
- **Substandard equipment:** substandard equipment; equipment
- **Family/financial strain:** pay-related financial strain; carry-over family stress
- **Past critical incidents:** lack of control over victim injuries; sensory recollection of injured/dying; thoughts re disturbing events; exposure to death/dying; exposure to injury/mutilation
- **Reduction in force/wage/benefit:** cuts to force/budget; reduction in force/benefits/wages
- **Poor health habits:** poor diet; lack of exercise
- **Sleep issues:** poor sleep quality; inadequate sleep at work; sleep disruption; loss of sleep
- **Co-worker conflict:** work personality conflicts; lack of camaraderie; substandard crew member; conflicts with lower ranks

- **Job skill concerns:** concerns regarding latest technology; perfectionism concerns; concern regarding meeting MFS standards; concern re inadequate skills; concern regarding making mistakes.

Table 5.4 Estimated prevalence of occupational stress in the MFS.

Occupational Stressors	Weighted n	All MFS (n=1061)	
		%	95% CI
Job skill concerns	880	83	(80.6, 85.1)
Co-worker conflict	856	80.7	(78.2, 83.0)
Sleep issues	846	79.7	(77.2, 82.0)
Poor health habits	784	73.9	(71.2, 76.4)
Reduction in Force/Wage/Benefit worries	716	67.5	(64.7, 70.2)
Past Critical Incidents	706	66.5	(63.7, 69.3)
Family/Financial strain	701	66.1	(63.3, 68.8)
Substandard equipment	700	66	(63.1, 68.7)
Management/Labour conflicts	685	64.5	(61.7, 67.3)
Threats to personal safety	673	63.4	(60.5, 66.2)
Second job stress	638	60.2	(57.2, 63.0)
Tedium	599	56.5	(53.6, 59.3)
Discrimination	464	43.7	(40.9, 46.6)
Conveying tragic news	413	38.9	(36.1, 41.8)

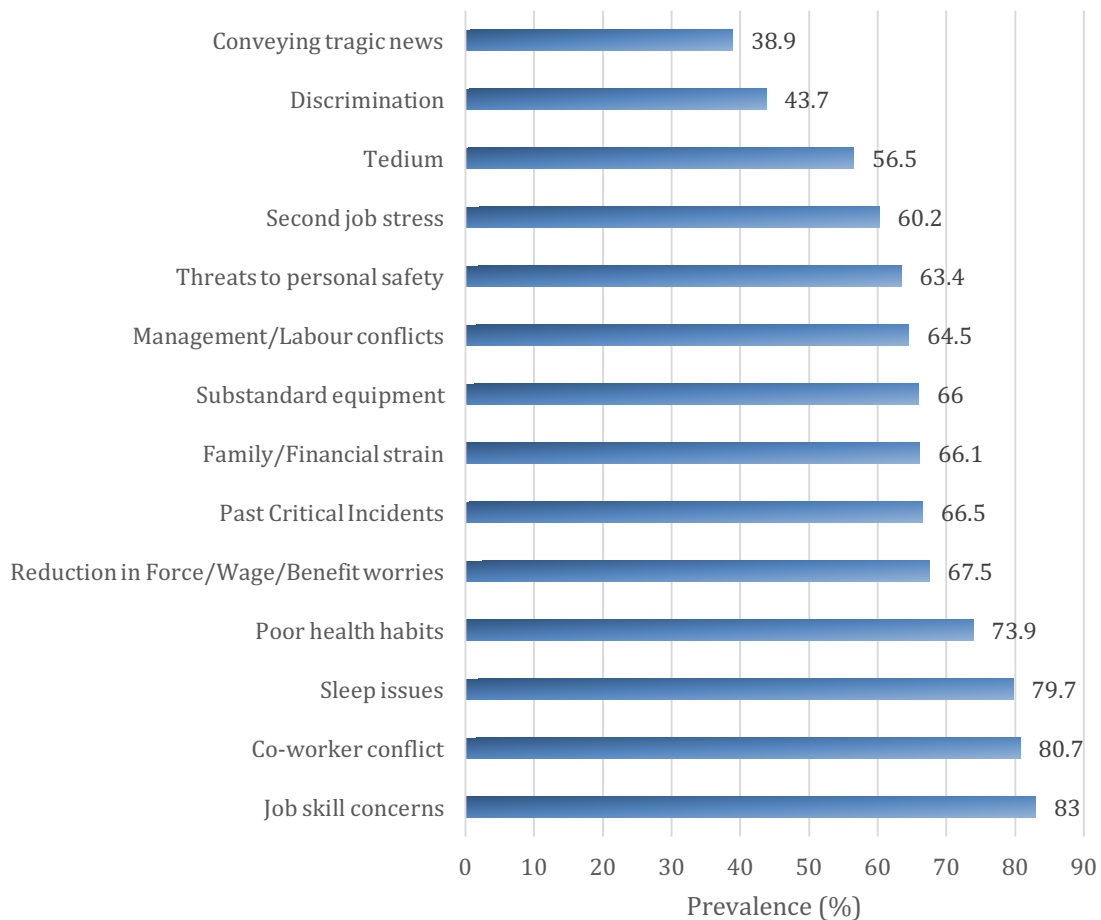


Figure 5.2 Estimated prevalence of occupational stress in the MFS.

Table 5.4 and Figure 5.2 present the estimated prevalence of occupational stress in the MFS. The most common source of occupational stress reported by MFS personnel was job skills concerns, with 83% (CI 80.6, 85.1) of MFS members reporting this concern. This was followed closely by co-worker conflict (80.7%, CI 78.2, 83.0), sleep issues (79.7%, CI 77.2, 82.0) and poor health habits (73.9%, CI 71.2, 76.4).

5.2.1 The relative contribution of workplace exposures, occupational stressors and lifetime trauma to 12-month and current mental health

The following subsection presents the results of a series of regression models examining the relative contribution of workplace exposures, occupational stressors and lifetime trauma to 12-month ICD-10 mental disorder, current psychological distress (using the K10 total score), and current posttraumatic stress symptoms (Tables 5.5, 5.6 and 5.7).

Table 5.5 Relative risk of any 12-month ICD-10 mental disorder in the MFS by number of lifetime traumas, workplace exposures and occupational stressors.

Predictors	Model 1				Model 2			
	RR	95% CI	t	p	RR	95% CI	t	p

No. Career workplace exposures	1.031	0.998, 1.065	1.86	.064	1.003	0.974, 1.033	0.21	0.836
No. Occupational stressors	1.002	0.992, 1.012	0.38	0.702	1.000	0.990, 1.011	.04	0.968
No. Lifetime trauma exposures	1.145	1.072, 1.223	4.03	0.000	1.142	1.067, 1.222	3.83	0.000

Model 1 was adjusted for age, employment status, sex, time served in MFS and rank.

Model 2 was adjusted for age, employment status, sex, time served in MFS and rank, as well as all other variables in the table above.

Table 5.5 shows the association between workplace exposures, occupational stressors and lifetime trauma exposures and 12-month ICD-10 disorder when each factor was examined separately (model 1) and when controlling for all factors in the model (model 2). In model 1 workplace exposures had a small association with risk for 12-month mental disorder, while lifetime trauma exposure had the greatest association. In model 2, the effect of workplace exposures was substantially reduced, while lifetime trauma retained the strongest association.

Table 5.6 Relative impacts of number of lifetime traumas, workplace exposures and occupational stressors on current psychological distress (K10 total score)

Predictors	Model 1				Model 2			
	B	95% CI	t	p	B	95% CI	t	p
No. Career workplace exposures	0.193	0.138, 0.248	6.89	<0.001	0.080	0.004, 0.156	2.07	0.039
No. Occupational stressors	0.069	0.045, 0.093	5.62	<0.001	0.059	0.037, 0.082	5.17	<0.001
No. Lifetime traumatic events	0.446	0.300, 0.592	6.02	<0.001	0.326	0.161, 0.491	3.88	<0.001

Model 1 was adjusted for age, employment status, sex, time served in MFS and rank.

Model 2 was adjusted for age, employment status, sex, time served in MFS and rank, as well as all other variables in the table above.

In contrast, as shown in Table 5.6, when the association between these three factors and current psychological distress (as measured by the K10 total score) was examined, in model 1 all factors were significantly associated with psychological distress, with workplace exposures having the strongest relationship. In model 2, while all factors remained significant, occupational stressors retained the strongest association. In this context, occupational stressors may be considered more of an outcome or correlate of psychological distress (i.e. the more distressed you feel, the more likely you are to report issues in the workplace).

Table 5.7 Relative impacts of number of lifetime traumas, workplace exposures and occupational stressors on current posttraumatic stress symptoms (PCL5 Total score)

Predictors	Model 1				Model 2			
	B	95% CI	t	p	B	95% CI	t	p
No. Career workplace exposures	0.523	0.397, 0.648	8.19	<0.001	0.404	0.255, 0.552	5.35	<0.001
No. Occupational stressors	0.079	0.054, 0.103	6.34	<0.001	0.052	0.014, 0.090	2.66	0.008
No. Lifetime trauma exposures	0.908	0.586, 1.230	5.55	<0.001	0.471	0.096, 0.845	2.47	0.014

Model 1 was adjusted for age, employment status, sex, time served in MFS and rank.

Model 2 was adjusted for age, employment status, sex, time served in MFS and rank, as well as all other variables in the table above.

Finally, Table 5.7 shows that when the association between these factors and current self-reported posttraumatic stress symptoms was examined, in model 1, again all were significantly associated, however the strongest association was for workplace exposures. In model 2, when the effects of all factors were accounted for, number of workplace exposures, above and beyond number of lifetime traumatic exposures and number of occupational exposures, retained the strongest association with posttraumatic stress symptoms.

5.3 Discussion

There are a range of occupational specific factors that are important to consider in relation to the health and wellbeing of MFS members; these include workplace exposures and general occupational stressors, in addition to background lifetime trauma exposure (as discussed in detail in Chapter 3). This chapter examined the prevalence of these occupational factors among the MFS, and the contribution of both, in addition to lifetime trauma, to 12-month and 30-day mental health outcomes.

5.3.1 Workplace Exposures

MFS members attend critical incidents as part of their regular duties, and these are considered to be significant workplace exposures (McFarlane, 2010a). These include attending incidents which involve witnessing death or serious injury, and rendering assistance at accidents and disasters. As would be expected, the prevalence of workplace exposures across the career of MFS members was generally high. Overall, three quarters of MFS members had experienced more than 10 workplace exposure types across their career, with more than a third reporting having experienced 20 or more, and approximately 6% reporting 30 or more. The most commonly reported workplace exposure was witnessing death, which was experienced by more than 95% of the MFS. This was followed by experiencing operational issues, such as dealing with intrusive media (%), managing distressed bystanders (89%), and experiencing threats against them (75%). Three quarters of MFS members reported attending an injury event, and 70% reported attending a disaster.

While these workplace exposures represent the nature of expected duties in the context of MFS service, they nonetheless have the potential to result in psychological distress. An examination of the association between each category of workplace exposure and self-reported 30-day psychological distress showed that when examined individually, with the exception of witnessing death or disaster, all other exposure types were associated with increased psychological distress. When the relative association between each exposure and psychological distress was examined those exposure types with the strongest association were injuries to self, threats to self and interestingly, callouts where mental health issues were a significant cause of distress. All of these exposures potentially challenge the self-perceived competence of MFS members if there are adverse outcomes. MFS officers are highly trained and these skills will generally substantially mitigate the psychological impact of attending to injuries or deaths. However, there may be particular circumstances where issues such as personal identification with the victim, particularly where children are involved or where there is grotesque or horrendous injury, or in situations of high threat to the firefighter, where training may not provide psychological protection.

Furthermore, those situations where the MFS member themselves is under threat, is injured or must deal with a situation they do not feel well equipped to manage, appear to be particularly stressful. Together this suggests that when considering the potential impact of workplace exposures on the workforce, the MFS should pay particular attention to those critical incidents that may be scenarios that have not been fully addressed in training and may leave the firefighter with a sense of failed intervention that can undermine competence.

The implications are that consideration should be given to training MFS members to deal with those situations that are an extreme test of their competence and performance and provide adequate support in the aftermath of events of this nature. In these situations, targeted follow-up should occur. For example, when MFS members are injured in the course of a critical incident, addressing both the physical injury and the psychological consequence should be an important priority in their occupational rehabilitation (as discussed in Chapter 4 of this report). The provision of appropriate support following incidents where MFS members may have experienced a severe sense threat in the course of their duties poses more of a challenge, as this is more difficult to identify.

One type of event that was found to be particularly distressing in this study was a call out to an emergency where a mental health issue had to be dealt with. While specific information was not obtained about these incidents, these are likely to be challenging for a variety of reasons, particularly if they involve threatened or actual suicide. As community mental health care has become the accepted model of care and where there are limited inpatient facilities, the emergency services have increasingly been placed in situations of having to deal with severely mentally ill individuals, a task for which they are largely unprepared and untrained. This situation can be unpredictable and challenging in the case of threats of violence or self-injury.

In relation to injuries, as discussed earlier in this report, injuries in the course of duty are not an uncommon experience within the MFS. To ensure the maintenance of both physical health and psychological wellbeing, it is critical that support and follow-up is provided in relation to these events. Again, reduction of injury risk through fitness and wellbeing standards and risk mitigation programs is important.

5.3.2 Occupational stressors

In addition to examining workplace exposures, self-reported occupational stressors were also measured. The estimated prevalence of all stressors was high, with even the least prevalent stressors, conveying tragic news, discrimination, and tedium, still being endorsed by 38.9%, 43.7%, and 56.5% of the population respectively. Between 60 and 70% of MFS personnel reported experiencing concern over second job stress, threats to personal safety, management/labour conflicts, substandard equipment, family/financial strain, past critical incidents, and reduction in force/wage/benefit worries. The most commonly reported sources of occupational stress within the MFS were job skill concerns (83%), co-worker conflict (80.7%), sleep issues (79.7%) and poor health habits (73.9%). While these stressors are often considered as predictors of health and wellbeing outcomes, it is critical to also consider them as potential manifestations of stress, and outcomes in their own right. A key example is sleep issues – while these are likely to have a detrimental effect on general health and wellbeing, they are as likely to reflect underlying psychological and physical health issues as they are to predict them. Thus, the extent of self-reported occupational stress may serve as an indicator of stress and distress more generally.

5.3.3 Occupational factors and mental health

This study also examined the association between occupational factors and 12-month mental disorder, current psychological distress and current posttraumatic stress symptoms. Results showed that in terms of diagnosable mental disorder, lifetime trauma exposure conveys the greatest risk. However, when it comes to current symptomatology, while lifetime trauma still has a significant association, occupational stress had the strongest relationship with psychological distress, and workplace exposures had the strongest association with posttraumatic stress symptoms. In the case of the association between occupational stress and psychological distress, it is likely that this represents a correlation between the two, whereby the occupational stressors at least partly represent symptoms of distress. This is important, as it suggests that issues such as co-worker conflict and job skill concerns could be indicative of deeper distress, and a flag for follow-up with an individual.

The association between workplace exposure and posttraumatic stress symptoms suggests that these everyday critical incidents are not without psychological consequences, and highlight the importance of symptom recognition through mental health literacy, and the need for early intervention (McFarlane & Bryant, 2007).

5.3.4 Conclusion

This chapter reviewed the matrix of different workplace exposures, occupational stressors and number of lifetime traumas in the MFS. While there is some overlap between these categories, the findings highlight the importance of the number of lifetime trauma exposures as a risk factor for mental health. Equally, the impact of related workplace exposures demonstrates the consequence of the cumulative burden of trauma exposure during an MFS member's career, on their mental health and functioning.

The occupational stressors represent the realistic challenges and difficulties that exist in any workplace. The way that these are managed and addressed is critical to the morale and general sense of welfare of the workforce. Issues such as bullying, discrimination and workplace conflict need to be carefully identified and managed. One of the challenges is that there can be an interaction between an individual's mental health and these stressors. Bullying is a significant risk factor for mental disorders, however an individual who is depressed and has a pessimistic state of mind is likely to be more sensitive to the behaviour of others and appropriate criticism. Hence, the issues of "cause and effect" are at times more difficult to directly disentangle in relation to these stressors. In contrast, lifetime traumatic events and workplace exposures are independent of the individual's mental state. Hence, the evidence of their detrimental impact on mental health is a direct effect.

Occupational stressors are critical to workplace satisfaction and productivity. This highlights the importance of the personnel management strategies for the MFS being developed in the context of an understanding of their complex determinants. Regular monitoring of workplace morale and atmosphere is one barometer of the effectiveness of the broader workplace management and intervention strategies in an organisation.

5.4 Implications and recommendations

5.4.1 Leave, workplace size, and overtime; Rostering and exposure

- The issue of the cumulative burden of trauma exposure in the course of an officer's career needs to be managed both at an individual and a workforce level. The strategies for managing an officer who has had a particularly traumatic exposure require consideration. Optimally, a rest period should follow such exposures even if the firefighter makes no particular complaint of distress. Within the restrictions of maintaining operational teams, ensuring officers can take leave when requested potentially plays an important role in managing the cumulative burden of fire officers.

5.4.2 Management of difficult members of the public and exposure to suicides

- The reported difficulties by MFS firefighters with members of the public with mental illness highlights the importance of basic training in how to assess and deal with such individuals. This program can be used as a more general opportunity to improve the mental health literacy of the MFS workforce. Equally, the challenge of dealing with aggressive and challenging members of the public is an opportunity to train officers in conflict resolution skills. These have equal potential to be used in dealing with confrontations and difficulties within the workforce.

5.4.3 Performance management

- Poor performance or repeated difficulties between a fire officer and other members of the workforce require ongoing appraisal and consideration as potential manifestations of psychological difficulties. The development of an integrated program including educating the workforce as to the significance of such performance issues should be a priority.
- Managers should be trained to consider that performance difficulties may be related to psychiatric disorder and ensure performance management programs are conducted in the setting of a mental health assessment.
- The findings of the report should be discussed with the leadership group of the MFS. In particular, the current training in managing occupational stresses and HR skills should be assessed in the context of the findings of the report

5.4.4 General recommendations

- A strategy should be developed for communicating the notion of mental fitness. This should be developed akin to the idea of physical fitness to address early symptoms of distress such as sleep disturbance and intrusive memories. Early intervention

strategies to address subsyndromal symptoms to sustain mental fitness should be developed. This approach should be combined with a strategy for firefighters to think about their mental health on a spectrum rather than simply being well or unwell.

- The Australian Defence Force has developed programs to assist in managing arousal in the combat environment with strategies such as breathing regulation and control. The provision of training in similar strategies and mindfulness should be considered as a resource for the health and wellbeing of the MFS workforce. These strategies should also be drawn from proven techniques utilised in sports psychology to deal with anticipatory anxiety

6 Summary of Key Findings

Mental Health

- ❖ Approximately half of the entire MFS met ICD-10 criteria for any mental disorder in their lifetime (30% ICD-10 alcohol disorder; 21.9% affective disorder, 15.2% anxiety disorder).
- ❖ 17.1% of the entire MFS met ICD-10 criteria for any mental disorder in the previous 12-months, with anxiety disorders most common (12.7%) followed by affective Disorders (5.7%) and alcohol disorders (3.0%).
- ❖ The most common 12-month disorder type in the MFS was PTSD (5.8%) followed by panic attacks (5.6%), and depressive episodes (5%).
- ❖ Lifetime trauma exposure was high in the MFS, particularly in relation to event types likely to be experienced in the workplace such as seeing someone badly injured or killed (76.7%) and experiencing a man-made disaster (58.7%).
- ❖ The risk of PTSD was elevated among those MFS members who reported experiencing traumas that they would most commonly be exposed to in the course of their duties such as dealing with a deceased person and mass casualties. These events are of particular importance in terms of their cumulative impact on MFS members.
- ❖ Mental disorder and symptoms had most impact on MFS member's functioning in the family and social domains, with less effect on workplace functioning.
- ❖ The majority of the MFS, about two thirds of the population, recorded low levels of psychological distress on the K10, however the remaining third reported moderate to high levels of current distress.
- ❖ 10% of the MFS reported some form of suicidal ideation in the previous 12 months but this did not necessarily translate into suicide attempts, with a very low population level prevalence of plans and attempts (under 1 %).

Physical Health

- ❖ The most prevalent physical health conditions in the MFS were high cholesterol (13.3%), high blood pressure (10.4%), sinus problems (9.8%), skin cancers (8.9%), osteoarthritis (5.9%) and hearing loss (5.9%).
- ❖ Doctor diagnosed physical health conditions increased with age and length of service. Station officers and senior management also had higher numbers of conditions compared to firefighters, suggesting an overall accumulation of physical health complaints with age.
- ❖ There was substantial comorbidity between doctor diagnosed physical conditions and 12-month mental disorder in the MFS. An estimated 70.9% of the MFS who reported a doctor diagnosed traumatic brain injury also met criteria for a 12-month mental disorder. Nearly 60% of those with rheumatoid arthritis (58.7%), 43.1% of those with carpal tunnel syndrome, 30.9% of those with impotence, 30.1% of those with hearing loss, 28.7% of those with kidney disease, and 28.5% of those with migraine met criteria for a 12-month ICD-10 mental disorder.
- ❖ The most prevalent form of injuries sustained while on duty and while attending emergencies were musculoskeletal, with just over one third of the MFS estimated to have sustained a musculoskeletal injury while on duty or attending an emergency during their career.
- ❖ When examining the relative impact of these three factors, lifetime trauma is the strongest predictor of 12-month ICD-10 disorder. Current psychological distress is most strongly predicted by occupational stressors, and workplace exposures are the strongest predictors of current self-reported symptoms of PTSD.

6.1 Overview

The key objective of the MFS Report was to document the mental health and wellbeing of the South Australian Metropolitan Fire Service firefighters. This report sets out to describe the characteristics of the MFS workforce and to estimate the levels of diagnosable mental disorder in this population and to compare this to the Australian community. This was possible because the same methodology was used in estimating the prevalence of mental disorder in the Australian community in the National Mental Health and Wellbeing Survey in 2007. A similar methodology was used to study the Australian Defence Force in 2010 (McFarlane et al., 2011). The functional impact of these disorders, both in the workplace and at home, are also an important focus and addressed in chapter 3. An important issue is to consider these disorders in the context of the general physical health of firefighters, which is also a critical issue in terms of their fitness for duty. This is addressed in chapter 4.

A second aim was to identify the occupational hazards and risks for MFS firefighters, particularly their lifetime exposure to traumatic events, and workplace exposures. These, and the day-to-day occupational stressors in the career of a firefighter are documented in

chapter 5 and their relationship with both diagnosable disorders and self-reported psychological distress and posttraumatic stress symptoms are also explored.

6.2 Background and Summary of Findings

There has been an increasing focus on the health and wellbeing of emergency service personnel and an advocacy for the care of their mental health by organisations such as Beyond Blue. This is in recognition of the critical community service provided by individuals in organisations such as the Metropolitan Fire Service. Given the occupational hazards, it is important that these are identified and managed in the course of a firefighter's career so as to allow a healthy and rewarding life in retirement. These issues have been in the public domain because of recent changes to workers' compensation legislation that have potentially limited support for those who are injured in the course of their duties. If the community and Government are to appropriately support those who are injured in the course of providing community service in organisations such as the Metropolitan Fire Service, it is critical that this is framed against the background of an accurate assessment of the potential adverse health consequences of these occupations.

The findings of this report are of particular value because this is the first study to document the mental health of an entire emergency service population using gold standard methodology- a structured diagnostic interview. These findings need to be considered against the background of other studies both nationally and internationally that have made prevalence estimates of posttraumatic stress disorder in emergency service populations (Berger et al., 2012; Harvey et al., 2016). A meta-analysis of all emergency service workers in published studies in the international literature estimated a 10% prevalence (Berger et al., 2012). One of the challenges of interpreting the findings of this study and those of the international data is that those who are injured in the line of duty are likely to resign or retire. Hence, the actual cost of a career as a Metropolitan Fire Service firefighter is not captured by this study but rather it addresses the health of the current workforce. An attempt was made to capture those who had left the fire service but it was not possible to recruit a representative sample to make estimates of the health and wellbeing of those who had transitioned.

The findings reported in this study were weighted to represent the entire MFS. This strategy was utilised because the characteristics of the entire population are known, making it possible to account for non-responding MFS participants in terms of age, gender and rank. While younger firefighters were less likely to respond, this potential bias however was addressed using weighted analysis method. There was nonetheless an adequate response rate of 54.5%.

Approximately 50% of the entire MFS met ICD-10 criteria for any mental disorder in their lifetime, with alcohol disorders having the highest lifetime prevalence, followed by affective disorders then anxiety disorders. Anxiety disorders were the most prevalent 12-month disorders, followed by affective and alcohol disorders. The most prevalent 12-month mental disorder among the MFS was PTSD, followed by panic attacks and depressive episodes. Lifetime trauma exposure was high, particularly in relation to event types likely to be experienced in the workplace such as seeing someone badly injured or killed (76.7%) and man-made disasters (58.7%). While the estimated risk for PTSD was generally greatest for those traumatic events that were least prevalent (such as reporting purposely or accidentally injuring or killing someone), it was also elevated among those MFS members

who reported experiencing traumas that they would most commonly be exposed to in the course of their duties.

The 12-month prevalence of alcohol disorders was low in the entire MFS, however was associated with the greatest impairments in work functioning, followed by social phobia and specific phobia. Impairment in social functioning was greatest in those with panic disorder, followed by those with alcohol dependence. Family functioning was most impaired in those with panic disorder, alcohol dependence and specific phobia. Affective disorders in general had the greatest impact on work functioning, while comorbid affective and anxiety disorders, and anxiety disorder specifically had the greatest impact on functioning in the social and family domains. Anxiety disorders also carried the greatest impacts on quality of life in this population.

While approximately one third of the MFS reported moderate or higher levels of current psychological distress, the majority of the MFS recorded low levels. Approximately 10% of the MFS reported some form of suicidal ideation, but this did not necessarily translate into attempts, with a very low population level prevalence of suicide plans and attempts (under 1%). While plans and attempts were exceptionally low, the level of suicidal ideation was substantially higher than generally observed in the Australian community.

The most prevalent physical health conditions in the MFS were high cholesterol (13.3%), high blood pressure (10.4%), sinus problems (9.8%), skin cancers (8.9%), osteoarthritis (5.9%) and hearing loss (5.9%). Doctor diagnosed physical health conditions increased with age and length of service. Station Officers and Senior Management had higher numbers of conditions compared to firefighters, suggesting an overall accumulation of physical health complaints with age.

There was a substantial degree of comorbidity between physical and mental health in the MFS. The comorbidity between doctor-diagnosed physical conditions and 12-month mental disorder tended to be greater for lower prevalence conditions. An estimated 70.9% of the MFS who reported a doctor diagnosed traumatic brain injury also met criteria for a 12-month mental disorder. Nearly 60% of those with rheumatoid arthritis (58.7%), 43.1% of those with carpal tunnel syndrome, 30.9% of those with impotence, 30.1% of those with hearing loss, 28.7% of those with kidney disease, and 28.5% of those with migraine met criteria for a 12-month ICD-10 mental disorder.

The most prevalent form of injuries sustained while on duty and while attending emergencies were musculoskeletal injuries, with just over one third of the MFS estimated to have sustained a musculoskeletal injury while on duty or attending an emergency.

Workplace trauma exposure is an inherent part of MFS service with 76% of the workforce reporting exposure to 10 or more critical incidents during their career, and 6.1% reporting more than 30 critical incidents. Almost all MFS personnel have witnessed death on the job (95.64%), with almost 76% reporting feeling threatened on the job. The workplace events most highly associated with current levels of psychological distress were events involving injury to MFS members themselves, and events requiring attendance at mental health incidents. Occupational stressors were also commonly reported by MFS members, however the direction of the relationship between mental health symptoms and self-reported occupational stress remains undetermined. The three most common sources of occupational stress reported by MFS members were job skill concerns, co-worker conflict (80.7%), and sleep issues (79.7%).

The relative impact of workplace exposures, occupational stressors and lifetime trauma differs depending on whether the outcome is a diagnosable disorder or current symptoms of psychological distress or PTSD. When examining the relative impact of these three factors, lifetime trauma is the strongest predictor of 12-month ICD-10 disorder. Current psychological distress is most strongly predicted by occupational stressors, and workplace exposures are the strongest predictors of current self-reported symptoms of PTSD.

6.3 Mental Health

In relation to mental health, this report is of particular value because it has looked at both the rates of specific diagnosable mental disorders within the MFS, as well as self-reported suicidality and symptoms of general psychological distress and posttraumatic stress.

As discussed, the rates of diagnosable mental disorder in the MFS look very similar to the general Australian community. While this offers some reassurance, it equally needs to be emphasised that there remains within the MFS workforce, 17% of individuals who in the last 12 months have experienced a mental disorder diagnosis. This carries with it a significant personal cost which generally appears to be most apparent in the individual's social and family functioning, rather than in the workforce. However, the interpersonal costs are likely to be manifest indirectly through increased workplace conflict and general dissatisfaction with the work environment.

At the present time, the nature of the Workers' Compensation Legislation in South Australia creates a significant barrier to the management of the risk of those within the workplace who are suffering from significant anxiety and depression. The continued exposures of the workplace represent a significant risk to these individuals. Even with effective treatment, they remain at risk of further exacerbation of their conditions if they continue to be exposed to significant traumatic stressors. A strategy that recognises this risk within the workers' compensation liabilities of the MFS is important to consider.

One domain that was highlighted as having a greater prevalence in the MFS than in the Australian community was suicidal ideation. This represents an area that requires specific focus in terms of possible interventions because of its negative effect on quality of life and morale. In particular, it highlights that an element for the MFS workforce, apart from the specific issue of the adequate care for those with psychiatric disorders, is helping firefighters deal with the circumstances of death and severe injury to members of the public. Evidence suggests these may have a particular association with the risks of suicidal ideation (Bryan et al., 2017; Hom et al., 2017; Kimbrel et al., 2016). This is a domain that warrants ongoing monitoring in the context of an intervention program.

The use of continuous measures of psychological distress is an important issue because it highlights the prevalence of subsyndromal symptoms within the MFS population. This study found that approximately one third of the workforce have significant symptoms of psychological distress. Individuals who have these levels of distress are at risk of further exacerbation of their symptoms with subsequent stress exposures. They also represent a group of individuals who are particularly likely to benefit from early intervention, as treatment at lower levels of distress has a significantly greater probability of having positive outcomes. However, it is difficult to motivate people to seek care with these lower levels of distress because the related levels of impairment are relatively mild and often individuals adapt to such symptoms by minimisation (Robbins & Kirmayer, 1991). The significance of

these subsyndromal symptoms are well documented in a range of environments. This highlights the importance of having an active mental health literacy program that encourages individuals to self-monitor and understand the significance and importance of psychological preparedness and fitness in the workplace. This should be expressed in the language of having a sustained and healthy career that leads to a positive retirement in good health, rather than forced by a disability.

From a management perspective, programs in emergency services have appropriately been focused on traumatic stress and the consequence of these exposures in the workplace. In this study, anxiety disorders had more impact on social and family functioning. Overall, levels of disrupted functioning were substantially greater in the family and social environments, thus families are likely to have a greater visibility of the consequence and costs of mental disorder on the individual rather than this being apparent in the workplace. However, in terms of maintaining the general capacity of the workforce, it is important to note the finding of work related functional impairment related particularly to depressive disorders.

6.4 Physical Health

As discussed in chapter 4 of this report, in outlining the physical health complaints of firefighters, it is critical that these be viewed in the context of the individual's mental health. There is an increasing body of literature that highlights how conditions such as PTSD carry with them significant burdens of physical comorbidity. Trauma exposure, independent of the presence of PTSD, increases the probability of a range of medical conditions (Glaesmer et al., 2011). The important issue is that these associations are more apparent in older age groups as the accumulation of life experiences, including trauma exposures, and the risk of chronic ill health increases (McFarlane, 2010b).

There is an important interaction between cumulative trauma exposure and age which is likely to emerge at an earlier stage in the lives of firefighters because of the nature of their employment-related exposures: it is critical that physical illness in the workplace is addressed with knowledge of this broader context. A key challenge is that health practitioners who provide care to firefighters in the broader medical community are unlikely to be specifically aware of these causal interactions. This raises important questions about the role of occupational advice for firefighters on how to optimise their health in the longer term in the face of the stresses and strains of their occupation. In particular, having developed certain medical conditions, an important issue to ascertain with individual firefighters is the potential costs to them of continued employment, given their medical condition. This highlights the importance of accumulating a body of knowledge and experience in an occupational health service that can then advise more generally in the context of the disease-specific interventions that are likely to be provided by specialist physicians and surgeons. Particular examples are those officers who have experienced musculoskeletal disorders, particularly those that have an inflammatory component (Gola et al., 2013; Michopoulos et al., 2015).

Metabolic syndrome which brings together the combined risk factors of abdominal obesity, hyperlipidaemia, glucose insensitivity and related hypertension at a workforce level represents a major pool of risk for future cardiovascular disease (Michopoulos et al., 2016b). Particularly in the older age group, the associated risks and morbidity should be the focus of workplace intervention programs. Equally, the risks of continued trauma exposure in such individuals requires a management strategy.

6.5 Occupational Stressors

A range of occupational stressors were identified within the MFS workforce. In particular, lifetime workplace exposures of a traumatic nature were a significant burden and cause of distress. The study of Harvey et al (2015) highlights the cumulative consequence of these exposures on the mental health of firefighters. The current study found that the incidents that represented particular challenges to firefighters were those where there was a significant element of personal threat including situations where firefighters were injured themselves. Dealing with severely injured or mentally ill members of the public appeared to be more problematic than dealing with death. This highlights how providing skills for fire officers to deal with these situations is an important possible strategy for better preventing the feelings of helplessness that can be experienced in these circumstances.

In terms of the occupational stressors, job skill concerns and co-worker conflict were the most reported stressors. As discussed, these can have a bidirectional relationship with psychological symptoms, where individuals with depression and anxiety feel less confident about their capacity and become more reactive in the workplace. Equally, inadequate training in dealing with the aggression and inappropriate behaviour of colleagues has a significant capacity to be detrimental to individuals' mental health. An exploration of the job skill concerns reported is an important avenue to be followed up. Self-reported poor health habits were also identified as being an issue by 74% of firefighters. A further exploration of these health habits and identifying opportunities at an organisational level of intervening in this domain should be a priority.

In general, the levels of distress documented here are relatively typical of large organisations and highlight the importance of ongoing monitoring of the occupational environment and morale. These stressors are often the primary focus of people's distress, rather than complaint about the traumatic exposures that have to be dealt with as a firefighter. Hence, having an active strategy that equips MFS leadership to resolve conflict in the workplace, as well as optimising a healthy working environment is likely to have a positive effect on morale.

When examining the contribution of the different types of stressors to diagnosable mental disorder as against general distress in the MFS workforce, it appears that the lifetime trauma exposures play a predominant role with mental disorder. This highlights the recognised risk of traumatic stress to the mental health of this population. The relationship between career workplace exposures, occupational stressors and lifetime traumatic events to symptomatic distress was somewhat different. The K10 and Posttraumatic Symptom Checklist examine the impact of these stressors on a dimensional scale. In these domains, all 3 areas of cumulative stressors have a significant effect. This highlights that in the absence of an actual mental disorder diagnosis, these stressors still carry a general health burden. Managing the occupational stressors is an important preventative strategy for lessening the effect of the traumatic exposures in the workplace. This is in keeping with the knowledge that morale and group cohesion play an important protective role in relation to traumatic stress reactions (Hoge et al., 2007).

6.6 General Conclusion

The Metropolitan Fire Service firefighters provide a critical role in protecting and caring for the community. They are highly respected in the broader community and this is reflected in

the role of a firefighter being a sought-after occupation. The engagement of the MFS Senior Leadership in allowing the conduct of this study also highlights the awareness and concern about the health and welfare of the firefighters. Equally, the levels of participation and engagement of the firefighters is critical to the conduct of such research and highlights the motivation which exists within the organisation, both to monitor the health and adapt interventions based on knowledge that can assist firefighters. However, there is also a group of firefighters particularly the younger individuals who are relatively less concerned about these issues. This highlights a key challenge in implementing any interventions, where this represents a more difficult task with younger individuals who tend to see themselves as being fit, capable, and bullet proof. However, this is the stage of life when it is critical to provide a set of skills that ensure the longevity of the individual's career and the maintenance of their physical and psychological health into a healthy retirement.

In the last two decades, there has been a dramatic increase in the information available as to the risk factors and possible interventions that can be used to improve the occupational health and welfare of individuals within the emergency services. In particular, the interaction between cumulative trauma exposure, and mental and physical health has become far better established. Traumatic exposure has the capacity to lead to significant physiological, immunological, and epigenetic dysregulation. This highlights the importance of having an integrated approach to managing the physical and mental health of members of our community who place themselves in harm's way for our protection. The focus on workers' compensation and limiting liabilities at times has meant the importance of the more positive interventions that are possible in the workplace have not received optimal funding or attention from government. Allowing the conduct of a research program such as this provides an important basis for the further development of appropriate programs. These also have a general relevance for the other emergency services.

A further challenge is to optimise the collective skill base for assisting the emergency services in Australia. These are state based organisations where each organisation has to coordinate and manage its own occupational health programs. This undermines the potential economies and congregation of expertise that could occur if these programs were organised across services at a national level. There is the risk of a fragmented and individualised approach which is not necessarily based on the appropriate use of the composite evidence and knowledge base which is available to inform such programs. A service such as this provides a window where a methodology that has been utilised both in the Australian community and other occupational groups such as the Australian Defence Force can provide links as to how to draw from programs that addressed similar problems in other populations. This highlights the importance of having organisations with broad expertise in these areas that can be provided to the agencies that are caring for their workforce.

The capacity of fire to impact negatively on people's health has long been understood and was well documented by Samuel Pepys in his famous diary which included the Great Fire in London. In the aftermath of that catastrophe, he described many of the symptoms that we understand today as posttraumatic stress disorder. The challenge for the future is to ensure that individuals who volunteer their services to protect the community, pass through their career and leave with their health intact, both from a physical and psychological perspective. This should be optimised through the health programs provided by their employer.

6.7 Implications and recommendations

6.7.1 General recommendations

- A summary sheet of the findings be prepared and distributed to MFS officers, including a summary of possible supports and interventions. The general good mental health of firefighters should be described.
- The strategies to optimise health promotion in the MFS should utilise proven and developed workplace programs. The strategies should address the existence of different groups in the workforce with a focus on the interaction with age and risk. Different messaging is required according to risk. This should involve provision of information about the emergence of diseases with age so that firefighters are aware of the probability of both age and service related injuries impacting the reality of reaching a desired retirement age. This approach should be part of a program that assists firefighters in planning transition to retirement or other employment.
- A program of surveillance should be established to ensure the value of the interventions that are accepted and implemented.
- The issues related to workplace mental health are not confined to the MFS. The MFS has the potential to provide more general leadership in systems of care and workplace programs. Equally programs develop by other Government agencies and emergency services should be identified and utilised by the MFS with the necessary modifications

6.7.2 Recruitment and promotion

- A comprehensive assessment of past psychiatric history and exposures to traumatic stress should be undertaken as part of recruitment.
- Promotion provides an opportunity for training in managing workplace stressors and identifying potential signs of emerging psychological distress. Promotion should also be seen as an opportunity for further training in mental health literacy to allow those in command to monitor the mental health and wellbeing of the workplace.

6.7.3 Leadership

- While technical and management skills are central aspects of leadership attributes and training, the maintenance of morale and the health of the workforce is also of critical importance. Occupational health and safety should be seen from a broad perspective where the integral nature of physical and mental health of fire officers is seen as central to operational readiness and capacity. Regular updates and training in emerging knowledge in these domains should be part of the ongoing support for those in management positions.

- The strategies of addressing workplace conflict and the early intervention strategies in the MFS require review. Specific training for those in leadership roles in managing observed difficulties in the workforce and conflict should be considered. Strategies that manage these both from a HR/disciplinary and also a mental health perspective should be considered.
- The health and welfare strategies need to be developed in parallel to management initiatives to ensure an integrated a cohesive program.

6.7.4 Gender Issues

- The specific mental health of female firefighters was not discussed because of the small size of this group and the potential for the identification of individuals. However, they were identified as a group at particular risk which is in keeping with the known greater risk of PTSD (Christiansen & Elklit, 2008). There is increasing acceptance of females taking high stress positions such as combat roles in the Defence Force. They are a group who may benefit particularly from regular psychological support and mental health literacy programs particularly because of their minority status in the workplace.

6.7.5 Health maintenance – risk assessment

- Existing health maintenance strategies within the MFS need to be reviewed, particularly for those with physical injuries or medical conditions. A strategy to address dietary and physical preventative strategies at workforce level should be considered, particularly in the older age groups.
- The maintenance of psychological fitness requires consideration both using group-based strategies and those focused on individuals. Those individuals with self-appraised concerns of their mental health are more likely to be responsive to the provision of intervention strategies. The uptake of these programs will be optimised by emphasising the importance of a dimensional approach to mental health and the importance of addressing early symptoms to maintain operational capacity.
- Due to the fitness requirements for firefighters, it is important that self-appraisal skills are taught to ensure a self-recognition of the potential barriers to capacity and performance. With increasing age, these issues are an aspect of planning for retirement. A program for planning and supporting the transition to retirement should be developed, particularly for those with health conditions that carry a significant risk of worsening morbidity.

7. References

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Annex A

Mental disorder in the MFS

Table A.1 Prevalence of lifetime ICD-10 affective, anxiety, alcohol and any disorders

	All (n=1061)		Male (career) (n=830)		Male (retained) (n=205)		Female (all) (n=26)	
	N	(95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any affective disorder	232	21.9 (18.2, 26.0)	180	21.7 (18.3, 25.5)	45	21.8 (11.5, 37.3)	7	28.6 (8.1, 64.5)
Any anxiety disorder	161	15.2 (12.5, 18.3)	136	16.4 (13.5, 19.9)	18	8.5 (3.9, 17.6)	7	28.6 (8.1, 64.5)
Any alcohol disorder	311	29.3 (25.4, 33.5)	251	30.3 (26.4, 34.4)	56	27.1 (16.0, 42.2)	4	14.3 (2.3, 54.1)
Any mental disorder	527	49.7 (45.0, 54.3)	432	52.1 (47.7, 56.4)	84	40.8 (26.4, 57.1)	11	42.9 (15.8, 74.9)
PTSD	13.1	(10.4, 16.2)	107	12.9 (10.2, 16.2)	24	11.7 (5.8, 22.1)	7	28.6 (8.1, 64.5)

Table A.2 Prevalence of 12 month ICD-10 affective, anxiety, alcohol and any disorders

	All (n=1061)		Male (career) (n=830)		Male (retained) (n=205)		Female (all) (n=26)	
	N	(95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any affective disorder	61*	5.7 (4.1, 8.0)	46	5.5 (3.9, 7.9)	7	3.6 (1.0, 12.2)	7	28.6 (8.1, 64.5)
Any anxiety disorder	134*	12.7 (9.7, 16.4)	95*	11.4 (8.9, 14.6)	32*	15.7 (7.0, 31.7)	7	28.6 (8.1, 64.5)
Any alcohol disorder	32	3.0 (1.9, 4.6)	32	3.8 (2.4, 5.9)	0	0.0 (-)	0	0.0 (-)
Any mental disorder	182	17.1 (13.8, 21.1)	133	16.1 (13.1, 19.6)	37	18.1 (8.7, 34.0)	11	42.9 (15.8, 74.9)
PTSD	61*	5.8 (4.1, 8.1)	47	5.6 (3.8, 8.2)	7	3.3 (1.0, 10.7)	7	28.6 (8.1, 64.5)

Table A.3 Prevalence of 12-month ICD-10 affective disorders in the entire MFS

	All (n = 1061)		Male (career) (n = 830)		Male (retained) (n = 205)		Female (all) (n= 26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any affective disorder	61*	5.7 (4.1, 8.0)	46	5.5 (3.9, 7.9)	7	3.6 (1.0, 12.2)	7	28.6 (8.1, 64.5)
Depressive episodes	53	5.0 (3.6, 7.1)	46	5.5 (3.9, 7.9)	0	0.00 (-)	7	28.6 (8.1, 64.5)
Dysthymia	2	0.2 (0.1, 1.0)	2	0.3 (0.1, 1.3)	0	0.00 (-)	0	0.0 (-)
Bipolar affective disorder	7	0.7 (0.2, 2.4)	0	0.0 (-)	7	3.6 (1.0, 12.2)	0	0.0 (-)

Table A.4: Prevalence of 12-month ICD-10 anxiety disorders in the MFS

	All (n=1061)		Male (career) (n=830)		Male (retained) (n=205)		Female (all) (n=26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any anxiety disorder	134*	12.7 (9.7, 16.4)	95*	11.4 (8.9, 14.6)	32*	15.7 (7.0, 31.7)	7	28.6 (8.1, 64.5)
Panic attack	60*	5.6 (3.6, 8.7)	35	4.2 (2.8, 6.2)	17*	8.5 (2.4, 26.2)	7	28.6 (8.1, 64.5)
Panic disorder	19	1.8 (1.0, 3.3)	15	1.8 (1.0, 3.4)	4	2.1 (0.4, 10.7)	0	0.0 (., .)
Social phobia	33	3.1 (1.5, 6.3)	15	1.8 (1.0, 3.3)	18*	8.8 (2.5, 26.7)	0	0.0 (., .)
Specific phobia	33	3.1 (1.9, 5.2)	24	2.9 (1.7, 4.9)	9	4.4 (1.3, 14.3)	0	0.0 (., .)
Generalised anxiety disorder	14	1.3 (0.6, 2.7)	5	0.6 (0.2, 1.8)	5	2.5 (0.9, 7.2)	4	14.3 (2.3, 54.1)
Obsessive-compulsive disorder	15	1.4 (0.7, 3.1)	10	1.2 (0.6, 2.7)	5	2.4 (0.4, 12.6)	0	0.0 (., .)
Agoraphobia	14	1.4 (0.7, 2.8)	12	1.43 (0.63, 3.21)	3	1.27 (0.27, 5.78)	0	0.00 (., .)
Posttraumatic stress disorder	61*	5.8 (4.1, 8.1)	47	5.6 (3.8, 8.2)	7	3.3 (1.0, 10.7)	7	28.6 (8.1, 64.5)

Table A.5: Lifetime trauma in the entire MFS

	All (n=1061)		Male (career) (n=830)		Male (retained) (n=205)		Female (all) (n=26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Combat	20	1.9 (0.9, 3.7)	10	1.2 (0.6, 2.55)	10	4.7 (1.4, 14.7)	0	0.00 (., .)
Peacekeeper	17	1.6 (0.7, 3.4)	12	1.4 (0.6, 3.2)	5	2.4 (0.4, 12.7)	0	0.00 (., .)
Witnessed mass carnage/mutilated bodies	453**	43.00 (38.7, 47.3)	391*	47.2 (42.9, 51.6)	51*	25.4 (14.6, 40.3)	11	42.9 (15.8, 74.9)
Purposely injured or killed someone	10	1.0 (0.5, 2.1)	10	1.2 (0.6, 2.6)	0	0.00 (., .)	0	0.00 (., .)
Life threatening automobile accident	244*	23.0 (19.8, 26.6)	206*	24.9 (21.4, 28.8)	34	16.6 (9.6, 27.2)	4	14.3 (2.3, 54.1)
Other life-threatening accident	242**	22.9 (19.3, 27.00)	185*	22.4 (19.0, 26.2)	53*	26.0 (14.9, 41.3)	4	14.3 (2.3, 54.1)
Exposed toxic chemicals	436**	42.0 (37.8, 46.3)	378*	46.7 (42.5, 51.0)	55*	26.7 (15.6, 41.8)	4	14.3 (2.3, 54.1)
Man-made disaster	622**	58.7 (54.1, 63.2)	503*	60.8 (56.4, 65.0)	104*	50.8 (35.9, 65.5)	15	57.1 (25.1, 84.2)
Natural disaster	363*	34.3 (30.6, 38.1)	330*	39.9 (35.7, 44.2)	29	14.1 (7.5, 24.7)	4	14.3 (2.3, 54.1)
Someone close died unexpectedly	502**	47.5 (42.8, 52.1)	393*	47.5 (43.2, 51.9)	102*	49.6 (34.4, 64.8)	7	28.6 (8.1, 64.5)
Child had life threatening illness/injury	140*	13.2 (10.3, 16.8)	103*	12.5 (10.0, 15.5)	36*	17.8 (8.5, 33.5)	0	0.00 (., .)
Life threatening illness	197*	18.6 (15.8, 21.8)	174*	21.0 (17.8, 24.7)	23	11.1 (5.9, 19.9)	0	0.00 (., .)
Saw someone badly injured/ killed	810**	76.7 (72.2, 80.6)	666*	80.5 (76.7, 83.8)	118*	58.1 (41.3, 73.3)	26	100.00 (., .)
Accidentally injured/ killed someone	39	3.7 (2.4, 5.6)	34	4.1 (2.7, 6.3)	5	2.4 (0.4, 12.7)	0	0.00 (., .)
Raped	19	1.8 (0.9, 3.5)	10	1.2 (0.6, 2.6)	5	2.4 (0.4, 12.7)	4	14.3 (2.3, 54.1)
Sexual assault	93*	8.8 (6.8, 11.2)	68	8.2 (6.2, 10.8)	10	4.9 (1.8, 12.9)	15	57.1 (25.1, 84.2)
Beaten by parent	56*	5.3 (3.7, 7.7)	33	4.0 (2.6, 6.0)	20	9.6 (4.5, 19.4)	4	14.3 (2.3, 54.1)
Beaten by spouse	9	0.9 (0.3, 2.2)	5	0.6 (0.2, 1.9)	0	0.00 (., .)	4	14.3 (2.3, 54.1)
Beaten by other	123*	11.6 (9.3, 14.5)	93*	11.3 (8.9, 14.2)	30	14.6 (8.2, 24.5)	0	0.00 (., .)
Witness domestic violence	90*	8.5 (6.5, 11.1)	69	8.3 (6.3, 11.0)	18	8.6 (3.9, 17.6)	4	14.3 (2.3, 54.1)
Stalked	67*	6.3 (4.5, 8.9)	40	4.9 (3.2, 7.2)	19	9.5 (4.3, 19.4)	7	28.6 (8.1, 64.5)
Mugged	239*	22.6 (19.3, 26.2)	186*	22.4 (19.0, 26.3)	53	25.9 (17.4, 36.7)	0	0.00 (., .)
Kidnapped	17	1.7 (0.8, 3.3)	10	1.2 (0.6, 2.6)	7	3.6 (1.0, 12.2)	0	0.00 (., .)
Unarmed civilian	41	3.9 (2.6, 5.6)	41	5.0 (3.4, 7.2)	0	0.00 (., .)	0	0.00 (., .)
Civilian in place of ongoing terror	24	2.3 (1.3, 3.8)	24	2.9 (1.7, 4.9)	0	0.00 (., .)	0	0.00 (., .)

	All (n=1061)		Male (career) (n=830)		Male (retained) (n=205)		Female (all) (n=26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Someone close had traumatic experience	169**	16.1 (12.5, 20.2)	107*	13.0 (10.3, 16.2)	51*	24.8 (12.6, 42.9)	11	42.9 (15.8, 74.9)
Other traumatic event	219*	20.7 (17.6, 24.1)	193*	23.3 (19.9, 27.2)	26	12.7 (6.7, 22.6)	0	0.00 (., .)
Experience didn't want to talk about	90*	8.5 (6.4, 11.1)	73*	8.8 (6.6, 11.6)	10	4.7 (1.4, 14.7)	7	28.6 (8.1, 64.5)

Note: Margin of error for totals < 20, unless * MoE 20-39, ** MoE > 40

Table A.6: Prevalence of 12-month ICD-10 alcohol disorders

	All (n=1061)		Male(career) (n=830)		Male (retained) (n=205)		Female (all) n=26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Any alcohol disorder	32	3.0 (1.9, 4.6)	32	3.8 (2.4, 5.9)	0	0.0 (-)	0	0.0 (-)
Alcohol harmful use	17	1.6 (0.8, 3.0)	17	2.0 (1.0, 3.8)	0	0.0 (-)	0	0.0 (-)
Alcohol dependence	15	1.4 (0.8, 2.6)	15	1.8 (1.0, 3.3)	0	0.0 (-)	0	0.0 (-)

Margin of error for totals is < 20 unless: * 20-39, ** 40+

Table A.7: Work disruption and 12-month ICD-10 mental disorder

	All (n=182)		Male (career) (n=133)		Male (retained) (n=37)		Female (all) (n=11)	
	M	(95% CI)	M	(95% CI)	M	(95% CI)	M	(95% CI)
Any Mental Disorder	2.74	(2.03, 3.46)	2.59	(1.95, 3.22)	3.24	(0.76, 5.71)	3.00	(0.00, 7.01)
Any Affective Disorder	3.59	(2.47, 4.70)	3.28	(2.03, 4.52)	4.10	(0.91, 7.29)		
Any Anxiety Disorder	2.68	(1.81, 3.55)	2.38	(1.66, 3.11)	3.42	(0.56, 6.28)	3.00	(0.00, 6.85)
Any Alcohol Disorder	3.05	(1.45, 4.64)	3.05	(1.45, 4.64)	NA	NA	NA	NA

Table A.8: Social disruption and 12-month ICD-10 mental disorder

	All (n=182)		Male (career) (n=133)		Male (retained) (n=37)		Female (all) (n=11)	
	M	(95% CI)	M	(95% CI)	M	(95% CI)	M	(95% CI)
Any Mental Disorder	3.21	(2.49 , 3.93)	3.02	(2.39, 3.65)	3.83	(1.16, 6.50)	3.33	(0.72, 5.95)
Any Affective Disorder	4.17	(3.23, 5.11)	4.04	(2.94, 5.14)	4.10	(0.91, 7.29)	5.00	(3.72, 6.28)
Any Anxiety Disorder	3.41	(2.48, 4.33)	3.20	(2.42, 3.98)	4.10	(1.00, 7.21)	3.00	(0.00, 6.85)
Any Alcohol Disorder	3.41	(1.81, 5.00)	3.41	(1.81, 5.00)	NA	NA	NA	NA

Table A.9: Family disruption and 12-month ICD-10 mental disorder

	All (n=182)		Male (career) (n=133)		Male (retained) (n=37)		Female (all) (n=11)	
	M	(95% CI)	M	(95% CI)	M	(95% CI)	M	(95% CI)
Any Mental Disorder	3.36	(2.65, 4.07)	3.22	(2.56, 3.87)	3.77	(1.22, 6.32)	3.67	(1.51, 5.82)
Any Affective Disorder	4.35	(3.45, 5.26)	4.29	(3.24, 5.33)	4.10	(0.91, 7.29)	5.00	(3.72, 6.28)
Any Anxiety Disorder	3.47	(2.57, 4.37)	3.27	(2.48, 4.07)	4.03	(1.07, 7.00)	3.50	(0.29, 6.71)
Any Alcohol Disorder	3.68	(2.01, 5.34)	3.68	(2.01, 5.34)	NA	NA	NA	NA

Table A.10: Social Impairment for MFS personnel with no mental disorder, affective disorder only, anxiety disorder only, both affective and anxiety disorder

Disrupt work	No affective or anxiety disorder (n = 887)		Affective disorder only (n = 21)		Anxiety disorder only (n = 99)		Both affective and anxiety disorder (n = 31)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Not at all	530	58.8 (53.8, 63.7)	2	9.4 (2.0, 34.2)	39	39.1 (23.7, 57.0)	6	18.1 (5.8, 44.2)
Mildly	292	32.4 (27.8, 37.4)	15	57.5 (30.8, 80.4)	34	34.3 (21.3, 50.0)	10	28.8 (13.7, 50.8)
Moderately	45	4.9 (3.4, 7.1)	.	0.0 (., .)	19	19.4 (10.5, 33.1)	9	24.5 (10.0, 48.4)
Markedly	20	2.2 (1.3, 3.8)	2	9.4 (2.0, 34.2)	.	0.0 (., .)	3	7.4 (1.6, 28.6)
Extremely	.	0.0 (., .)	2	9.4 (2.0, 34.2)	7	7.3 (2.1, 22.8)	3	7.6 (1.6, 29.2)

	No affective or anxiety disorder (n = 887)		Affective disorder only (n = 21)		Anxiety disorder only (n = 99)		Both affective and anxiety disorder (n = 31)	
Disrupt work	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Disrupt social								
Not at all	488	54.2 (49.2, 59.1)	2	9.4 (2.0, 34.2)	35	34.9 (20.0, 53.5)	.	0.0 (., .)
Mildly	296	32.9 (28.3, 37.8)	15	57.5 (30.8, 80.4)	38	38.2 (24.4, 54.2)	14	40.0 (21.1, 62.5)
Moderately	78	8.7 (6.5, 11.5)	6	23.8 (7.6, 54.3)	13	12.7 (6.3, 23.9)	6	17.5 (5.6, 43.0)
Markedly	24	2.7 (1.6, 4.5)	.	0.0 (., .)	12	11.8 (4.4, 28.2)	7	21.2 (8.9, 42.7)
Extremely	3	0.3 (0.1, 1.4)	.	0.0 (., .)	2	2.4 (0.5, 10.4)	5	14.4 (4.9, 35.6)
Disrupt family								
Not at all	447	49.6 (44.6, 54.6)	.	0.0 (., .)	36	36.2 (21.3, 54.4)	.	0.0 (., .)
Mildly	329	36.5 (32.0, 41.2)	17	66.9 (38.5, 86.7)	32	31.8 (19.1, 47.9)	14	40.0 (21.1, 62.5)
Moderately	86	9.6 (6.8, 13.4)	6	23.8 (7.6, 54.3)	15	15.1 (8.0, 26.9)	6	17.5 (5.6, 43.0)
Markedly	23	2.5 (1.5, 4.2)	.	0.0 (., .)	14	14.5 (6.2, 30.4)	7	21.2 (8.9, 42.7)
Extremely	6	0.7 (0.2, 2.3)	2	9.4 (2.0, 34.2)	2	2.4 (0.5, 10.4)	5	14.4 (4.9, 35.6)

*includes n=23 missing population information, and could not be categorised into a mental disorder comorbidity group

Table A.11: Quality of Life for MFS personnel with no mental disorder, affective disorder only, anxiety disorder only, both an affective and anxiety disorder

Quality of life	No affective or anxiety disorder		Affective disorder only		Anxiety disorder only		Both affective and anxiety disorder	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Very poor/ poor	5	0.5 (0.1, 3.0)	.	0.0 (., .)	13	12.7 (5.3, 27.1)	5	14.3 (4.9, 35.2)
Neither poor nor good	58	6.4 (3.8, 10.5)	2	9.4 (2.0, 34.2)	.	0.0 (., .)	6	18.1 (5.9, 43.9)
Good/very good	828	92.0 (87.7, 94.9)	23	90.6 (65.8, 98.0)	82	82.2 (67.7, 91.1)	21	60.8 (38.4, 79.4)

Table A.13: K10 risk categories in the MFS

K10 category	All (n=1061)		Male (career) (n=830)		Male (retained) (n=205)		Female (all) (n=26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Low (10-15)	665	66.8 (63.8, 69.6)	535*	67.6 (64.7, 70.3)	117	65.1 (54.8, 74.2)	14	54.1 (30.3, 76.2)
Moderate (16-21)	231	23.2 (20.7, 25.9)	185*	23.4 (20.9, 26.0)	38	21.4 (14.0, 31.2)	8	31.0 (12.4, 58.9)
High (22-29)	69	7.0 (5.5, 8.7)	55	7.0 (5.6, 8.6)	14	8.0 (3.8, 16.1)	0	0
Very high (30-50)	30	3.0 (2.1, 4.3)	17	2.1 (1.4, 3.2)	10	5.5 (2.6, 11.3)	4	14.9 (4.6, 38.8)

Margin of error for totals is < 20 unless: * 20-39, ** 40+

Table A.14: Suicidality in the Entire MFS

	All (n=1061)		Male (career) (n=830)		Male (retained) (n=205)		Females (all) (n=26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Suicidal ideation	108	10.1 (8.5, 12.1)	67	8.1 (6.7, 9.8)	26	12.9 (7.9, 20.4)	14	54.1 (30.3, 76.2)
Felt life not worth living	97	9.8 (8.1, 11.8)	62	7.9 (6.4, 9.6)	21	11.7 (6.7, 19.5)	14	54.1 (30.3, 76.2)
Felt so low thought about committing suicide	48	4.9 (3.7, 6.4)	31	4.0 (3.0, 5.3)	10	5.5 (2.6, 11.3)	7	27.7 (11.5, 53.0)
Suicide plan or attempt	7	0.7 (0.4, 1.5)	5	0.6 (0.3, 1.3)	2	1.3 (0.3, 5.8)	0	0.0 (., .)
Suicide plan	6	0.6 (0.3, 1.3)	3	0.4 (0.2, 1.1)	2	1.3 (0.3, 5.8)	0	0.0 (., .)

Suicide attempt	2	0.2 (0.0, 0.6)	2	0.2 (0.1, 0.7)	0	0.0 (., .)	0	0.0 (., .)
No ideation, Plan or attempt	887	89.0 (86.9, 90.9)	723	91.3 (89.5, 92.9)	152	85.2 (76.5, 91.1)	12	45.9 (23.8, 69.7)

Physical Health in the MFS

Table A.15: Estimated Prevalence of doctor diagnosed physical health conditions among the MFS

	All N=1061		Male (career) N=830		Male (retained) N=205		Female (all) N=26	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
High blood pressure	110	10.4 (8.7, 12.3)	83	10.0 (8.5, 11.8)	27	13.2 (8.1, 20.9)	0	0.0 (., .)
Heart attack	10	0.9 (0.6, 1.5)	10	1.2 (0.7, 2.0)	0	0.0 (., .)	0	0.0 (., .)
High cholesterol	141	13.3 (11.6, 15.2)	121	14.6 (12.8, 16.6)	20	9.7 (5.8, 15.8)	0	0.0 (., .)
Heart failure	8	0.7 (0.4, 1.5)	5	0.6 (0.3, 1.2)	3	1.4 (0.3, 6.4)	0	0.0 (., .)
Migraines	36	3.4 (2.5, 4.6)	28	3.4 (2.5, 4.6)	5	2.4 (0.8, 6.8)	3	11.5 (2.1, 44.3)
Pneumonia	35	3.3 (2.5, 4.4)	32	3.9 (2.9, 5.2)	3	1.2 (0.3, 5.6)	0	0.0 (., .)
Stomach/duodenal ulcers	28	2.6 (1.8, 3.8)	15	1.8 (1.2, 2.8)	12	6.0 (3.1, 11.5)	0	0.0 (., .)
Colitis/Crohn's disease	10	1.0 (0.6, 1.6)	10	1.3 (0.7, 2.1)	0	0.0 (., .)	0	0.0 (., .)
Functional dyspepsia	2	0.2 (0.0, 0.5)	2	0.2 (0.1, 0.7)	0	0.0 (., .)	0	0.0 (., .)
Hepatitis	5	0.5 (0.2, 1.0)	5	0.6 (0.3, 1.2)	0	0.0 (., .)	0	0.0 (., .)
Bowel polyps	52	4.9 (3.9, 6.0)	52	6.2 (5.0, 7.7)	0	0.0 (., .)	0	0.0 (., .)
Kidney disease	23	2.1 (1.5, 3.1)	20	2.5 (1.7, 3.5)	2	1.1 (0.3, 5.0)	0	0.0 (., .)
Bladder disease	10	1.0 (0.6, 1.6)	10	1.2 (0.7, 2.0)	0	0.0 (., .)	0	0.0 (., .)
Diabetes	13	1.2 (0.7, 2.1)	4	0.4 (0.2, 1.1)	9	4.6 (2.3, 8.9)	0	0.0 (., .)
Temporomandibular joint dysfunction	4	0.4 (0.2, 0.8)	3	0.4 (0.2, 0.9)	0	0.0 (., .)	1	4.6 (2.0, 10.1)
Traumatic brain injury	12	1.2 (0.7, 1.9)	10	1.2 (0.7, 1.9)	3	1.2 (0.3, 5.6)	0	0.0 (., .)
Fibrositis or fibromyalgia	2	0.2 (0.0, 0.5)	2	0.2 (0.1, 0.7)	0	0.0 (., .)	0	0.0 (., .)
Eye or vision problems	32	3.1 (2.3, 4.1)	30	3.6 (2.7, 4.8)	2	1.1 (0.3, 5.0)	0	0.0 (., .)
Sinus problems	104	9.8 (8.4, 11.6)	94	11.3 (9.6, 13.2)	8	3.8 (1.6, 9.1)	3	11.5 (2.1, 44.3)
Hearing loss	62	5.9 (4.8, 7.2)	53	6.4 (5.2, 7.8)	10	4.7 (2.3, 9.5)	0	0.0 (., .)
Dermatitis	26	2.5 (1.7, 3.6)	20	2.4 (1.7, 3.4)	6	3.0 (0.9, 9.4)	0	0.0 (., .)
Eczema	28	2.6 (1.8, 3.8)	24	2.9 (2.1, 4.1)	4	1.8 (0.3, 9.0)	0	0.0 (., .)
Psoriasis	29	2.8 (1.9, 4.0)	23	2.8 (2.0, 3.9)	6	3.0 (0.9, 9.4)	0	0.0 (., .)
Malignant melanoma	11	1.1 (0.7, 1.7)	11	1.4 (0.9, 2.2)	0	0.0 (., .)	0	0.0 (., .)
Other skin cancer	94	8.9 (7.5, 10.4)	86	10.4 (8.9, 12.2)	8	3.7 (1.6, 8.4)	0	0.0 (., .)
Other cancer	36	3.4 (2.5, 4.4)	32	3.8 (2.9, 5.0)	3	1.4 (0.3, 6.4)	1	4.6 (2.0, 10.1)
Chronic fatigue syndrome	4	0.3 (0.1, 0.8)	4	0.4 (0.2, 1.1)	0	0.0 (., .)	0	0.0 (., .)
Impotence	18	1.7 (1.1, 2.5)	15	1.8 (1.2, 2.8)	2	1.1 (0.3, 5.0)	0	0.0 (., .)
Sleep apnoea	32	3.1 (2.3, 4.1)	23	2.8 (2.0, 3.8)	9	4.6 (2.3, 8.9)	0	0.0 (., .)
Carpal tunnel syndrome	34	3.2 (2.3, 4.5)	21	2.6 (1.8, 3.6)	10	4.8 (2.3, 9.8)	3	11.5 (2.1, 44.3)

Osteoporosis	7	0.6 (0.3, 1.5)	2	0.2 (0.1, 0.6)	5	2.5 (0.8, 7.3)	0	0.0 (., .)
Osteoarthritis	63	5.9 (4.8, 7.3)	60	7.3 (5.9, 8.9)	0	0.0 (., .)	3	10.3 (2.0, 39.1)

*No responders reported having angina, epilepsy, MND, MS, Cirrhosis, or multiple chemical sensitivity

Table A.16: Mean number of conditions age, rank and length of service.

	All (N=1061) Mean (95% CI)	Male (career) (N=830) Mean (95% CI)	Male (retained) (N=205) Mean (95% CI)	Female (all) (N=26) Mean (95% CI)
Age				
19	0.3 (0.1, 0.5)	0.4 (0.2, 0.5)	0.3 (0.0, 0.7)	0.3 (0.0, 0.5)
35	0.5 (0.4, 0.6)	0.5 (0.4, 0.6)	0.5 (0.2, 0.8)	0.5 (-0.3, 1.3)
45	1.2 (1.1, 1.4)	1.2 (1.1, 1.4)	1.3 (0.8, 1.8)	1.0 (1.0, 1.0)
55+	1.9 (1.7, 2.1)	1.9 (1.7, 2.1)	2.3 (1.1, 3.5)	1.0 (1.0, 1.0)
Rank				
Station officer/ senior management	1.4 (1.2, 1.5)	1.4 (1.2, 1.5)	1.2 (0.4, 1.9)	0.5 (-0.2, 1.2)
Senior firefighter/firefighter	0.9 (0.8, 0.9)	0.9 (0.8, 1.0)	0.7 (0.5, 0.9)	0.6 (0.1, 1.0)
Length of service				
0-4	0.3 (0.2, 0.5)	0.5 (0.3, 0.6)	0.1 (0.0, 0.3)	1.3 (0.7, 1.8)
5-14	0.6 (0.5, 0.7)	0.6 (0.5, 0.7)	0.9 (0.5, 1.3)	0.2 (0.0, 0.3)
15-24	1.3 (1.0, 1.6)	1.4 (1.1, 1.6)	1.1 (0.3, 2.0)	0.0 (0.0, 0.0)
25+	1.7 (1.5, 1.8)	1.7 (1.5, 1.8)	2.0 (1.1, 2.9)	1.0 (1.0, 1.0)
All	1.0 (1.0, 1.1)	1.1 (1.0, 1.2)	0.8 (0.5, 1.0)	0.5 (0.1, 0.9)

Table A.17: Prevalence of mental and physical disorder comorbidity

	Physical condition		Physical condition and any CIDI disorder		K10 score for those with physical condition
	N	% (95% CI)	N	% (95% CI)	% (95% CI)
Metabolic (hypertension, high cholesterol, diabetes)	220	20.9 (18.1, 24.0)	44	19.8 (13.4, 28.2)	16.6 (15.3, 17.9)
Heart attack	13	1.2 (0.6, 2.4)	0	0.0 (., .)	16.9 (14.1, 19.6)

	Physical condition		Physical condition and any CIDI disorder		K10 score for those with physical condition
	N	% (95% CI)	N	% (95% CI)	% (95% CI)
Stroke	7	0.7 (0.3, 1.6)	0	0.0 (.,.)	17.3 (15.0, 19.6)
Heart failure	12	1.1 (0.5, 2.7)	0	0.0 (.,.)	14.6 (13.0, 16.2)
Migraines	26	2.5 (1.5, 4.1)	7	28.5 (12.0, 53.8)	15.7 (13.1, 18.3)
Pneumonia	44	4.2 (2.8, 6.2)	3	6.0 (1.3, 24.2)	15.2 (13.6, 16.8)
Gastro (ulcer, colitis, dyspepsia)	85	8.1 (6.2, 10.4)	18	20.9 (12.1, 33.8)	15.4 (14.3, 16.5)
Hepatitis	2	0.2 (0.1, 1.0)		0.0 (.,.)	12.0 (12.0, 12.0)
Kidney disease	23	2.2 (1.2, 3.9)	7	28.7 (9.1, 61.6)	20.9 (13.9, 27.9)
Bladder disease	12	1.2 (0.6, 2.3)	2	19.5 (4.3, 56.9)	19.3 (14.1, 24.5)
Chronic (TMJ dysfunction, fibrositis, chronic fatigue, osteoarthritis)	86	8.2 (6.3, 10.4)	10	11.3 (5.4, 22.1)	14.6 (13.9, 15.4)
TBI	18	1.7 (1.0, 3.0)	13	70.9 (40.1, 89.9)	16.7 (14.6, 18.9)
Vision problems	45	4.3 (3.0, 6.1)	10	21.4 (10.4, 39.1)	16.7 (15.3, 18.1)
Sinus	117	11.1 (8.9, 13.9)	18	15.4 (8.8, 25.7)	15.7 (14.8, 16.6)
Hearing loss	71	6.8 (5.1, 8.9)	22	30.1 (18.1, 45.7)	18.5 (15.8, 21.2)
Skin condition (dermatitis, eczema, psoriasis)	60	5.7 (4.1, 7.7)	2	4.1 (0.9, 16.6)	14.2 (13.2, 15.1)
Cancers (melanoma, other cancer, other skin cancer)	151	14.4 (11.8, 17.4)	35	23.0 (15.1, 33.3)	16.6 (15.6, 17.6)
Impotence	23	2.2 (1.3, 3.7)	7	30.9 (13.1, 57.1)	20.1 (16.3, 23.9)
Sleep apnoea	34	3.3 (2.1, 5.1)	7	19.9 (6.0, 49.3)	18.8 (13.1, 24.5)
Carpal tunnel	27	2.6 (1.6, 4.2)	12	43.1 (21.0, 68.4)	18.5 (12.1, 24.8)
Osteoporosis	10	1.0 (0.3, 2.6)		0.0 (.,.)	15.6 (12.3, 18.8)
Rheumatoid arthritis	24	2.3 (1.3, 3.8)	14	58.7 (33.3, 80.2)	15.1 (13.9, 16.2)
Other inflammatory arthritis	23	2.2 (1.2, 3.9)	5	22.4 (7.3, 51.1)	16.9 (14.2, 19.5)
Gout	33	3.1 (2.1, 4.7)	7	22.6 (9.7, 44.5)	15.1 (13.4, 16.9)
Other musc	155	14.7 (12.2, 17.5)	37	24.2 (16.8, 33.5)	17.6 (16.5, 18.7)
No physical symptoms selected (ignoring the free text "other"s)	492	46.4 (42.7, 50.0)	76	15.5 (10.3, 22.5)	14.8 (14.0, 15.6)
No physical symptoms selected (counting the free text "other"s)	473	41.5 (37.5, 45.6)	53	12.1 (8.2, 17.5)	14.8 (13.9, 16.7)

** Note: prevalence estimates of doctor diagnosed physical conditions vary slightly in this table from the previous due to the statistical weighting used

Table A.18: Estimated rates of injuries sustained while on duty

	All N=1061		Male (career) N=830		Male (retained) N=205		Female (all) N=26	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Burn (no smoke inhalation)	49	4.6 (3.7, 5.8)	47	5.6 (4.5, 7.1)	2	1.1 (0.3, 5.0)	0	0.0 (-)
Smoke/gas inhalation (no burn)	27	2.6 (1.8, 3.6)	20	2.4 (1.7, 3.5)	7	3.5 (1.5, 8.2)	0	0.0 (-)
Burn and smoke inhalation	10	0.9 (0.6, 1.5)	10	1.2 (0.7, 2.0)	0	0.0 (-)	0	0.0 (-)
Other respiratory distress	18	1.7 (1.1, 2.7)	15	1.9 (1.2, 2.8)	0	0.0 (-)	3	11.5 (2.1, 44.3)
Wound, cut, bleeding or bruise	129	12.2 (10.6, 14.1)	114	13.8 (11.9, 15.8)	10	4.7 (2.3, 9.5)	6	21.8 (6.3, 53.8)
Dislocation or fracture	65	6.2 (4.9, 7.7)	50	6.0 (4.8, 7.4)	10	4.9 (2.3, 10.2)	6	21.8 (6.3, 53.8)
Strain, sprain or muscular pain	359*	33.8 (31.5, 36.3)	328*	39.6 (36.9, 42.3)	20	9.9 (5.9, 16.3)	10	39.2 (22.7, 58.7)
Thermal stress	55	5.2 (4.0, 6.7)	44	5.3 (4.1, 6.7)	11	5.5 (2.4, 12.1)	0	0.0 (-)
Other injury	55	5.2 (4.1, 6.5)	47	5.7 (4.5, 7.1)	7	3.7 (1.5, 8.5)	0	0.0 (-)

Table A.19: Estimated rates of physical injuries while attending an emergency

	All N=1061		Male (career) N=830		Male (retained) N=205		Female (all) N=26	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Burn (no smoke inhalation)	112	10.6 (9.1, 12.3)	102	12.3 (10.7, 14.2)	10	4.9 (2.3, 10.2)	0	0.0 (., .)
Smoke/gas inhalation (no burn)	139	13.1 (11.4, 15.0)	117	14.0 (12.3, 16.0)	20	9.7 (5.8, 15.8)	3	11.5 (2.1, 44.3)
Burn and smoke inhalation	17	1.6 (1.1, 2.3)	17	2.0 (1.4, 2.9)	0	0.0 (., .)	0	0.0 (., .)
Other respiratory distress	39	3.7 (2.8, 4.7)	39	4.7 (3.6, 6.1)	0	0.0 (., .)	0	0.0 (., .)
Wound, cut, bleeding or bruise	212*	20.0 (17.9, 22.2)	190	22.9 (20.7, 25.3)	16	7.8 (4.1, 14.5)	6	21.8 (6.3, 53.8)

Dislocation or fracture	65	6.1 (4.9, 7.6)	50	6.0 (4.8, 7.5)	9	4.6 (2.3, 8.9)	6	21.8 (6.3, 53.8)
Strain, sprain or muscular pain	337*	31.7 (29.3, 34.2)	299*	36.0 (33.4, 38.7)	31	14.9 (9.8, 22.1)	7	27.7 (11.5, 53.0)
Thermal stress	144*	13.6 (11.7, 15.8)	110	13.2 (11.4, 15.2)	32	15.4 (9.7, 23.6)	3	11.5 (2.1, 44.3)
Other injury	58	5.5 (4.4, 6.8)	50	6.1 (4.9, 7.6)	7	3.7 (1.5, 8.5)	0	0.0 (., .)

Workplace exposures and occupational stressors

Table A.20: Number of workplace exposures across MFS career

Number of Workplace Exposures	All (n=1061)		Male (Career) (n=830)		Male (Retained) (n=205)		Female (All) (n=26)	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Low (0-9)	255	24.1 (21.7, 26.6)	135	16.3 (14.3, 18.5)	110	53.5 (44.9, 62.0)	11	41.3 (20.2, 66.2)
Moderate (10-19)	424	40.0 (37.2, 42.8)	342	41.2 (38.4, 44.0)	75	36.8 (28.7, 45.7)	7	27.7 (11.5, 53.0)
High (20-29)	317	29.8 (27.6, 32.2)	394	35.4 (32.8, 38.1)	15	7.2 (4.0, 12.7)	8	31.0 (12.4, 58.9)
Very high (30-44)	64	6.1 (5.0, 7.4)	59	7.1 (5.9, 8.7)	5	2.5 (0.8, 7.3)	0	0

Table A.21: Estimated prevalence of Lifetime Workplace exposures in the MFS

Workplace Exposures	All MFS			Male (Career) (n=830)			Male (Retained) (n=205)			Female (All) (n=26)		
	N	%	95% CI	N	%	95% CI	N	N	95% CI	N	%	95% CI
Witnessed co-worker fire death	11	1.0	0.6, 1.7	8	1.0	0.6, 1.7	2	1.2	0.3, 5.0	0	0.00	-
Witnessed co-worker non-fire death	20	1.9	1.2, 2.9	10	1.2	0.7, 2.1	10	4.8	2.3, 9.8	0	0.00	-
Co-worker fire death (not witnessed)	64	6.0	5.0, 7.3	61	7.4	6.1, 8.9	3	1.2	0.3, 5.6	0	0.00	-
Co-worker non-fire death (not witnessed)	273	25.8	23.8, 27.9	256	30.8	28.4, 33.3	5	2.5	0.8, 7.3	13	48.5	30.5, 66.8

Workplace Exposures	All MFS			Male (Career) (n=830)			Male (Retained) (n=205)			Female (All) (n=26)		
	N	%	95% CI	N	%	95% CI	N	N	95% CI	N	%	95% CI
Aided injured friend/relative	186	17.5	15.5, 19.7	144	17.4	15.4, 19.6	39	18.9	13.0, 26.6	3	10.3	2.0, 39.1
Callout infant injury/death	148	14.0	12.2, 16.0	123	14.9	13.0, 17.0	21	10.1	5.9, 16.8	4	14.9	4.6, 38.8
Witnessed co-worker injury	103	9.7	8.3, 11.4	95	11.4	9.8, 13.3	5	2.3	0.8, 6.3	4	14.9	4.6, 38.8
Co-worker injury (not witnessed)	312	29.4	27.3, 31.7	302	36.4	33.7, 39.1	3	1.2	0.3, 5.6	8	30.0	14.9, 51.2
Callout child injury/death	540	50.9	48.1, 53.6	462	55.6	52.8, 58.4	70	34.0	26.5, 42.6	8	31.0	12.4, 58.9
Fire with single death	722	68.0	65.7, 70.3	665	80.1	77.7, 82.2	45	22.0	16.0, 29.4	12	47.2	23.2, 72.5
Fire with multiple deaths	211	19.9	17.9, 22.0	189	22.7	20.6, 25.1	19	9.5	5.8, 15.2	3	10.3	2.0, 39.1
MVA single death	877	82.6	80.1, 84.9	736	88.7	86.8, 90.4	127	61.8	52.4, 70.5	13	51.8	26.8, 75.9
MVA 2-4 deaths	507	47.8	45.2, 50.4	437	52.6	49.9, 55.3	54	26.3	19.4, 34.5	17	64.4	38.0, 84.2
MVA > 4 deaths	35	3.3	2.4, 4.3	32	3.9	2.9, 5.1	0	0.0	-	3	10.3	2.0, 39.1
Callout known casualty	261	24.6	22.3, 27.2	152	18.4	16.3, 20.6	105	51.3	42.2, 60.3	4	14.9	4.6, 38.8
Fire with multiple burn victims	387	36.5	34.0, 39.0	356	42.8	40.1, 45.6	29	14.3	9.0, 22.0	2	9.2	5.6, 14.9
Callout mental health concerns	735	69.3	66.6, 71.8	641	77.2	74.7, 79.5	77	37.5	29.1, 46.7	17	66.7	37.7, 86.9
CPR/full arrest resulting in death	514	48.4	45.6, 51.2	440	53.1	50.2, 55.9	68	33.0	25.1, 42.1	5	20.8	7.6, 45.4
Callout mutilated bodies	659	62.1	59.4, 64.8	578	69.6	66.9, 72.1	67	32.8	24.9, 41.9	14	54.1	30.3, 76.2
Casualty resembled self/family	181	17.1	15.1, 19.2	155	18.7	16.6, 21.0	23	11.0	6.8, 17.3	4	14.9	4.6, 38.8
Callout murder	262	24.7	22.6, 26.9	243	29.2	26.8, 31.8	15	7.4	4.0, 13.3	4	16.2	4.6, 43.6
Aided sexual assault victim	25	2.4	1.7, 3.4	20	2.4	1.7, 3.4	3	1.2	0.3, 5.6	3	10.3	2.0, 39.1
Callout completed suicide	664	62.6	60.0, 65.2	594	71.5	68.9, 74.0	64	31.0	23.3, 40.0	7	27.7	11.5, 53.0
Callout attempted suicide	612	57.7	54.8, 60.5	515	62.1	59.3, 64.8	82	40.0	31.3, 49.3	15	58.7	33.9, 79.8
Inappropriate dispatch	296	27.9	25.4, 30.5	258	31.1	28.6, 33.8	30	14.7	9.1, 22.9	7	27.7	11.5, 53.0
Adult DOA, natural cause	586	55.3	52.6, 57.9	515	62.1	59.3, 64.8	57	27.8	20.7, 36.1	14	54.1	30.3, 76.2
Direct exposure to chemicals	516	48.6	45.9, 51.3	463	55.8	52.9, 58.5	42	20.5	14.0, 29.1	11	41.3	20.2, 66.2
Callout industrial accident	562	53.0	50.2, 55.7	488	58.8	56.1, 61.5	63	30.6	23.0, 39.3	11	42.6	19.7, 69.1
Experienced career changing injury	87	8.2	6.9, 9.7	80	9.6	8.1, 11.4	7	3.5	1.5, 8.2	0	0.0	-
Received 3 rd degree burn	29	2.8	2.0, 3.7	27	3.2	2.4, 4.3	3	1.2	0.3, 5.6	0	0.0	-
Received head injury	58	5.5	4.4, 6.8	55	6.6	5.4, 8.2	0	0.0	-	3	11.5	2.1, 44.3

Workplace Exposures	All MFS			Male (Career) (n=830)			Male (Retained) (n=205)			Female (All) (n=26)		
	N	%	95% CI	N	%	95% CI	N	N	95% CI	N	%	95% CI
Received fracture	102	9.6	8.1, 11.3	84	10.1	8.5, 11.9	15	7.3	4.0, 13.1	3	11.5	2.1, 44.3
Received musculoskeletal strain	467	44.0	41.6, 46.5	435	52.4	49.6, 55.1	23	11.2	6.8, 17.8	10	36.9	18.7, 59.9
Callout adolescent injury/death	441	41.6	39.0, 44.2	385	46.4	43.7, 49.2	43	21.2	15.0, 29.0	13	49.5	26.8, 72.4
Bystanders distressed/interfering	724	68.3	65.5, 70.9	621	74.8	72.3, 77.2	90	43.7	34.9, 53.0	14	54.1	30.3, 76.2
Callout prominent media	868	81.8	79.4, 84.0	749	90.2	88.4, 91.8	99	48.2	39.0, 57.5	21	79.5	59.4, 91.1
Threats or fear of violence	503	47.4	44.6, 50.3	411	49.5	46.7, 52.4	76	37.1	29.0, 46.0	16	62.1	34.3, 83.6
Removed body from MVA	398	37.5	34.9, 40.2	346	41.7	39.0, 44.4	45	22.0	15.3, 30.5	7	27.7	11.5, 53.0
Body removal with other agencies	586	55.2	52.3, 58.0	498	60.1	57.3, 62.8	74	36.2	27.7, 45.6	13	49.5	26.8, 72.4
Physically at risk	492	46.3	43.6, 49.1	429	51.6	48.8, 54.4	50	24.2	17.4, 32.5	13	51.8	26.8, 75.9
Direct exposure bodily fluids	497	46.9	44.1, 49.6	434	52.3	49.5, 55.1	51	24.7	17.6, 33.5	12	47.2	23.2, 72.5
Significant operational problems	592	55.8	53.0, 58.5	518	62.4	59.6, 65.1	62	30.0	22.3, 39.1	12	47.2	23.2, 72.5
Prolonged contact with casualty	531	50.0	47.3, 52.8	456	54.9	52.1, 57.7	58	28.4	20.9, 37.3	17	65.6	47.9, 79.9
Community natural disaster	535	50.5	47.6, 53.3	437	52.6	49.8, 55.4	84	40.7	32.5, 49.6	15	58.7	33.9, 79.8

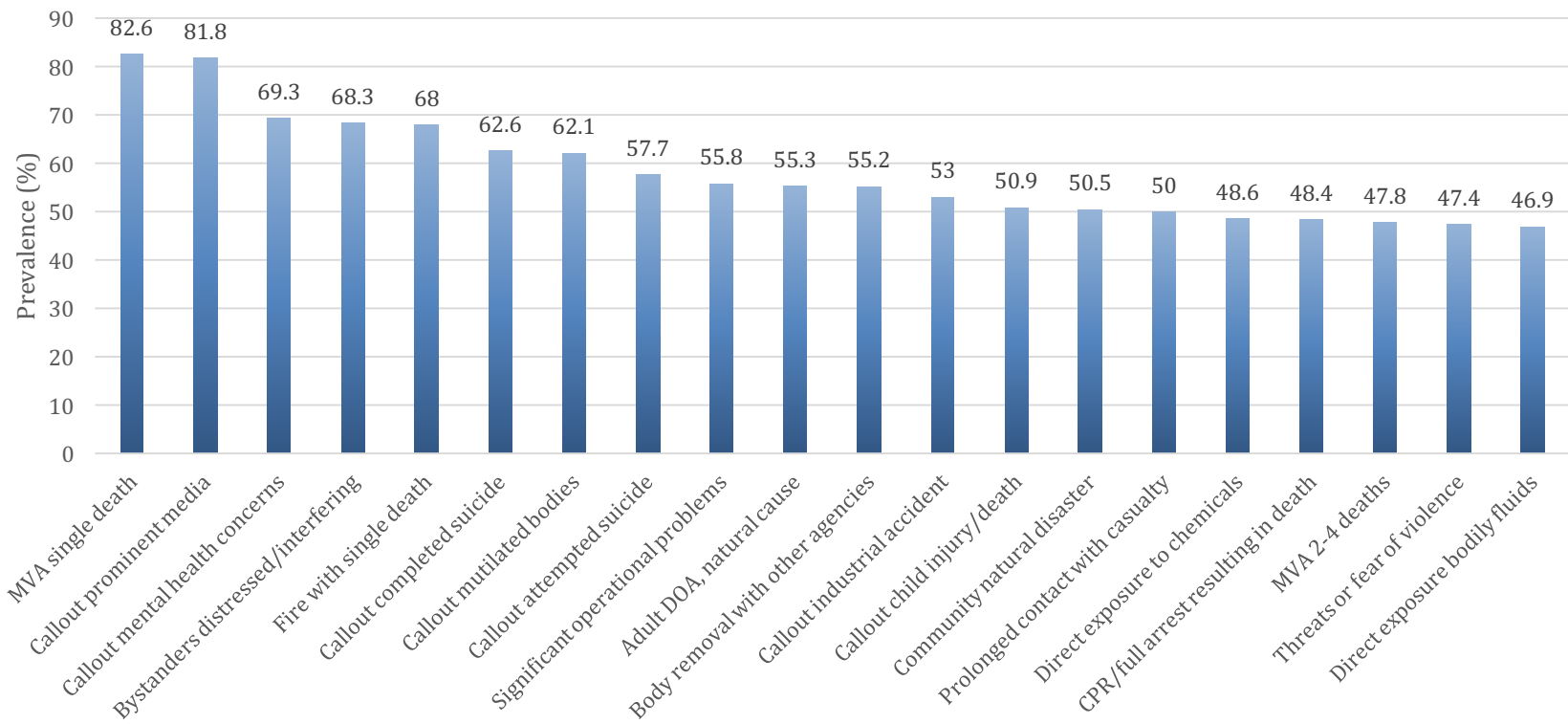


Figure A.1. Estimated prevalence of Workplace exposures in the MFS (Top 20)

Table A.22: Occupational stressors in the MFS

Sources of Occupational Stress	All (n=1061)			Male (Career) (n=830)			Male (Retained) (n=205)			Female (All) (n=26)		
	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
Work personality conflicts	744*	70.1	67.3, 72.7	614*	74.0	71.4, 76.4	107	52.1	42.7, 61.2	23	88.5	55.7, 97.9
Threats to personal safety	389*	36.7	34.0, 39.5	321*	38.7	36.0, 41.5	57	27.7	20.2, 36.9	11	41.5	22.6, 63.4
Sensory recollection of injured/dying	467*	44.0	41.2, 46.9	384*	46.3	43.5, 49.2	70	34.0	25.7, 43.4	13	48.5	30.5, 66.8
Conflicts with public	498*	46.9	44.1, 49.8	411*	49.5	46.6, 52.3	69	33.8	25.6, 43.2	18	69.0	41.1, 87.6
Poor diet	650*	61.2	58.4, 64.0	535*	64.4	61.7, 67.1	97	47.6	38.4, 56.9	18	68.0	40.9, 86.7
Job security worries	537*	50.6	47.6, 53.5	418*	50.4	47.5, 53.2	104	50.6	41.3, 59.8	15	57.4	30.9, 80.3
Conflict with peer ranks	609*	57.4	54.5, 60.3	491*	59.2	56.3, 61.9	96	46.9	37.7, 56.3	22	85.1	61.2, 95.4
Too much responsibility	573*	54.0	51.0, 56.9	458*	55.2	52.3, 58.0	99	48.5	39.3, 57.8	15	58.7	33.9, 79.8
Concerns re retirement	621*	58.5	55.7, 61.3	528*	63.6	60.9, 66.23	80	39.2	30.6, 48.5	12	47.2	23.2, 72.5
Lack of control over victim injuries	465*	43.8	41.0, 46.7	390*	47.0	44.2, 49.9	62	30.3	22.5, 39.6	12	47.2	23.2, 72.5
Discrimination	450*	42.4	39.6, 45.3	367*	44.2	41.4, 47.1	65	31.9	23.9, 41.2	18	68.0	40.9, 86.7
Worries re handling mass casualties	506*	47.7	44.7, 50.6	405*	48.8	46.0, 51.7	85	41.5	32.6, 51.0	15	58.7	33.9, 79.8
Poor sleep quality	812*	76.5	73.9, 79.0	668	80.5	78.2, 82.7	120	58.7	49.3, 67.5	23	89.7	60.9, 98.0
Anxious/demanding colleague	592*	55.8	52.8, 58.7	483*	58.2	55.4, 61.0	96	46.6	37.4, 56.0	13	51.8	26.8, 75.9
Informing loved ones of injury/death	354*	33.4	30.7, 36.2	272*	32.8	30.1, 35.5	71	34.8	26.6, 44.1	11	42.6	19.7, 69.1
No control over work schedule	589*	55.6	52.6, 58.5	468*	56.4	53.6, 59.2	105	51.2	41.9, 60.5	16	63.3	37.4, 83.3
Pay-related financial strain	557*	52.5	49.6, 55.4	442*	53.3	50.5, 56.1	95	46.5	37.4, 55.9	19	74.9	55.6, 87.6
Inability to predict/control	532*	50.2	47.2, 53.1	427*	51.4	48.6, 54.2	93	45.6	36.5, 54.9	12	47.2	23.2, 72.5

Sources of Occupational Stress	All (n=1061)			Male (Career) (n=830)			Male (Retained) (n=205)			Female (All) (n=26)		
	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
Concerns re latest technology	614*	57.9	55.0, 60.6	517*	62.3	59.6, 65.0	76	37.2	28.8, 46.5	20	78.2	46.2, 93.7
Dangerous/violent people	513*	48.4	45.5, 51.3	418*	50.3	47.5, 53.2	80	38.8	30.1, 48.3	16	62.1	34.3, 83.6
Being in emergency vehicle	592*	55.8	53.0, 58.6	507*	61.0	58.2, 63.8	66	32.4	24.3, 41.8	19	73.6	44.0, 90.8
Lack of novelty/boredom	536*	50.5	47.6, 53.3	453*	54.6	51.7, 57.4	68	33.2	25.0, 42.5	15	56.4	30.5, 79.2
Harassment	397*	37.5	34.7, 40.3	323*	38.9	36.2, 41.7	58	28.3	20.6, 37.5	16	63.3	37.4, 83.3
Cuts to force/budget	660*	62.2	59.3, 65.0	526*	63.4	60.6, 66.1	115	55.9	46.7, 64.8	19	73.6	44.0, 90.8
Substandard equipment	663*	62.4	59.6, 65.2	531*	64.0	61.2, 66.7	112	54.9	45.5, 63.9	19	72.3	47.0, 88.5
Dislike duties	514*	48.4	45.6, 51.3	440*	53.0	50.2, 55.9	60	29.3	21.5, 38.6	13	51.8	26.8, 75.9
Inadequate sleep at work	559*	52.7	50.0, 55.4	497*	59.8	57.0, 62.6	47	23.0	16.0, 31.9	15	57.7	39.0, 74.4
Perfectionism concerns	696*	65.6	62.8, 68.3	575*	69.2	66.6, 71.8	100	48.9	39.8, 58.1	21	79.5	59.4, 91.1
Concern re meeting MFS standards	729*	68.7	65.9, 71.4	576*	69.4	66.7, 72.0	132	64.6	55.3, 72.9	20	78.2	46.2, 93.7
Concern re inadequate skills	745*	70.2	67.5, 72.8	592*	71.3	68.7, 73.8	127	61.9	52.5, 70.5	26	100.0	., .
Thoughts re disturbing events	579*	54.6	51.7, 57.4	474*	57.1	54.2, 59.8	88	42.7	34.0, 51.9	18	68.0	40.9, 86.7
Increased personal risk	583*	55.0	52.1, 57.8	488*	58.8	56.0, 61.6	79	38.4	29.8, 47.8	16	63.3	37.4, 83.3
Observing co-worker stress	645*	60.8	57.9, 63.5	512*	61.7	58.9, 64.4	110	53.5	44.4, 62.4	23	89.7	60.9, 98.0
Unnecessary meetings	518*	48.8	45.9, 51.7	50	49.0	47.2, 52.8	85	41.5	32.6, 51.0	18	68.0	40.9, 86.7
Difficulties relaxing at work	559*	52.7	49.58, 55.5	466*	56.1	53.3, 58.9	78	38.1	29.5, 47.4	15	56.4	30.5, 79.2
Worries re team competence	557*	52.5	49.5, 55.4	431*	52.0	49.1, 54.8	106	51.7	42.4, 61.0	19	74.6	44.0, 90.8
Dislike routine paper work	631*	59.5	56.6, 62.3	501*	60.3	57.5, 63.1	111	54.2	44.9, 63.3	19	73.6	44.0, 90.8
Lack of camaraderie	600*	56.6	53.7, 59.5	474*	57.1	54.2, 59.9	110	53.8	44.4, 62.9	16	63.3	37.4, 83.3

Sources of Occupational Stress	All (n=1061)			Male (Career) (n=830)			Male (Retained) (n=205)			Female (All) (n=26)		
	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
Concerns re inadequate training	734*	69.2	66.4, 71.8	582*	70.1	67.4, 72.6	132	64.2	54.9, 72.6	20	78.2	46.2, 93.7
Substandard crew member	671*	63.3	60.4, 66.1	537*	64.7	62.0, 67.3	115	56.1	46.6, 65.1	19	73.6	44.0, 90.8
Conflict with senior ranks	572*	53.9	51.0, 56.8	460*	55.4	52.6, 58.2	95	46.4	37.3, 55.7	16	63.3	37.4, 83.3
Sleep disruption	706*	66.5	63.7, 69.2	574*	69.2	66.5, 71.8	109	53.4	44.1, 62.4	22	85.1	61.2, 95.4
Feel isolated from family	613*	57.7	54.8, 60.6	494*	59.5	56.7, 62.3	99	48.4	39.1, 57.8	19	74.9	55.6, 87.6
Exposure to death/dying	519*	48.9	46.0, 51.8	440*	53.1	50.2, 55.9	66	32.1	24.0, 41.5	12	47.2	23.2, 72.5
Conflicts with lower ranks	531*	50.0	47.1, 53.0	421*	50.7	47.8, 53.5	91	44.5	35.5, 53.9	19	73.6	44.0, 90.8
Carry-over family stress	623*	58.8	55.9, 61.6	515*	62.0	59.3, 64.8	85	41.5	32.6, 51.0	23	89.7	60.9, 98.0
Management/labour conflicts	503*	47.4	44.5, 50.3	416*	50.1	47.3, 53.0	73	35.9	27.4, 45.2	13	51.8	26.8, 75.9
Over-reliance on team work	447*	42.1	39.3, 45.0	370*	44.5	41.7, 47.4	65	31.8	23.9, 40.9	12	47.2	23.2, 72.5
Concern re making mistakes	779*	73.5	70.8, 75.9	622*	75.0	72.4, 77.4	132	64.5	55.4, 72.7	25	95.4	89.9, 98.0
Conveying tragic news to survivors	389*	36.6	33.9, 39.5	305*	36.8	34.1, 39.5	74	35.9	27.6, 45.0	10	38.0	16.4, 65.7
Exposure to injury/mutilation	534*	50.3	47.4, 53.2	445*	53.6	50.8, 56.4	72	35.3	26.8, 44.7	16	63.3	37.4, 83.3
Concerns re personal injury/death	557*	52.5	49.6, 55.4	453*	54.6	51.8, 57.4	86	41.7	32.9, 51.1	18	69.0	41.1, 87.6
Loss of sleep	715*	67.4	64.5, 70.0	579*	69.7	67.0, 72.3	113	54.9	45.6, 63.9	23	89.7	60.9, 98.0
Carry-over stress from second job	451*	42.5	39.6, 45.4	325*	39.2	36.5, 42.0	109	53.4	44.0, 62.6	16	62.1	34.3, 83.6
Lack of exercise	702*	66.1	63.3, 68.8	555*	66.9	64.2, 69.5	124	60.6	51.1, 69.3	22	85.1	61.2, 95.4
Equipment	596*	56.2	53.3, 59.1	490*	59.0	56.2, 61.8	93	45.6	36.5, 54.9	13	51.8	26.8, 75.9
Reduction in force/benefits/ wages	612*	57.7	54.8, 60.6	508*	61.3	58.5, 64.0	91	44.2	35.3, 53.6	13	51.8	26.8, 75.9

*Margin of error 20-39

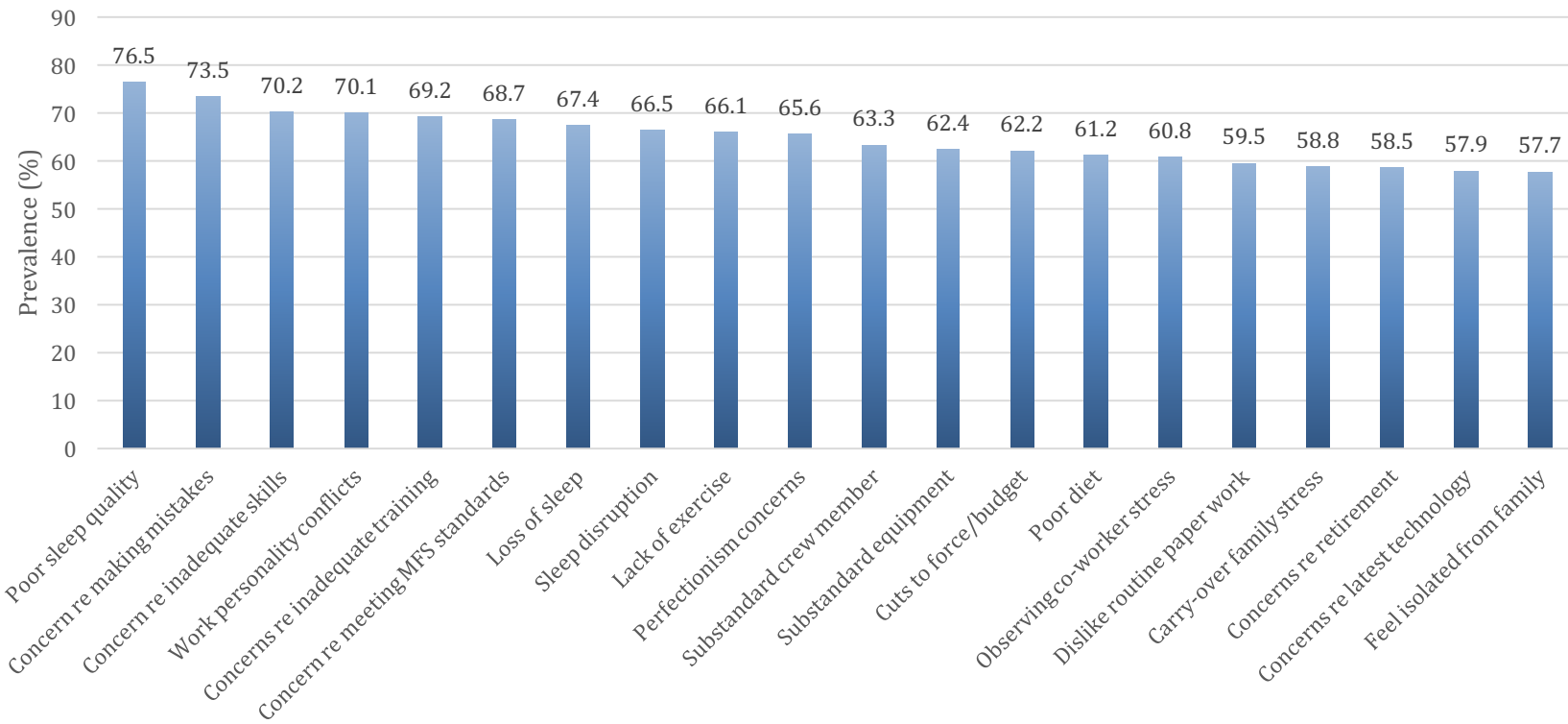


Figure A.2: Occupational stressors in the MFS

Annex B: Additional Sections of the Survey not included in this Report

MFS separation details.

Members who indicated in the survey that they had transitioned out of the service were asked a series of questions pertaining to their separation including the year they ceased employment, and whether they left on workers compensation or after prolonged sick leave. Participants were also provided with a comprehensive list of reasons for leaving the MFS and were asked to indicate how much influence each one of the proposed factors had on their decision to leave. These items were based on current exit surveys utilised by the MFS and ADF.

Family.

Participants were asked a series of questions about their relationship and household status, children, satisfaction with family relationships, and financial hardships. Items in this section of the survey were taken from various sources including the Household, Income and Labour Dynamics in Australia (HILDA) Survey (Watson & Wooden, 2001) the Australian Institute of Family Studies and the Gulf War Veterans Health Study (Sim et al., 2003).

Support.

In this section of the survey participants were asked to indicate the level of personal support they had received from their spouse/partner, family, friends and co-workers. These items were taken from the Intergenerational Health Effects of Service in the Military Study (Centre for Military and Veterans Health, 2007) and modified to suit the current population. Participants also completed an adapted version of the Schuster Social Support Scale (Schuster, 1990) which assessed their relationships with members of their workplace/crew and their immediate supervisors.

Risk and resilience behaviour.

In this section of the survey, participants were asked a series of questions relating to risky driving behaviour, problem gambling and resilience. Items examining risky driving were sourced either from the Australian Institute of Family Studies (Smart, 2005) or developed by the CTSS and looked specifically at speeding/speeding offences, loss of license, DUI offences and reckless driving offences. Problem gambling behaviour was assessed via the Problem Gambling Severity Index (PGSI) (Ferris, 2001). The PGSI is a widely used nine-item scale for measuring the severity of gambling problems in the general population. Each item is scored from 0 to 3. The higher the total score, the greater the risk that an individual's gambling is a problem. Resilience was assessed via an abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2 (Vaishnavi et al., 2007).

Recent life events.

Participants were asked to complete a modified, 15-item version of the List of Threatening Experiences (Brugha et al., 1985). This brief questionnaire is frequently used to assess recent stressful life events.

Depression –Patient Health Questionnaire (PHQ-9).

Self-reported depression was examined using the PHQ 9 (Kroenke et al., 2001). The 9 items of the scale are scored from 0-3 and summed to give a total diagnostic severity score between 0 and 27.

Anxiety – Patient Health Questionnaire (PHQ).

The PHQ is a self-report inventory that is used as a screening and diagnostic tool for mental health disorders of depression, anxiety, alcohol, eating, and somatoform. Only the anxiety module of the full PHQ was utilised in the current questionnaire.

Generalized Anxiety Disorder – Generalised Anxiety Disorder 7 (GAD-7).

Generalised anxiety disorder was measured via the GAD-7 (Spitzer, 2006). Each of the 7 items is scored from 1 to 3, providing a total generalized anxiety score ranging between 0 and 21.

Anger – Dimensions of Anger Reactions 5 (DAR-5).

The DAR- 5 (Forbes, 2004) is a concise measure of anger. It consists of five items which address anger frequency, intensity, duration, aggression and interference with social functioning. Items are scored on a 5-point Likert scale generating a severity score ranging from 5 to 25 with higher scores indicative of worse symptomatology.

Somatic symptoms – Patient Health Questionnaire 15 (PHQ-15).

The PHQ-15 (Kroenke, 2002) is a somatic symptom severity scale that comprises 15 items from the PHQ, each of which is scored from 0 to 2, providing a total severity score of between 0 and 30. PHQ-15 scores of 5, 10, 15, represented cut-off points for low, medium, and high somatic symptom severity, respectively

Experience with physical violence.

This section of the questionnaire examined participants' experiences with exhibiting and threatening physical violence. Items were developed by the CTSS study team in 2010 for the Mental Health Prevalence Wellbeing Study (McFarlane et al., 2011).

Physical health.

Self-perceived insomnia was examined via the Insomnia Severity Index (ISI)(Bastien et al., 2001). The ISI comprises seven items assessing the severity of sleep-onset and sleep maintenance difficulties, satisfaction with current sleep pattern, interference with daily functioning, noticeability of impairment attributed to the sleep problem, and degree of distress or concern caused by the sleep problem. Each item is rated on a 0–4 scale and the total score ranges from 0 to 28. A higher score suggests more severe insomnia.

Treatment seeking.

This series of questions looked at mental health concerns and/or problems, the effect of mental health on individuals' MFS careers, help seeking behaviours and strategies, healthcare/treatment utilisation to inform/assess or manage mental health, satisfaction with services received and finally any barriers and/or stigmas to care. Items in this section were derived from several sources including the CIDI (Kessler & Ustun, 2004).

Twelve month and lifetime ICD-10 mental disorders

Past year and lifetime ICD-10 rates of the following mental disorders were assessed using the CIDI 3.0: adult separation disorder, suicidality, and intermittent explosive disorder.

Substance use.

Drug use was measured via the CIDI(Kessler & Ustun, 2004). Additional items adapted from the 1998 Adverse Childhood Experiences (ACE) Study (Felitti et al., 1998) were also included in this section of the survey.

